CHAPTER TWO
Demand and Supply: An Introduction

LEARNING OBJECTIVES

This chapter will enable you to:

LO1 Explain the concept of demand.

LO2 Explain the concept of supply.

LO3 Explain the term the market.

LO4 Understand the concept of (price and quantity) equilibrium.

LO5 Understand the causes and effects of a change in demand.

LO6 Understand the causes and effects of a change in supply.

LO7 Understand why demand and supply determine price and the quantity traded and not the reverse.

What’s ahead...

This chapter introduces you to the fundamental economic ideas of demand and supply. It explains the distinction between individual and market demand and looks at the various reasons why the demand for products changes from time to time. We then take a look at things from the producers’ point of view and explain what determines the amounts that they put on the market. Next we explain how markets are able to reconcile the wishes of the two groups, and we introduce the concept of equilibrium. Finally, we look at how the market price and the quantity traded adjust to various changes.

A QUESTION OF RELEVANCE...

Have you ever wondered why the prices of some products, like computers or CD players, tend to fall over time, while the prices of other products, such as cars or auto insurance, tend to rise? Or perhaps you wonder how the price of a house can fluctuate tens of thousands of dollars from year to year. Why does a poor orange harvest in Florida cause the price of apple juice made in Ontario to rise? And why do sales of typewriters continue to fall, despite their lower prices? This chapter will give you insights into questions like these.
If the average person were to think about the subject matter of economics, it is unlikely that she would immediately think of choice or opportunity costs, which was a principal topic of Chapter 1. More likely, she would think in terms of money or interest rates and, almost certainly, demand and supply. Most people realize, without studying the topic, that demand and supply are central to economics. In our own ways, and as a result of our experiences in life, most of us feel that we know quite a lot about the subject. After all, who are better experts on the reaction of consumers to changes in the market than consumers themselves? However, as we will see shortly, the way that economists define and use the terms “demand” and “supply” differs from the everyday usage. To make matters worse, there doesn’t seem to be a consensus among non-economists about the meaning of either of these two words: there is a range of meaning. This is often the case with language, but it does lead to a great deal of confusion, which can be illustrated in the following exchange between two observers of the housing market:

Isn’t it shocking that house prices have increased so much in the past year? It makes it very difficult for first-time buyers to get into the market.

Well, yes, but that’s the law of demand. Presumably builders can get away with charging a higher price as long as people are willing to pay.

Are you suggesting that the demand for new houses has increased, then?

Yes, it must have.

But surely, higher prices are going to lead to a lower demand. I thought that was the law of demand!

Well, yes. But, don’t you see, a lower demand will lead to lower prices.

And lower prices to a higher demand…

What’s happening here? There seems to be some confusion, but what is causing it? Is it because neither of the speakers know what they are talking about? Well, that’s a possibility, of course. But more likely the root cause of the confusion surrounds that simple word “demand.” As we shall see, demand is being used in two different ways, and neither speaker is aware of this. It’s probably clear to you already that economists are very fussy about defining and using economic terms correctly, and this is particularly true in a discussion about demand and supply. Demand doesn’t simply mean what people want to buy, nor is supply just the amount being produced. Besides the problem of definitions, another source of confusion in the above discussion is a misunderstanding of cause and effect: is the change in house prices the effect of changing demand, or is it the cause? This chapter will clear up some of the confusion and give us a basis upon which to analyze and clarify some real, practical problems. First, let us take a look at the concept of demand.

2.1 Demand

**LO 1**

Explain the concept of demand.

**Demand:** the quantities that consumers are willing and able to buy per period of time at various prices.

**Individual Demand**

There are several dimensions to the term demand. First, economists use the word not in the sense of commanding or ordering but in the sense of wanting something. However, this want also involves the ability to buy. In other words, demand refers to both the desire and the ability to purchase a good or service. This means that although I may well have a desire for a new top-of-the-line BMW, I unfortunately don’t have the ability to buy one at current prices, and therefore my quantity demanded is zero.
Second, even though we know there are many factors that determine what products and what quantities a consumer purchases, economists would suggest that the price is usually the most important of these, and for this reason they look at how consumers might react to a change in the price assuming that all other factors remain unchanged. The Latin phrase for this perspective is *ceteris paribus*, which literally means “other things being equal.” However, it is usually interpreted by economists to mean “other things remaining the same.” In other words, demand is the relationship between the price of a product and the quantities demanded, *ceteris paribus*.

Third, demand is a hypothetical construct that expresses this desire and ability to purchase, not at a single price, but over a range of hypothetical prices. Finally, demand is also a flow concept, in that it measures quantities over a period of time. In summary, demand:

- involves both the consumers’ desire and ability to purchase
- assumes that other things are held constant
- refers to a range of prices
- measures quantities over time

All of these aspects of demand are captured in Table 2.1, which shows the demand schedule for an enthusiastic beer drinker named Tomiko.

<table>
<thead>
<tr>
<th>Price per Case</th>
<th>Quantity Demanded (Number of Cases per Week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12</td>
<td>6</td>
</tr>
<tr>
<td>$13</td>
<td>5</td>
</tr>
<tr>
<td>$14</td>
<td>4</td>
</tr>
<tr>
<td>$15</td>
<td>3</td>
</tr>
<tr>
<td>$16</td>
<td>2</td>
</tr>
<tr>
<td>$17</td>
<td>1</td>
</tr>
<tr>
<td>$18</td>
<td>0</td>
</tr>
</tbody>
</table>

Once again, what we mean by demand is the entire relationship between the various prices and the quantities that people are willing and able to purchase, and this relationship can be laid out in the form of a demand schedule. The above schedule shows the amounts per week that Tomiko is willing and able to purchase at the various prices shown. Note that there is an *inverse* relationship between the price and quantity. This simply means that at higher prices Tomiko would not be willing to buy as much as at lower prices. In other words:

- The higher the price, the lower the quantity demanded; and the lower the price, the higher the quantity demanded.

Another, though less obvious, statement of this law of demand is to say that in order to induce Tomiko to buy a greater quantity of beer, the price must be lower. Tomiko’s demand schedule is graphed in Figure 2.1.

In Figure 2.1, at a price of $15 per case, the quantity demanded by Tomiko is 3 cases per week, while at a lower price of $12 per case, she would be willing to buy 6 cases. The demand is therefore plotted as a downward-sloping curve. (To economists, curves include straight lines!) Once again, note that when we use the terms “demand,” or “demand schedule,” or “demand curve,” we are referring to a whole array of different prices and quantities.
It is very important for you to note that since the price of any product is part of what we call the “demand” for that product, a change in the price cannot change the demand. Certainly it can affect the amounts we are willing to purchase, and we express this by saying that:

A change in the price of a product results in a change in the quantity demanded for that product.

This is illustrated in Figure 2.2. Graphically, as we move down the demand curve, the quantity demanded increases; as we move up the demand curve, the quantity demanded decreases.
Why Is the Demand Curve Downward-Sloping?

There are a number of rationales for the proposition that people tend to buy more at lower rather than at higher prices. Most of us can confirm from our own experience that a lower price will induce us to buy more of a product or to buy something that we would or could not purchase before. Witness the big crowds that are attracted to nothing more than a sign saying, “SALE.” In addition, most microeconomic research done over the years tends to confirm this law of demand, and theories of consumer behaviour (such as the marginal utility theory, which we will study in Chapter 5) lend additional support to the idea.

Let’s begin our exploration of the question of why people tend to buy more at lower prices. Remember that our demand for products is a combination of our desire and our ability to purchase. A lower price affects both of these. The lower the price of a product, the more income a person has left to purchase additional products.

Let’s explain this by assuming, for instance, that the price of beer in Table 2.1 was $14, and Tomiko was buying 4 cases per week, for a total expenditure of $56 per week. Next, let’s say the price decreases to $12. Tomiko could, if she wished, buy the same quantity for an outlay of $48, thus saving a total of $8. It’s almost as if Tomiko had received a pay raise of $8. In fact, in terms of its effect on Tomiko’s pocketbook, it is exactly the same. Or, as economists would express it, her real income has increased. A decrease in price means that people can afford to buy more of a product (or more of other products) if they wish. This is referred to as the income effect of a price change, and it affects people’s ability to purchase. This is because a lower price means a higher real income, and as a result people will tend to buy more of a product. (Conversely, an increase in the price would effectively reduce people’s real income.)

In addition to this, a price change also affects people’s desire to purchase. We are naturally driven to buy the cheaper of competing products, and a drop in the price of one of them increases our desire to substitute it for the now relatively more expensive product. For instance, if the price of wine were to drop (or for that matter, if the price of beer were to increase), then some beer drinkers might well switch to what they regard as a cheaper substitute. In general, there are substitutes for most products, and people will tend to substitute a relatively cheap product for a more expensive one. This is called the substitution effect. A higher price, on the other hand, tends to make the product less attractive to us than its substitutes, and so we buy less of it.

When the price of a product drops, we will buy more of it because we are more able (the income effect) and because we are more willing (the substitution effect). Conversely, a price increase means we are less able and less willing to buy the product, and therefore we buy less. (There is a possible exception to this, which we will look at in the next chapter.)

The close relationship that exists between the price and the quantity demanded is so pervasive that it is often referred to as the law of demand.

real income: income measured in terms of the amount of goods and services that it will buy. Real income will increase if either actual income increases or prices fall.

income effect: the effect that a price change has on real income, and therefore on the quantity demanded of a product.

substitution effect: the substitution of one product for another as a result of a change in their relative prices.
Market Demand

Up to this point, we have focused on individual demand. Now we want to move to market demand (or total demand). Conceptually, this is easy enough to do. By summing every individual’s demand for a product, we are able to obtain the market demand. Table 2.2 provides a simple example.

### Table 2.2

<table>
<thead>
<tr>
<th>Price per Case</th>
<th>Tomiko’s Demand</th>
<th>Meridith’s Demand</th>
<th>Abdi’s Demand</th>
<th>Jan’s Demand</th>
<th>Market Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>13</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>14</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>15</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Let’s say we know not only Tomiko’s demand but also the demands of three other friends in a small, four-person economy. The market demand then is the horizontal summation of individual demands, which simply means that to find the quantities demanded at $12 we add the quantities demanded by each individual, that is, $6 + 3 + 4 + 9 = 22$. The same would be done for each price level. This particular market demand is graphed in Figure 2.3. Note that this demand curve, which is the summation of the specific numbers of the four people in Table 2.2, is not a straight line. Yet, it is still downward-sloping and so conforms to the law of demand. For the most part we will work with straight-line demand curves, although there is no reason to assume that all real-life demand curves plot as straight lines.

### Figure 2.3

At a price of $12, the total or market quantity demanded equals 22 cases. As with individual demand, when the price increases to $16, then the quantity demanded will drop, in this case to 6. This is because at a higher price, each individual buys less, and in addition there are fewer people who can afford to or are willing to buy any at all. (Meridith has dropped out of the market.)
Note that, as with the individual demand curve, the market demand curve also slopes downward. This is because not only do people buy more as the price drops, but in addition more people buy. At a price of $18 in our example, only Abdi would buy any beer. As the price drops to $16, not only would Abdi buy beer, but so too would Tomiko and Jan. The price would need to drop to $14 to induce all four people to buy beer.

Finally, before we take a look at the supply side of the market, note again that our demand schedule tells us only what people might buy; it tells us nothing about what they are actually buying, because to know this we also need to know the actual price. And to find out what the actual price of beer is, we need to know…yes, the supply.

**SELF-TEST**

1. The data in the next table indicates the weekly demand for litres of soy milk by Al, Bo, and Cole (the only three people in a very small market).

   a) Fill in the blanks in the table.

   b) What is the basic shape of the demand curve in this market?

   c) What is the total quantity demanded at a price of $2.50?

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity Demanded: Al</th>
<th>Quantity Demanded: Bo</th>
<th>Quantity Demanded: Cole</th>
<th>Total (market) Quantity Demanded:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$4.00</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3.50</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2.50</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**2.2 Supply**

**LO2**

Explain the concept of supply and demand.

**supply**: the quantities that producers are willing and able to sell per period of time at various prices.

**supply schedule**: a table showing the various quantities supplied per period of time at different prices.

**Individual Supply**

In many ways the formulation of supply is very similar to that of demand. Both measure hypothetical quantities at various prices, and both are flow concepts. However, we now need to look at things through the eyes of the producer, rather than the consumer. We will assume for the time being that the prime motive for the producer is to maximize profits, although we will examine this assumption in more detail in a later chapter. For now we can certainly agree with Adam Smith who, in *The Wealth of Nations*, noted that few producers are in business to please consumers, nor, of course, do consumers buy products to please producers. Both are motivated, instead, by self-interest.

The term **supply** refers to the quantities that suppliers are **willing and able** to make available to the market at various different prices. **Table 2.3** shows a hypothetical **supply schedule** for Bobbie the brewer.
Note that there is a direct relationship between the price and the quantity supplied, which means that a higher price will induce Bobbie to produce more. Remember that Bobbie’s reason for being in business is to make as much profit as possible. Suppose that Bobbie was asked how much she will, hypothetically, be prepared to supply if the beer could be sold at $12 per case. Knowing what her costs are likely to be, she figures that she could make the most profit if she produces 2 cases. At a higher price, there is a likelihood of greater profits, and therefore she is willing to produce more. Also, as we shall see in Chapter 6, as firms produce more, often the cost per unit tends to rise and therefore the producer needs the incentive of a higher price in order to increase production. For the time being, however, we can rely on the proposition that a higher price means higher profits and therefore will lead to higher quantities produced. This is illustrated in Figure 2.4.

Joining together the individual points from the supply schedule in Table 2.3 gives us the upward-sloping supply curve shown in Figure 2.4. Again, we emphasize the fact that, as with the term “demand,” the term “supply” does not refer to a single price and quantity, but to the whole array of hypothetical price and quantity combinations contained in the supply schedule and illustrated by the supply curve.
Since price is part of what we mean by the term supply, a change in the price level cannot change the supply. A change in price does of course lead to a change in the quantity that a producer is willing and able to make available. Thus, the effect of a change in price we call a change in the quantity supplied. This is illustrated in Figure 2.5.

**FIGURE 2.4** Individual Supply Curve

At a low price of $12, the most profitable output for Bobbie is 2 cases. If the price increased, she would be willing and able to produce more, since she would be able to make greater profits. At $18, for instance, the quantity she would produce increases to 8 cases.

**change in the quantity supplied**: the change in the amounts that will be produced as a result of a price change. This is shown as a movement along a supply curve.

Since price is part of what we mean by the term supply, a change in the price level cannot change the supply. A change in price does of course lead to a change in the quantity that a producer is willing and able to make available. Thus, the effect of a change in price we call a change in the quantity supplied. This is illustrated in Figure 2.5.

**FIGURE 2.5** Changes in the Quantity Supplied

If the price changes, it will lead to a movement along the supply curve. An increase in the price from, say, $P_1$ to $P_2$ will cause an increase in the quantity supplied from $Q_1$ to $Q_2$. A decrease in the price from $P_3$ to $P_4$ will lead to a decrease in the quantity supplied from $Q_3$ to $Q_4$. The supply curve itself, however, does not change.
To summarize:

An increase in the price will lead to an increase in the quantity supplied and is illustrated as a movement up the supply curve.

A decrease in the price will cause a decrease in the quantity supplied, which is illustrated as a movement down the supply curve.

Market Supply

As we did with the market demand, we can derive the market supply of a product by summing the supply of every individual supplier. A word of caution, however, is in order. We must make the necessary assumption that the producers are all producing a similar product and that consumers have no preference as to which supplier or product they use. Given this, it is possible to add together the individual supplies to derive the market supply. In our example, suppose that Bobbie the brewer is competing with three other brewers of similar size and with similar costs. The market supply of beer in this market would be as shown in Table 2.4.

### Table 2.4 Deriving the Market Supply

<table>
<thead>
<tr>
<th>Price per Case</th>
<th>Bobbie the Brewer's Supply</th>
<th>Supply of Other Brewers</th>
<th>Market Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>13</td>
<td>3</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>14</td>
<td>4</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td>15</td>
<td>20</td>
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<tr>
<td>16</td>
<td>6</td>
<td>18</td>
<td>24</td>
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<tr>
<td>17</td>
<td>7</td>
<td>21</td>
<td>28</td>
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<tr>
<td>18</td>
<td>8</td>
<td>24</td>
<td>32</td>
</tr>
</tbody>
</table>

The total quantities supplied by the three other brewers are equal to the quantities that Bobbie would supply at each price, multiplied by three. The fourth column, market supply, is the addition of every brewer’s supply, that is, the second column plus the third column.

The market supply of beer is illustrated in Figure 2.6.

The market supply curve is upward-sloping primarily for the same reason the individual supply curve is upward-sloping: because higher prices imply higher profits and will therefore induce a greater quantity supplied. But there is an additional reason. In the example we have used, we assumed for simplicity’s sake that the suppliers are of similar size and have similar costs. In reality that’s unlikely: costs and size are likely to differ, so that a price which generates a profit for one firm may mean a loss for another. As the price of a product increases, however, some firms that were previously unable to produce will now find that they can successfully operate at a profit. Thus, as the price of the product increases, currently operating firms will produce more. In addition, other firms not previously producing will enter the market and start to produce.
In summary, then, a higher price, which deters consumers from buying more, is an incentive for suppliers to produce more. Conversely, a lower price induces consumers to buy more but is a reason for suppliers to cut back their output.

The motives of consumers and producers are very divergent, the former wishing to obtain the lowest price possible, the latter wanting to sell at the highest. How can their wishes converge? How is trade possible in these circumstances? Well, if the question means: is it possible for all prospective consumers and suppliers to be satisfied, the answer must be no. If the question means: is it possible for some of these people to be satisfied, the answer will, almost always, be yes. Of course, this will require that they be able in some sense to meet and get together. A market enables them to do just that.

Most people are able to understand the terms market price and market demand, but many are not clear as to what constitutes a market. Certainly the term includes places that have a physical location, such as a local produce or fish market. But, in broader terms, a market really refers to any exchange mechanism that brings buyers and sellers of a product together. There may be times when we feel that we need to inspect or get further on-the-spot information about a product before we buy it, and this is the purpose of the retail market. But there are other times when we possess sufficient information about a product or a producer that it’s not necessary to actually see either of them before we purchase. This applies, for instance, if you wish to buy stocks and bonds or make a purchase on the Internet. Increasingly, in these days of higher costs of personal service and greater availability of electronic communication, markets are becoming both wider and more accessible. The market for commodities such as copper, gold or rubber, for instance, is both worldwide and anonymous, in that the buyers and sellers seldom meet in person.

By a market, then, we mean any environment in which buyers and sellers can communicate, which is relatively open and operates without preference. When we talk of the market price, then, we mean the price available to all buyers and sellers of a product; by
market demand we mean the total quantities demanded; and market supply refers to the quantity made available by all suppliers at each possible price.

Later in the text, you will encounter a variety of different types of markets, some of which work very well and others that work poorly, if at all. The analysis in this chapter assumes that the market we are looking at is very (economists call it “perfectly”) competitive. We will devote the whole of Chapter 8 to examining this type of market in more detail. For now, we need to mention that a perfectly competitive market is, among other things, one in which there are many small producers, each selling an identical product. Keeping this caution in mind, let’s see how this market works.

We now examine the point at which the wishes of buyers and sellers coincide by combining the market demand and supply for beer in Table 2.5.

<table>
<thead>
<tr>
<th>Price per Case</th>
<th>Market Demand</th>
<th>Market Supply</th>
<th>Surplus (+)/Shortage (−)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12</td>
<td>22</td>
<td>8</td>
<td>−14</td>
</tr>
<tr>
<td>13</td>
<td>18</td>
<td>12</td>
<td>−6</td>
</tr>
<tr>
<td>14</td>
<td>16</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>9</td>
<td>20</td>
<td>+11</td>
</tr>
<tr>
<td>16</td>
<td>6</td>
<td>24</td>
<td>+18</td>
</tr>
<tr>
<td>17</td>
<td>3</td>
<td>28</td>
<td>+25</td>
</tr>
<tr>
<td>18</td>
<td>2</td>
<td>32</td>
<td>+30</td>
</tr>
</tbody>
</table>

You can see from this table that there is only one price, $14, at which the wishes of consumers and producers coincide. Only when the price is $14 will the quantities demanded and
and supplied be equal. This price level is referred to as the **equilibrium price**. Equilibrium, in general, means that there is balance between opposing forces; here, those opposing forces are demand and supply. The word equilibrium also implies a condition of stability, so that if this stability is disturbed, there will be a tendency to return automatically to equilibrium. To understand this point, refer to Table 2.5 and notice that if the price were, say, $12, then the amount being demanded, 22, would exceed the amount being supplied, which is 8. At this price there is an excess demand or, more simply, a shortage of beer, to the tune of 14 cases. This amount is shown in the last column and marked with a minus sign. In this situation there would be a lot of unhappy beer drinkers. Faced with the prospect of going beerless, many of them will be prepared to pay a higher price for their suds and will therefore bid the price up. As the price of beer starts to rise, the reaction of consumers and producers will differ. Some beer drinkers will not be able to afford the higher prices, so the quantity demanded will drop. On the supply side, producers will be delighted with the higher price and will start to produce more—and the quantity supplied will increase. Both of these tendencies will combine to reduce the shortage as the price goes up. Eventually, when the price has reached the equilibrium price of $14, the shortage will have disappeared and the price will no longer increase. Part of the law of demand suggests, then, that:

**Shortages cause prices to rise.**

This is illustrated in Figure 2.7.

**Figure 2.7**

*How the Market Reacts to a Shortage*

At a price of $12, the quantity supplied of 8 is far below the quantity demanded of 22. The horizontal distance between the two shows the amount of the shortage, which is 14. As a result of the shortage, price bidding between consumers will force up the price. As the price increases, the quantity demanded will drop, but the quantity supplied will rise until these two are equal at a quantity of 16.

Now let’s see, again using Table 2.5, what will happen if the price happens to be above equilibrium, at, say, $16 a case. At this price, the quantity demanded is 6 cases, and the quantity supplied is 24 cases. There is insufficient demand from the producers’ point of view, or, more simply, there is a surplus (or excess supply) of 18 cases. This is shown in the last column of Table 2.5 as +18. This is not a stable situation, because firms cannot continue producing a product that they cannot sell. They will be forced to lower the price in an attempt to sell more. As the price starts to drop, two things happen concurrently. Consumers will be happy to consume more, or, to use economic terms, there will be an increase in the quantity
demanded. In Figure 2.8, note that as the price falls, the quantity demanded increases, and this increase is depicted as a movement down the demand curve. At the same time, faced with a falling price, producers will be forced to cut back production. This is what we have called a decrease in the quantity supplied. In the same figure, this is shown as a movement along (down) the supply curve. The net result of this will be the eventual elimination of the surplus as the price moves toward equilibrium. In other words:

**Surpluses cause prices to fall.**

Only if the price is $14 will there be no surplus or shortage, and the quantity produced will be equal to the quantity demanded. This is the equilibrium price. The quantity prevailing at the equilibrium price is known as the **equilibrium quantity**, in this case 16 cases. This equilibrium quantity is the quantity both demanded and supplied (since they are equal).

**FIGURE 2.8**

*How the Market Reacts to a Surplus*

A price above equilibrium will produce a surplus. At $16, the quantity supplied of 24 exceeds the quantity demanded of 6. The horizontal distance of 18 represents the amount of the surplus. The surplus will result in producers dropping the price in an attempt to increase sales. As the price drops, the quantity demanded increases, while the quantity supplied falls. The equilibrium quantity is 16.

**SELF-TEST**

2. Can a change in the price of a product lead to a change in the demand? Can it lead to a change in supply? Explain.

3. The following table shows the demand and supply of eggs (in hundreds of thousands per day).

   a) What is the equilibrium price and the equilibrium quantity?

   b) Complete the surplus/shortage column. Using this column, explain why your answer to question A must be correct.

   c) What would be the surplus/shortage at a price of $2.50? What would happen to the price and the quantity traded?

   d) What would be the surplus/shortage at a price of $4.00? What would happen to the price and the quantity traded?

<table>
<thead>
<tr>
<th>Price</th>
<th>Demand</th>
<th>Supply</th>
<th>Surplus/Shortage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.00</td>
<td>60</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>2.25</td>
<td>58</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>2.50</td>
<td>56</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>2.75</td>
<td>54</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td>52</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>3.25</td>
<td>50</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>3.50</td>
<td>48</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>3.75</td>
<td>46</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>4.00</td>
<td>44</td>
<td>54</td>
<td></td>
</tr>
</tbody>
</table>
Recall from the definition of demand that the concept refers to the relationship between various prices and quantities. In other words, both price and quantity make up what is known as demand. Thus, a change in price cannot cause a change in demand but does cause a change in the quantity demanded. That said, we must now ask: what are the other determinants, besides the price, that would influence how much of any particular product consumers will buy? Another way of looking at this is to ask: once equilibrium price and quantity have been established, what might disturb that equilibrium? The general answer to this question is a change in demand. Table 2.6 shows such a change in the demand for beer.

### Table 2.6 An Increase in Demand

<table>
<thead>
<tr>
<th>Price per Case of Beer</th>
<th>Quantity Demanded 1</th>
<th>Quantity Demanded 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>13</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>15</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>16</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>17</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>18</td>
<td>10</td>
<td>16</td>
</tr>
</tbody>
</table>

Recall from the definition of demand that the concept refers to the relationship between various prices and quantities. In other words, both price and quantity make up what is known as demand. Thus, a change in price cannot cause a change in demand but does cause a change in the quantity demanded. That said, we must now ask: what are the other determinants, besides the price, that would influence how much of any particular product consumers will buy? Another way of looking at this is to ask: once equilibrium price and quantity have been established, what might disturb that equilibrium? The general answer to this question is a change in demand. Table 2.6 shows such a change in the demand for beer.

Here we will introduce new figures for demand in order to revert back to straight-line demand curves. Let’s say that $D_1$ is the demand for beer that existed last month and $D_2$ is the demand this month. There has been an increase in demand of 6 cases per week at each price. Put another way, whatever the price, consumers are willing and able to consume an additional 6 cases. Thus, there has been an increase in the demand. Figure 2.9 graphically illustrates an increase in demand.

An increase in demand, then, means an increase in the quantities demanded at each price, that is, a total increase in the demand schedule, which is illustrated by a rightward shift in the demand curve. Similarly, a decrease in demand means a reduction in the quantities...
demanded at each price—a decrease in the demand schedule—and this is illustrated by a leftward shift in the demand curve.

**Determinants of a Change in Demand**

Having illustrated what an increase in demand looks like, we now need to look at the factors that could bring about such a change. Some of these determinants of demand affect people’s willingness to purchase, others affect their ability to purchase, and still others affect both. The first factor that affects our willingness to purchase a product is our own particular preference. An increase in demand as shown in Table 2.6 could simply have been caused by a change in consumer preferences: consumers now prefer more beer.

A host of different things could affect our preferences. Tastes change over time and are influenced by the weather, advertising, articles and reports in books and magazines, opinions of friends, special events, and many other things. Specific examples would include decreased demand for steak as the summer barbeque season passes, increased demand for a book that Oprah featured on her TV show, or increased demand for security products following the tragedy of September 11, 2001. Such things can cause demand to either increase or decrease quite rapidly.

The second factor affecting the demand for a product is the income of consumers. This will affect their ability to consume. Generally speaking, you would expect that an increase in income leads most people to increase their purchases of most products, and a decrease in income generally causes a drop in the demand, that is, there is a direct relationship between income and demand. This is true for most products that we buy, and these products are called **normal products**. But it is certainly not true for all people and products. For instance, as the incomes of most people increase, these consumers tend to buy less of such things as low-quality hamburger meats, packets of macaroni and cheese, cheap toilet-paper rolls, and so on. Instead, they start to substitute higher-quality and higher-priced articles that they could not previously afford. When income is low, we are forced to survive on lower-quality staple products that economists call **inferior products**. There is an inverse relationship between income and the demand for inferior products. As income levels go up, the demand goes down. It also means that as incomes fall, our demand for these inferior products will
rise. In our beer example from Table 2.6, the increase in the market demand could have been caused by an increase in incomes, because beer is a normal product.

A third important determinant of demand is the prices of related products. A change in the price of related products will affect both people’s willingness and their ability to purchase a particular good. Products are related if a change in the price of one causes a change in the demand for the other. For instance, if the price of Pepsi were to increase, a number of Pepsi drinkers might well switch over to Coke.

There are, in fact, two ways in which products may be related. They may be related as substitutes, or they may be related as complements. Substitute (or competitive) products are products that are sufficiently similar in the eyes of most consumers that price becomes the main distinguishing feature. Pepsi and Coke, therefore, are substitute products because an increase in the price of one will cause an increase in the demand for the other. The relationship between the price of a product and the demand for its substitute is, therefore, a direct one. It also means that if the price of a product falls, then the demand for its substitute will also fall, since many consumers are now buying the cheaper product.

Complementary products tend to be purchased together, and their demands are inter-related. Skis and ski boots are complementary products, as are cars and gasoline, or beer and pretzels. If the price of one product increases, causing a decrease in the quantity demanded, then people will also purchase less of the complement. If the price of cameras were to increase so that people were buying fewer cameras, then we would also expect a decline in the demand for not only film but for other complementary products like lenses, tripods, carrying bags, and so on. There is, in this case, an inverse relationship between the price of a product and the demand for its complement, which means that an increase in price of the one product leads to a decline in the demand for the complementary product. Similarly, a decrease in the price of a product will lead to an increase in the demand for a complement.

### S E L F - T E S T

4. The following table shows the initial weekly demand ($D_1$) and the new demand ($D_2$) for packets of pretzels (a bar snack).

<table>
<thead>
<tr>
<th>Price</th>
<th>Demand ($D_1$)</th>
<th>Demand ($D_2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.00</td>
<td>10 000</td>
<td>11 000</td>
</tr>
<tr>
<td>2.50</td>
<td>9 800</td>
<td>10 800</td>
</tr>
<tr>
<td>3.00</td>
<td>9 600</td>
<td>10 600</td>
</tr>
<tr>
<td>3.50</td>
<td>9 400</td>
<td>10 400</td>
</tr>
<tr>
<td>4.00</td>
<td>9 200</td>
<td>10 200</td>
</tr>
</tbody>
</table>

To explain the change in demand from $D_1$ to $D_2$, what might have happened to the price of a complementary product, like beer? Alternatively, what might have happened to the price of a substitute product, like nuts?

A fourth determinant of demand is the expectations of the future on the part of consumers. There are many ways that our feelings about the future influence our present behaviour. Future expected prices and incomes can affect our present demand for a product, as does the prospect of a shortage. If consumers think that the price of their favourite beverage is likely to increase in the near future, they may well stock up in advance, just in case. The present demand for the product will therefore increase. Conversely, expected future price declines cause people to hold off their current purchases while awaiting the hoped-for lower prices.

In a similar fashion, an anticipated pay increase may cause some people to spend more now as they adjust to their expected higher standard of living. Similarly, it does seem likely
that most people who fear a layoff or other cause of a drop in salary will cut down spending in advance of the fateful date. Finally, it should be added that the possibility of future shortages, caused for instance by an impending strike, often causes a mad rush to the stores by anxious customers trying to stock up in advance.

These four determinants of demand—preferences, income, prices of related products, and future expectations—affect people’s individual demand in varying degrees. If we shift our attention to the market demand, these four factors still apply. In addition, a few other factors need to be mentioned. The size of the market population will affect the demand for all products. An increase in the size of the population, for example, will lead to an increase in the demand for most products in varying amounts. In addition, a change in the distribution of incomes will lead to an increase in the demand for some products and a decrease in the demand for others, even though the total income has not changed. The same will also be true for the age composition of the population. An aging population will increase the demand for products that largely appeal to older people (Anne Murray CDs), and decrease the demand for those that appeal only to the young (Tragically Hip CDs).

Notice that one factor is not included in this list of determinants of demand, and that is supply. Economists are scrupulous in their attempts to separate the forces of demand and supply. Remember that the demand formulation is a hypothetical construct based on the quantities that consumers are willing and able to purchase at various prices. There is an implied assumption that the consumer will be able to obtain these quantities; otherwise the demand schedule itself would not be relevant. In other words, when specifying the demand, we assume that the supply will be available, just as, when formulating supply, we make the assumption that there will be sufficient demand.

In summary, the determinants of demand are:

- consumer preferences
- consumer incomes
- prices of related goods
- expectations of future prices, incomes, or availability
- population size; or income and age distribution

Statistics Canada reports that annual per capita beer sales fell to 81.4 litres in 2000 from 92 litres a decade earlier. The decline in beer drinking is probably due to the aging population, lifestyle changes, and higher taxes.
The Effects of an Increase in Demand

We have just seen that the demand for any product is affected by many different factors. A change in any of these factors will cause a change in demand and lead to a change in price and production levels. Let us first consider the effects of an increase in the demand for a product. In summary, any one of the following could cause such an increase in the market demand:

• a change in preferences toward the product
• an increase in incomes if the product is a normal product, or a decrease in incomes if the product is an inferior product
• an increase in the price of a substitute product
• a decrease in the price of a complementary product
• the expectation that future prices or incomes will be higher or that there will be a future shortage of the product
• an increase in the population or a change in its income or age distribution

Any of these changes could cause people to buy more of a product, regardless of its price. As an example, let us combine supply and demand data in Table 2.7.

### Table 2.7: The Effects on the Market of an Increase in Demand

<table>
<thead>
<tr>
<th>Number of Cases per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price per Case</strong></td>
</tr>
<tr>
<td>$12</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td>17</td>
</tr>
<tr>
<td>18</td>
</tr>
</tbody>
</table>

You can see that at the old demand (Demand 1) and supply, the equilibrium price was $14 and the quantity traded was 14 cases. Assume now that the demand for beer increases (Demand 2 in Table 2.7). Since consumers do not usually signal their intentions to producers in advance, producers are not aware that the demand has changed until they have evidence. The evidence will probably take the form of unsatisfied customers. At a price of $14 a case, the producers in total have produced 14 cases. At this price, the new quantity demanded is 20 cases. There is a shortage of 6 cases, and some customers will go home disappointed because there is not sufficient beer, at a price of $14, to satisfy all customers. The important question is: will these brewers now increase production to satisfy the higher demand? The surprising answer is no—at least not at the present price. Brewers are not in the business of satisfying customers; they are in the business of making profits. As the dean of economics, Adam Smith, wrote over 200 years ago:

> It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner but from regard to their own self-interest.¹

You may object that unless firms are responsive to the demands of customers, they will soon go out of business. And you are right. But equally, a firm that is solely responsive to its

---

customers will go out of business even faster. Look back at the supply schedule in Table 2.7. At a price of $14, the brewers said they are prepared to produce 14 cases. They are not prepared to produce 20 cases, the amount that consumers now want. Why is that? Because, presumably, they can make more profits from producing 14 cases than from producing 20 cases; otherwise they would have produced 20 in the first place. In fact, it may well be that if they produced 20 cases at the current price of $14, they would end up experiencing a loss. Does this mean that the shortage of beer will persist? No, because we have earlier seen that shortages drive prices up until the shortage disappears and the new quantity demanded is equal to the quantity supplied. This will occur at a price of $16, where the quantity demanded and the quantity supplied are equal at the equilibrium quantity of 18. This adjustment process can be seen in Figure 2.10.

You can see in the graph that at the old price of $14, the new quantity demanded exceeds the quantity supplied. This shortage causes the price to rise. As it does so, notice that the quantity of beer that producers make also rises; that is, there will be an increase in the quantity supplied. Producers will produce more, not because there is a shortage, but because the shortage causes a rise in price. Note also that the increase in price causes some customers to reduce their purchases of beer; that is, there is a decrease in the quantity demanded. The price of beer will continue to increase as long as there is a shortage and will stop as soon as the shortage disappears. This occurs when the price has increased to $16. At the new equilibrium price, the quantity demanded will again equal the quantity supplied but at a higher quantity traded of 18 cases.

The Effects of a Decrease in Demand

Now let’s see what happens when there is a decrease in demand. Remember that a decrease in demand cannot be caused by an increase in price but is caused by a change in any of the non-price determinants, such as:
• a decrease in the preferences for the product
• a decrease in incomes if the product is a normal product, or an increase in incomes if the product is an inferior product
• a decrease in the price of a substitute product
• an increase in the price of a complementary product
• the expectation that future prices or incomes will be lower
• a decrease in the population or a change in its income or age distribution

A decrease in demand is shown in Table 2.8 and illustrated in Figure 2.11.

The Effects on the Market of a Decrease in Demand

<table>
<thead>
<tr>
<th>Price per Case</th>
<th>Supply</th>
<th>Demand 1</th>
<th>Demand 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12</td>
<td>10</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>13</td>
<td>12</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>15</td>
<td>16</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>16</td>
<td>18</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>17</td>
<td>20</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>22</td>
<td>10</td>
<td>4</td>
</tr>
</tbody>
</table>

The initial equilibrium price is $14, and the quantity traded is 14. Assume that the demand now decreases to Demand 3 in the table and D3 in Figure 2.11. At a price of $14, producers will continue to produce 14 cases; yet consumers now wish to purchase only 8 cases. A surplus is immediately created in the market. Mounting unsold inventories and more intensive competition between suppliers will eventually push down the price. Notice in Figure 2.11 that as the price decreases, the quantity supplied also starts to decrease and the quantity demanded begins to increase. Both of these factors will cause the surplus to disappear. The price will eventually drop to a new equilibrium of $12 where the quantity demanded and the quantity supplied are equal at 10 cases. In short:

A decrease in demand will cause both the price and the quantity traded to fall.
Let us again be clear about what we mean by supply: it is the relationship between the price of the product and the quantities producers are willing and able to supply. Price is part of what economists call supply. In other words, supply does not mean a single quantity. What we now need to figure out is what could cause a change in supply. What factors will cause producers to offer a different quantity on the market even though the price has not changed—what will cause a change in supply? We begin with Table 2.9, where an increase in supply is illustrated. For reasons we will soon investigate, suppliers are now willing to supply an extra 6 cases of beer at every possible price. This is illustrated in Figure 2.12.

An increase in supply causes the whole supply curve to shift right. (Be careful if you are tempted to describe it as a downward shift because then you would be saying that as the supply goes up, the supply curve goes down, which could make things very confusing! Better to talk about a rightward shift.) This means that at each and every price, producers are now willing to produce more.

SELF-TEST

5. What effect will the following changes have upon (i) the demand for, (ii) the price, and (iii) the quantity traded of commercially brewed beer?
   
   a) A new medical report praising the healthy effects of drinking beer (in moderation, of course).
   b) A big decrease in the price of home-brewing kits.
   c) A rapid increase in population growth.
   d) Talk of a possible future strike of brewery workers.
   e) A possible future recession.

LOG
Understand the causes and effects of a change in supply.

change in supply: a change in the quantities supplied at every price, caused by a change in the determinants of supply.
Determinants of a Change in Supply

What could have happened in the brewers’ world to make them wish to produce more even though the price is unchanged? Since we are assuming that the prime motivation for the supplier is profit, then something must have happened to make brewing more profitable, which is inducing a higher supply. Profit is the difference between revenue and cost, and since the price (and therefore revenue) is unchanged, then something must have affected the cost of producing beer. The first factor we will look at which might have decreased costs is the price of resources. For the brewers this includes the price of yeast, hops, malt, and other ingredients, as well as the price that must be paid for the brewing vats, bottles, and so on. If any of these should drop in price, then the cost for the brewers will fall and profits will rise. Under these circumstances, since they are now making a bigger profit on each case of beer, they will be very willing to produce more. A fall in the price of resources will lead to an increase in supply. Conversely, an increase in the price of resources will cause a decrease in supply.

An Increase in Supply

At each price, the quantities supplied have now increased, that is, the supply curve has shifted right, from $S_1$ to $S_2$. For example, at a price of $14, the original quantity was 14 and has now increased to 20. Similarly, at a price of $10, the quantity supplied has increased from 6 to 12. In this example, the quantities supplied have increased by 6 units at every price level, thus causing a parallel shift in the supply curve.

### Table 2.9

<table>
<thead>
<tr>
<th>Price per Case of Beer</th>
<th>Supply 1</th>
<th>Supply 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>13</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>15</td>
<td>16</td>
<td>22</td>
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<tr>
<td>16</td>
<td>18</td>
<td>24</td>
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<tr>
<td>17</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>18</td>
<td>22</td>
<td>28</td>
</tr>
</tbody>
</table>

**Figure 2.12**

An Increase in Supply

At each price, the quantities supplied have now increased, that is, the supply curve has shifted right, from $S_1$ to $S_2$. For example, at a price of $14, the original quantity was 14 and has now increased to 20. Similarly, at a price of $10, the quantity supplied has increased from 6 to 12. In this example, the quantities supplied have increased by 6 units at every price level, thus causing a parallel shift in the supply curve.
of production have dropped, these same brewers are able to make the same profits by
producing the 20 cases at a lower price of $14. This is the same thing as saying that the
brewers are now willing to produce the same quantities as before at lower prices. Again, this would
produce a rightward shift in the supply curve.

It is often suggested that the availability of resources is a major determinant of the supply
of a product. A bad grape harvest—grapes being the key input in the making of wine—will
obviously have an impact on the supply of wine. However, it’s not really the difficulty in
obtaining grapes that causes a decrease in the wine supply, since most things can be obtained
at a price. But there’s the rub. A bad grape harvest will cause the price of grapes to increase,
and this increase will reduce the profitability and production of wine producers.

A second major determinant of supply is the business taxes levied by the various levels
of government. They are similar to the other costs of doing business, and a decrease in them
(or an increase in a subsidy) will lead firms to make higher profits and encourage them,
therefore, to increase the supply; an increase in business taxes, on the other hand, will cause
a decrease in supply.

A third determinant of supply is the technology used in production. An improvement in
technology means nothing more than an improvement in the method of production. This
will enable a firm to produce more with the same quantity of resources (or, for that matter,
to produce the same output with fewer resources). An improvement in technology will not
affect the actual price of the resources, but, because more can now be done with less, it will
lead to a fall in the per unit cost of production. This means that an improvement in
technology will lead to an increase in the supply.

The price of related products also affects the supply, just as it affected the demand. But
here we must be careful, since we are looking at things from a producer’s point of view and
not a consumer’s. In other words, what a producer regards as related will usually differ from
a consumer’s view of related. A fourth determinant of supply, then, is the price of substitutes
in production. To a wheat farmer, for instance, the price of other grains like rye and barley
will be of great interest because the production of all grain crops are related in terms of
production methods and equipment. A significant increase in the price of rye, for example,
may well tempt the wheat farmer to grow rye in the future. In other words, an increase in the
price of one product will cause a drop in the supply of products that are substitutes in
production. A decrease will have the opposite effect.

A fifth determinant of supply is the future expectations of producers. Again, this is
analogous to the demand side of the market, but with a difference. While consumers will
eagerly look forward to the drop in the price of products, producers view the same prospect
with great anxiety. If a producer feels that the market is going to be depressed in the future
and that prices are likely to be lower, she may be inclined to change production now, before
the anticipated collapse. Lower expected future prices therefore tend to increase the present
supply of a product. Higher expected future prices have the opposite effect and cause
producers to hold off selling all of their present production in the hopes of making greater
profits from the future higher prices.

Finally, the market supply will also be affected by the number of suppliers. An increase in
the number of suppliers will cause an increase in the market supply, whereas a decrease in
the number of suppliers will reduce the overall market supply.

Again, notice that one thing omitted from this list of supply determinants is any
mention of demand. At the risk of repetition: firms are in business not to satisfy demand but
to make profits. Simply because the demand for a product increases does not mean that
producers will immediately increase production to satisfy the higher demand. However, the
higher demand will cause the price to increase, and this increase induces firms to supply
more, but this is an increase in the quantity supplied and does not imply an increase in the
supply. That is, the supply curve remains unchanged.
In summary, the determinants of market supply are:

- prices of resources
- business taxes
- technology
- prices of substitutes in production
- future expectations of suppliers
- number of suppliers

**The Effects of an Increase in Supply**

We have just discussed six different factors that could affect the supply of a product. Let us be more specific and look at what can cause an *increase* in supply:

- a decrease in the price of productive resources
- a decrease in business taxes (or increase in subsidies)
- an improvement in technology
- a decrease in the price of a productively related product
- the expectation of a decline in the future price of the product
- an increase in the number of suppliers

Let us see the effects of an increase in supply by using the original demand for beer, and the increase in supply by using Table 2.10.

**Table 2.10**

<table>
<thead>
<tr>
<th>Price per Case of Beer</th>
<th>Demand 1</th>
<th>Supply 1</th>
<th>Supply 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12</td>
<td>16</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>13</td>
<td>15</td>
<td>12</td>
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</tr>
<tr>
<td>16</td>
<td>12</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>17</td>
<td>11</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>18</td>
<td>10</td>
<td>22</td>
<td>28</td>
</tr>
</tbody>
</table>

At the original demand (Demand 1) and supply (Supply 1), the equilibrium price was $14 per case and the quantity traded was 16 cases. Assume that the supply now increases to Supply 2. At the present price of $14, there will be an immediate surplus of 6 cases. Before we look at the implications of this surplus, we ought to address a couple of possible qualms that some students might have. The first is this: won’t customers take up this excess of beer? It is easy to see that, at this price, consumers have already given their response: they want to buy 14 cases, not 20 cases, or any other number. In other words, consumers are buying beer to satisfy their own tastes, not to satisfy the brewers. A second question is this: why would producers produce 20 cases, knowing that the demand at this price is only 14 cases? The answer is that they don’t know. Each producer knows the circumstances in her own brewery and knows that, until now, she has been able to sell everything she has produced. With the prospect of higher profits coming from, let’s say, a decrease in costs, the brewer wants to produce more. If all producers do the same, there will be a surplus of beer. Figure 2.13 shows what will happen as a result of this surplus.
Faced with a surplus of beer, the market price will be forced down. As the price falls, the quantity demanded increases and the quantity supplied falls. Production increased initially, but because of the resulting drop in price, it is now dropping back slightly. The price will continue to drop until it reaches $12. Table 2.10 shows that, at this price, the quantity demanded and the quantity supplied are now equal at 16 cases. The effect of the increase in supply, then, is a lower price and a higher quantity traded.

<table>
<thead>
<tr>
<th>Price per case</th>
<th>Quantity of cases per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>22</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

### SELF-TEST

6. Suppose that the demand and supply for strawberries in Corona are as follows (the quantities are in thousands of kilos per week):

<table>
<thead>
<tr>
<th>Price</th>
<th>Demand</th>
<th>Supply 1</th>
<th>Supply 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$4.00</td>
<td>140</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>4.25</td>
<td>130</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>4.50</td>
<td>120</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>4.75</td>
<td>110</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>5.00</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>5.25</td>
<td>90</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>5.50</td>
<td>80</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

a) What are the present equilibrium price and equilibrium quantity? Graph the demand and supply curves, labelling them D₁ and S₁, and indicate equilibrium.

b) Suppose that the supply of strawberries were to increase by 50 percent. Show the new quantities in the Supply 2 column. What will be the new equilibrium price and quantity? Draw in S₂ on your graph and indicate the new equilibrium.

7. What effect will the following changes have on the supply, price, and quantity traded of wine?

a) A bad harvest in the grape industry results in a big decrease in the supply of grapes.

b) The number of wineries increases.

c) The sales tax on wine increases.

d) The introduction of a new fermentation method reduces the time needed for the wine to ferment.

e) The government introduces a subsidy for each bottle of wine produced domestically.

f) The government introduces a quota limiting the amount of foreign wine entering Canada.

g) There is a big increase in wages for the workers in the wine industry.

h) A big increase occurs in the prices of wine coolers (an industry that is similar in technology to the wine industry).
We leave it to the student to confirm that a decrease in supply will cause a shortage that will eventually raise the price of the product. The net result will be a higher price but a lower quantity traded.

To complete this introduction to demand and supply, let’s use the following chart as a summary:

- ↑ Demand → shortage → ↑ P and ↑ Q traded
- ↓ Supply → shortage → ↑ P and ↓ Q traded
- ↓ Demand → surplus → ↓ P and ↓ Q traded
- ↑ Supply → surplus → ↓ P and ↑ Q traded

Note that when the demand changes, both the price and the quantity traded move in the same direction; when the supply changes, the quantity traded moves in the same direction, but the price moves in the opposite direction.

From this table you should confirm in your own mind that it is the supply of, and demand for, a product that determines its price, and not the price that determines supply and demand. A change in any of the factors that affects demand or supply will therefore lead to a change in the price. The price of a product cannot change unless there is a change in either the demand or the supply. It follows therefore that you cannot really analyze any problem that starts: “What happens if the price increases (decreases)…” The reason for this, as the above chart makes clear, is that an increase in the price of a product might be caused by either the demand increasing or by the supply decreasing. But in the case of an increase in the demand, the quantity traded also increases, whereas in the case of a decrease in the supply, the quantity traded falls. In the first case, we are talking about an expanding industry; in the second, we are looking at a contracting industry.

Finally, make sure you understand clearly the distinction between changes in quantities demanded and supplied and changes in demand and supply as illustrated in Figure 2.14.

The next chapter will develop the ideas of demand and supply further and will analyze a number of diverse problems. To close this chapter, let’s try to figure out a simple exercise and make some final observations.

Looking back over the past decade or so, what has happened to the prices of home computers? Generally speaking, even allowing for inflation, they have decreased. And what about the quantity of computers that are bought and sold now, compared with the situation a decade ago? Definitely, it has increased. So, according to our little chart above, what could have produced this result in the marketplace? Well, there is only one thing that could lead to a decrease in price and an increase in the quantity traded, and that is an increase in supply. And what in the computer world over the past years could have caused an increase in supply? The answer must be an improvement in technology that has significantly reduced the costs of producing computers.

As we shall see in Chapter 3, not only is the market system an efficient way of preventing persistent surpluses and shortages, but it also functions very well in rationing scarce goods, services, and resources.
However, we should mention a number of themes that we will take up in Chapter 8. In the modern world, competitive markets are few and far between, since many markets are dominated by big corporations, big trade unions, and consumer associations, and are affected by government intervention. In addition, even when they are competitive, markets do not provide any guarantee that there will not be future periods of recession or inflation. Further, competitive markets cannot ensure that the right type or quantities of products are produced or that the distribution of incomes and wealth in a country is fair.

Finally, let's look back at the discussion that started this chapter and see if we can make sense of it. The one speaker started by stating that the price of houses has increased. (We presume he is talking about the market for existing, as well as new, houses.) Well, there are two major causes for a price increase: either the demand has increased (caused perhaps by lower interest rates or high immigration into the area); or the supply has decreased (caused by higher building costs or perhaps the expectation by sellers that prices will be higher in the future). In this particular conversation we are given no indication of the cause. However, the effects are going to be different. If housing prices increased because of a higher demand, you would expect to see a higher number of housing sales than usual; if they increased because of a lower supply, then the number of sales would be smaller than usual. It would be an easy enough job to figure out which was the cause. The rest of the conversation on the effects of a higher price is merely an exercise in confusion. Assuming that the present price is the equilibrium price, then nothing further will happen—at least until there is another change in demand or supply. Hopefully, you now realize what an important and versatile tool supply and demand analysis can be—but, like all tools, you must use it properly (and clean it off after every use!).

8. The following are various changes that occur in different markets. Explain what will happen to either demand or supply and to the equilibrium price and quantity traded.

   a) An increase in income upon the market for an inferior product.
   b) A decrease in the price of steel on the automobile industry.
   c) A government subsidy given to operators of day-care centres.
   d) A government subsidy given to parents who want their children to attend day-care centres.
   e) A medical report suggesting that wine is very fattening.
   f) A big decrease in the amount of Middle East oil exports on the refined-oil market.
   g) An increase in the popularity of antique furniture.
   h) An increase in the price of coffee on the tea market.

SELF-TEST
CHAPTER 2 Demand and Supply: An Introduction

It is important not to confuse the terms “demand” and “supply” with “purchases” and “sales.” As we have seen in this chapter, the quantity demanded and the quantity supplied are not always equal. However, purchases and sales, since they are two sides of the same transaction, must always be equal. The accompanying graph explains the differences in the terms.

\[ P_1 \] is the equilibrium price, and at this price the quantity demanded and supplied are equal—this is the amount traded and is the same thing as the amount sold and purchased. If the price happened to be above equilibrium, however, at a price, say, \( P_2 \), then the quantity demanded is denoted by \( a \), and the quantity supplied by \( b \). Clearly, the two quantities are not equal. But how much is bought and sold at this price? The answer is quantity \( a \). It really doesn’t matter how much is being produced since, at this price, this is the maximum amount that consumers are willing to buy. The difference \( ab \) represents the amount unsold, or the surplus.

On the other hand, what is the effect of the price being below equilibrium? Suppose the price is \( P_3 \), where the quantity supplied (c) is less than the quantity demanded (d)? This time, how much is being bought and sold? The answer must be quantity c. It doesn’t matter how much consumers want to buy of this product if producers are only making quantity c available. In general, the amount bought and sold is always equal to the smaller of the quantity demanded or supplied.

**ADDED DIMENSION**

**Sales Always Equal Purchases**

1. What are the four major determinants of individual demand?
2. Explain the difference between an inferior and a normal product.
3. What will happen to the price of a product if:
   a) the price of its substitute decreases?
   b) the price of its complement decreases?
4. Explain, step by step, how an increase in demand eventually affects both the price and the quantity traded.
5. What are the six major determinants of the market supply?
6. Explain how the market adjusts to an increase in the supply of a product.
7. What can cause the price of a product to rise? What can cause it to fall?
In this chapter you learned that, in competitive markets, the price and quantity traded of any product depends on both the demand for, and the supply of, that product. Once equilibrium is achieved, price and quantity will not change unless either supply or demand changes first. In order to fully understand this lesson, you must also understand the following:

1. Demand is the price/quantity relationship of a product that consumers are willing and able to buy per period of time.

2. Market demand is simply the conceptual summation of each individual’s demand within a given market.

3. The demand curve is downward sloping because of the:
   • substitution effect;
   • income effect.

4. Market demand changes if there is a change in:
   • consumers’ preferences;
   • consumers’ incomes;
   • the price of related products;
   • expectations of future prices, incomes, or availability;
   • the size of the market or income and age distribution.

5. Products can be related in two ways, as:
   • complements;
   • substitutes.

6. All products are either:
   • normal products;
   • inferior products.

7. Supply is the price/quantity relationship of a product that producers are willing and able to sell per period of time.

8. Market supply is simply the conceptual summation of each firm’s supply within a given market.

9. Market supply changes if there is a change in:
   • the price of resources;
   • business taxes;
   • technology;
   • prices of substitutes in production;
   • future expectations of suppliers;
   • the number of suppliers.

10. An increase in demand will cause a shortage and result in both price and quantity traded rising.

11. A decrease in demand will cause a surplus and result in both price and quantity falling.

12. An increase in supply will cause a surplus and result in price falling and quantity traded rising.

13. A decrease in supply will cause a shortage and result in price rising and quantity falling.

NEW GLOSSARY TERMS

ceteris paribus  
demand schedule  
equilibrium price  
equilibrium quantity  
income effect  
inferior products  
market  
market demand  
market supply  
normal products  
real income  
substitute products  
substitution effect  
supply  
supply schedule

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1. It is with this chapter that you will learn to appreciate the need for precision in the use of economic terms. For instance, the terms demand and supply have very clear definitions. “Demand” does not mean the amount a person wishes to buy or the amount she is buying. Demand is not a single quantity but a combination of different prices and quantities. Similarly, you cannot use the term “supply” synonymously with output, production, or quantity supplied. It is not a single quantity but, again, a range of different quantities and prices.

2. If you have understood the first point, then this next one should make sense. A change in price cannot affect the demand, since price is already part of what we mean by demand. That doesn’t mean that a change in price doesn’t affect consumers; generally, people change the amounts they purchase as a result of a price change, but this is what we call a change in the quantity demanded and not a change in demand. Similarly, a change in price leaves the supply unaffected. But it definitely affects the quantity supplied. These points are illustrated in the way that the demand and supply curves are affected. A change in price causes no change in the demand or supply curves but results in a movement along the curves. Only changes in other determinants, besides price, will cause a shift in the curves.

3. It is important for you to keep the concepts of demand and supply separate in your mind. A change in demand does not have any effect on the supply. This means that the supply curve will not shift when the demand curve changes. Similarly, you must disconnect the demand from the supply. A change in the supply has no impact on demand.

4. There really is no alternative to learning the factors that do affect the demand and supply. Memorize the five determinants of market demand and the six determinants of market supply. Note that, with the exception of expectations of future price changes, the factors that affect demand have no impact on supply, and vice versa. If possible, try not to be too “cute” when trying to figure out the way in which various changes in determinants affect markets. It is possible to give a convoluted explanation of why, for example, a change in the number of suppliers can affect preferences and, therefore, the demand of customers of that product. While remotely possible, the effect would be of minor significance. Instead use common sense and focus on the main effects. Remember that usually a change in one determinant will affect only the demand or the supply, seldom both.

5. Don’t skip the basics in this chapter even if, at times, they might seem a little simple. For example, don’t try to work out the effects of changes in demand or supply until you first have a good grasp of equilibrium.

6. Finally, the most important lesson that you can get from this chapter is that the price of a product is determined by both demand and supply. Price is the effect and not the cause. This means that equilibrium price cannot change in a free market unless there has been a change in either the demand or the supply.

Answered Questions

Indicate whether the following statements are true or false.

1. T or F The term “demand” means the quantities that people would like to purchase at various different prices.

2. T or F A change in the price of a product has no effect on the demand for that product.

3. T or F An increase in the price of a product causes a decrease in the real income of consumers.

4. T or F An increase in the price of a product leads to an increase in the supply.

5. T or F Equilibrium price implies that everyone who would like to purchase a product is able to.

6. T or F Surpluses drive prices up; shortages drive prices down.

7. T or F An increase in incomes will lead to a decrease in the demand for an inferior product.

8. T or F A decrease in the demand for a product will lead to a decrease in both the price and the quantity traded.
9. T or F  An increase in business taxes causes the supply curve to shift left.

10. T or F  A decrease in supply causes the price to fall and the quantity traded to increase.

Basic (Questions 1–12)

1. What does the term “demand” refer to?
   a) The amounts that consumers are either willing or able to purchase at various prices.
   b) The amounts that consumers are both willing and able to purchase at various prices.
   c) The quantity purchased at the equilibrium price.
   d) The price consumers are willing to pay for a certain quantity of a product.

2. What will a surplus of a product lead to?
   a) A reduction in supply.
   b) A reduction in price.
   c) An increase in price.
   d) An increase in supply.

3. What is the effect of a decrease in the price of a product?
   a) It will increase consumers’ real income while leaving their actual income unchanged.
   b) It will increase consumers’ actual income while leaving their real income unchanged.
   c) It will decrease demand.
   d) It will have no effect on income.

4. What is the effect of an increase in the price of coffee?
   a) It will lead to an increase in the demand for tea.
   b) It will lead to a decrease in the demand for tea.
   c) It will have no effect on the tea market.
   d) It will decrease the demand for coffee.

5. What is the slope of the demand curve?
   a) It is downward-sloping because when the price of a product falls, consumers are willing and able to buy more.
   b) It is upward-sloping because when the price of a product falls, consumers are willing and able to buy more.
   c) It is upward-sloping because when the price of a product increases, consumers are willing and able to buy more.
   d) It is downward-sloping because higher prices are associated with larger quantities.

6. What is the effect of an increase in the price of a productive resource?
   a) It will cause a decrease in the supply of the product.
   b) It will cause an increase in the supply of the product.
   c) It will cause a decrease in the demand for the product.
   d) It will cause an increase in the demand for the product.

7. In what way are Pepsi Cola and Coca Cola related?
   a) They are substitute products.
   b) They are complementary products.
   c) They are inferior products.
   d) They are unrelated products.

8. Which of the following could cause an increase in the supply of wheat?
   a) A decrease in the price of oats.
   b) An imposition of a sales tax on wheat.
   c) An increase in the price of fertilizer.
   d) A decrease in the price of wheat.

9. All of the following, except one, would cause an increase in demand for a normal product. Which is the exception?
   a) An increase in consumers’ incomes.
   b) An increase in the price of a substitute product.
   c) An increase in the size of the market.
   d) Consumer expectations of a lower future price for the product.

10. Which of the following pairs of goods are complementary?
    a) Coffee and tea.
    b) Skis and ski boots.
    c) Bread and crackers.
    d) Popcorn and pretzels.

11. All of the following, except one, would cause a decrease in the supply of product A. Which is the exception?
    a) An increase in the price of resources used to make product A.
    b) An increase in business taxes.
    c) An improvement in technology.
    d) The expectation by suppliers that future prices of product A will be higher.

12. Which of the following best describes a normal product?
    a) A product that people both need and like.
    b) A product whose demand increases if income increases.
    c) A product whose demand increases if income decreases.
    d) A staple product that everyone needs.
Intermediate (Questions 13–22)

13. How will a change in income affect the demand for an inferior product?
   a) The demand will increase if the income of consumers increases.
   b) The demand will increase if the income of consumers decreases.
   c) The demand for an inferior product is not affected by consumer incomes.
   d) The demand will remain the same but the quantity demanded will increase if income decreases.

14. Which of the following factors will shift the demand curve left?
   a) An increase in the price of a substitute product.
   b) A decrease in the price of a complementary product.
   c) An increase in income if the product is an inferior product.
   d) The expectation that future prices of the product will be higher.

15. A rightward shift in the supply curve for a product could be caused by all of the following except one. Which is the exception?
   a) The expectation by suppliers that the future price of the product will be higher.
   b) A decrease in the price of a productive resource used in its manufacture.
   c) A decrease in the price of a product that is a substitute in production.
   d) A technological improvement in manufacturing methods.

16. What is the effect of a decrease in the supply of a product?
   a) It will cause an increase in both the price and the quantity traded.
   b) It will cause an increase in the price but a decrease in the quantity traded.
   c) It will cause a decrease in both the price and in the quantity traded.
   d) It will cause a decrease in the price but an increase in the quantity traded.

Table 2.11 depicts the market for mushrooms (in thousands of kilograms per month). Use this table to answer questions 17 and 18.

<table>
<thead>
<tr>
<th>Price ($)</th>
<th>2.50</th>
<th>3.00</th>
<th>3.50</th>
<th>4.00</th>
<th>4.50</th>
<th>5.00</th>
<th>5.50</th>
<th>6.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity demanded</td>
<td>64</td>
<td>62</td>
<td>60</td>
<td>58</td>
<td>56</td>
<td>54</td>
<td>52</td>
<td>50</td>
</tr>
<tr>
<td>Quantity supplied</td>
<td>40</td>
<td>44</td>
<td>48</td>
<td>52</td>
<td>56</td>
<td>60</td>
<td>64</td>
<td>68</td>
</tr>
</tbody>
</table>

17. Refer to Table 2.11 to answer this question. What are the values of equilibrium price and quantity traded?
   a) $3 and 52.
   b) $3 and 62.
   c) $4 and 58.
   d) $4.50 and 56.
   e) They cannot be determined from the data.

18. Refer to Table 2.11 to answer this question. What will happen if the price of the product is $3?
   a) There would be a surplus of 18, which would lead to a decrease in price.
   b) There would be a shortage of 18, which would lead to an increase in price.
   c) There would be a shortage of 18, which would lead to a decrease in price.
   d) There would be a surplus of 18, which would lead to an increase in price.
   e) There would be neither a surplus nor a shortage.

19. In what way are products A and B related if an increase in the price of product A leads to a decrease in the demand for product B?
   a) Product A must be a resource used in the manufacture of product B.
   b) Product B must be a resource used in the manufacture of product A.
   c) The two products must be complements.
   d) The two products must be substitutes.
   e) The two products must be inferior products.

20. What is the effect of a shortage?
   a) It will cause a decrease in the price, leading to an increase in the quantity supplied and a decrease in the quantity demanded.
   b) It will cause a decrease in the price, leading to a decrease in the quantity supplied and an increase in the quantity demanded.
   c) It will cause an increase in the price, leading to an increase in the quantity supplied and a decrease in the quantity demanded.
   d) It will cause an increase in the price, leading to a decrease in the quantity supplied and an increase in the quantity demanded.
21. What is the effect of an increase in demand for a product?
   a) Its price will rise and quantity traded will decrease.
   b) Its price will rise and quantity traded will increase.
   c) Its price will fall and quantity traded will decrease.
   d) Its price will fall and quantity traded will increase.

   Refer to Figure 2.15 to answer questions 22, 23, and 24.

22. Refer to Figure 2.15 to answer this question.
What will be the effect if the price is now $1200?
   a) There would be a surplus of 30.
   b) There would be a shortage of 30.
   c) 160 would be purchased.
   d) There would be a surplus of 60.
   e) The price will increase.

23. Refer to Figure 2.15 to answer this question. Assume that there is a shortage of 60 units. What does this mean?
   a) Purchasers would be willing to pay an additional $600 for the quantity they are now purchasing.
   b) The price must be above equilibrium.
   c) The price must be $1200.
   d) The price must be $600.
   e) None of the above are correct.

24. Refer to Figure 2.15 to answer this question. Suppose that initially the market was in equilibrium and that demand increased by 60. What will be the new equilibrium as a result?
   a) A price of $1000 and quantity traded of 120.
   b) A price of $1000 and quantity traded of 160.
   c) A price of $1200 and quantity traded of 160.
   d) A price of $1400 and quantity traded of 160.
   e) A price of $1400 and quantity traded of 240.

25. How will the demand and supply of a product be affected if both producers and consumers expect the future price of a product will be higher than at present?
   a) It will cause an increase in demand but a decrease in supply.
   b) It will cause an increase in both the demand and supply.
   c) It will cause a decrease in both the demand and supply.
   d) It will cause an increase in supply but will have no effect on demand.
   e) It will cause an increase in supply but a decrease in demand.

Parallel Problems

ANSWERED PROBLEMS

26. Key Problem Table 2.12 shows the market for wool in the economy of Odessa (the quantities are in tonnes per year).

<table>
<thead>
<tr>
<th>Price ($)</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity demanded</td>
<td>130</td>
<td>110</td>
<td>90</td>
<td>70</td>
<td>50</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Quantity supplied</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
</tr>
</tbody>
</table>

   a) Plot the demand and supply curves on Figure 2.16 and label them D_1 and S_1. Mark the equilibrium as e_1 on the graph.
**Basic (Problems 27–31)**

27. Circle which of the following factors will lead to an increase in the demand for cranberry juice (which is a normal good).
   a) A decrease in the price of cranberry juice.
   b) A decrease in the price of cranberries.
   c) The expectation by consumers that the price of cranberry juice is likely to increase.
   d) An increase in the price of apple juice.
   e) An increase in consumer incomes.
   f) An improvement in the juicing process that lowers the cost of producing cranberry juice.

28. Table 2.13 shows the market demand and supply for Fuji apples in Peterborough.

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity Demanded</th>
<th>Quantity Supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>180</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>170</td>
<td>110</td>
</tr>
<tr>
<td>4</td>
<td>160</td>
<td>130</td>
</tr>
<tr>
<td>6</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>8</td>
<td>140</td>
<td>170</td>
</tr>
<tr>
<td>10</td>
<td>130</td>
<td>190</td>
</tr>
</tbody>
</table>

a) What is the equilibrium price and quantity traded?
   price: _______ quantity: _______

b) Suppose that the supply increases by 30. What would the price and quantity be at the new equilibrium?
   price: _______ quantity: _______

c) After the increase in supply, what would the surplus/shortage be at a price of $8?
   Surplus/shortage _______ of _______ .

29. In each of the four graphs in Figure 2.17 below, explain the change in equilibrium from a to b in terms of (1) an increase or decrease in demand or supply; and (2) an increase or decrease in the quantity demanded or supplied.
30. Suppose that new medical research strongly indicates that the consumption of coffee can cause cancer of the colon. What effect will this news have on either the demand or the supply, the equilibrium price, and quantity traded of the following products?

a) Coffee beans.
   demand: __________ price: __________
   quantity traded: __________

b) Tea, a substitute for coffee.
   demand: __________ price: __________
   quantity traded: __________

c) Danish pastries, a complement to coffee.
   demand: __________ price: __________
   quantity traded: __________

d) Teapots, a complement to tea.
   demand: __________ price: __________
   quantity traded: __________

31. What must have happened to demand or supply to cause the following changes?

a) The price of guitars falls, but the quantity traded increases.
   Demand/supply _________ must have _________

b) The price and quantity traded of saxophones decrease.
   Demand/supply _________ must have _________

c) The price of trombones increases, while the quantity traded falls.
   Demand/supply _________ must have _________

d) The price and quantity traded of clarinets increases.
   Demand/supply _________ must have _________

Intermediate (Problems 32–34)

32. Consider the effects of each of the events outlined in Table 2.14 on the market indicated. Indicate by placing a (↑), (↓) or (–) under the appropriate heading to indicate whether there will be an increase, decrease, or no change in demand (D), supply (S), equilibrium price (P), and quantity traded (Q).

33. Figure 2.18 shows the market for the new Guns and Butter compact disc, “Live at Saskatoon.”

a) Suppose that the CD producers put the disc on sale for $8 each. How much will be the surplus or shortage? How many will be sold?
   Surplus/shortage ____________ of ____________
   quantity sold: ____________

b) What is the maximum price at which the quantity actually sold in a) could have been sold?
   Maximum price: ____________

c) If the CD producers had actually put the CD on the market at the price mentioned in b), what would have been the resulting surplus/shortage?
   Surplus/shortage ____________ of ____________
34. “The price of houses rises when the demand increases. The demand for houses decreases when the price increases.” Change one of these statements so that the two are consistent with each other.

__________________________________________

__________________________________________.

Advanced (Problems 35–36)

35. In Kirin, at a market price of $1 per kilo, there is a shortage of 60 kilos of avocados. For each 50-cent increase in the price, the quantity demanded drops by 5 kilos, while the quantity supplied increases by 10 kilos.

36. Identify any two possible causes and five specific effects involved in the movement from point a to b to c in Figure 2.19.
37. **Key Problem** Table 2.15 shows the market for olives in the economy of Sorel (the quantities are in thousands of kilos per year).

### Table 2.15

<table>
<thead>
<tr>
<th>Price ($)</th>
<th>Demand</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>700</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>600</td>
<td>200</td>
</tr>
<tr>
<td>6</td>
<td>500</td>
<td>300</td>
</tr>
<tr>
<td>8</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>10</td>
<td>300</td>
<td>500</td>
</tr>
<tr>
<td>12</td>
<td>200</td>
<td>600</td>
</tr>
<tr>
<td>14</td>
<td>100</td>
<td>700</td>
</tr>
</tbody>
</table>

a) Plot the demand and supply curves and label them D<sub>1</sub> and S<sub>1</sub>. Mark the equilibrium as e<sub>1</sub> on the graph.

b) What are the values of equilibrium price and quantity?

c) If the price of olives were $10, would there be a surplus or shortage? Indicate the amount of the surplus or shortage on the graph.

d) Suppose that the demand were to decrease by 200. Draw and label the new demand curve as D<sub>2</sub>. What are the new values of equilibrium price and quantity? Mark the new equilibrium as e<sub>2</sub> on the graph.

e) Following the change in d) suppose that the supply were to decrease by 50%. Draw and label the new supply curve as S<sub>2</sub>. Now what are the new values of equilibrium price and quantity? Mark the new equilibrium as e<sub>3</sub> on the graph.

### Basic (Problems 38–42)

38. What effect will each of the following have on the price of wine, when it is a normal product regarded by many consumers as a substitute for beer and a complement to cheese.

a) A drop in the price of grapes.

b) An increase in the price of beer.

c) A drop in the wage costs in the wine industry.

d) A drop in the tax on wine.

e) A drop in the tax on beer but no change to the wine tax.

39. Table 2.16 shows the demand for and supply of packaged cookies in the economy of Hunter River.

<table>
<thead>
<tr>
<th>Price ($)</th>
<th>Demand</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

a) What is the equilibrium price and quantity?

b) Assume that the supply increases by 2 units at every price. What is the new equilibrium price and quantity?

c) Now assume that the demand increases by 2 units at every price. What is the new equilibrium price and quantity?

40. The two graphs in Figure 2.20 show the markets for orange juice and for apple juice, which are initially in equilibrium.
Show what will happen to the prices and quantities traded of both products if a severe frost in Florida were to seriously damage the orange crop.

41. Suppose that it is discovered that the herb anise, taken in the right proportions with chocolate, will cure male baldness. What effect will this have on the price and quantity traded of the following products?
   a) Hair transplants.
   b) Licorice candy, which is made with anise.
   c) Hair-cutting scissors.
   d) Chocolate.

42. How are each of the changes below explained in terms of changes in either supply or demand?
   a) The price of golf clubs increases and the quantity traded increases.
   b) The price of cigarettes increases and the quantity traded decreases.
   c) The price of squash rackets decreases and the quantity traded decreases.
   d) The price of computers decreases and the quantity traded increases.

Intermediate (Problems 43–45)

43. Consider the effects of each of the following events on the market for beef in Canada. Indicate, by placing a (↑), (↓), or (–) under the appropriate heading in Table 2.17, whether there will be an increase, decrease, or no change in demand, supply, equilibrium price, and quantity of beef traded.

<table>
<thead>
<tr>
<th>Event</th>
<th>Demand</th>
<th>Supply</th>
<th>Price</th>
<th>Quantity Traded</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Medical research indicates that cholesterol in beef is a major cause of heart attacks.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Improved cattle feeds reduce the cost of beef production.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Chicken sales are banned after an outbreak of chicken cholera.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) The price of pork decreases because the government gives a subsidy to pork producers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) A reduction in income taxes causes the incomes of Canadian consumers to rise sharply.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) The price of cattle feed rises during a drought.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

44. Table 2.18 shows the demand for the upcoming concert to be given by the string quartet, Guns and Butter, at the new 3000-capacity Saskatoon Auditorium.

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity Demanded</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10</td>
<td>8000</td>
</tr>
<tr>
<td>15</td>
<td>7000</td>
</tr>
<tr>
<td>20</td>
<td>6000</td>
</tr>
<tr>
<td>25</td>
<td>5000</td>
</tr>
<tr>
<td>30</td>
<td>4000</td>
</tr>
<tr>
<td>35</td>
<td>3000</td>
</tr>
<tr>
<td>40</td>
<td>2000</td>
</tr>
<tr>
<td>45</td>
<td>1000</td>
</tr>
</tbody>
</table>
a) Over what price range would there be a shortage of seats? Over what range would there be a surplus?
b) Suppose the promoters of the concert set the price at $25 per ticket. What will be the result?
c) Suppose that, in response to the great demand for the first concert, the promoters decide to add a second show open only to those who were unable to attend the first concert. What is the maximum price they could charge for this concert and still fill the auditorium?

45. “The price of potatoes will increase if their supply decreases. When the price of potatoes increases their supply increases.” Change one of these statements so that they are consistent with each other.

**Advanced (Problems 46–48)**

46. You are given Figure 2.21’s demand curves for Tomi, Tami, and Timi, citizens of Millerton.

![Figure 2.21](image1)

- **TABLE 2.19**

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>30</td>
<td>7</td>
</tr>
<tr>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>50</td>
<td>9</td>
</tr>
<tr>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>70</td>
<td>11</td>
</tr>
<tr>
<td>80</td>
<td>12</td>
</tr>
<tr>
<td>90</td>
<td>13</td>
</tr>
<tr>
<td>100</td>
<td>14</td>
</tr>
</tbody>
</table>

47. Given the graph of the market for starfruit shown in Figure 2.22, explain each change in terms of a shift in the appropriate curve, or movement along a curve; and for each change give an example of what might have caused the change:

![Figure 2.22](image2)

- a) From point \( a \) to point \( b \).
- b) From point \( a \) to point \( d \).
- c) From point \( c \) to \( d \).
- d) From point \( c \) to \( b \).

48. Suppose that in response to the high rent and low supply of affordable rental accommodation in the Vancouver market, the city decides to introduce a “rental chit” system. Low-income families will receive one chit per month with a value of $200, which can only be used to help pay their rent. Draw a supply and demand graph showing the effects on the rental market.
Web-Based Activities

Since this is the crucial introductory chapter to demand and supply analysis, rather than asking Web-based questions, we suggest that you spend some time doing the exercises in any one of the following three Web sites.

1. http://ecedweb.unomaha.edu/Dem_sup/econqui2.htm
The Algebra of Demand and Supply

We saw in the text how we can describe the market place in terms of both tables and graphs. In this appendix we will see how we can also analyze demand and supply algebraically. Suppose that Figure A1, the following graph and table, show the demand for soy milk in Canada:

![Figure A1: Graph and Table showing demand for soy milk in Canada.]

You will remember from the toolkit that, in general, the algebraic expression for a straight line is:

\[ Y = \alpha + \beta X \]

- \(\alpha\) is the value of the line where it crosses the Y-axis.
- \(\beta\) is the value of the slope.
- \(X\) is the variable that changes in response to the price of the good.

The Algebra of the Market

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The Algebra of the Market

You will remember from the toolkit that, in general, the algebraic expression for a straight line is:

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- \(\alpha\) is the value of the line where it crosses the Y-axis.
- \(\beta\) is the value of the slope.
- \(X\) is the variable that changes in response to the price of the good.
On our graph, price is shown on the vertical (Y) axis and quantity demanded on the horizontal (X) axis. Therefore the general expression for the demand curve is given as:

\[ P = \alpha + \beta Q^d \]

Here, the value of \( \alpha \) is equal to $(10). This is where the demand curve crosses the price axis, i.e., it is the highest price payable. The value of the slope is the ratio of change or rise/run. In terms of the demand curve, the slope shows by how much the quantity changes as the price changes, in other words:

\[
\text{the slope equals } \frac{\Delta \text{ (change in) } P}{\Delta \text{ (change in) } Q}
\]

For our demand curve, that value equals:

\[ \frac{1}{-2} \]

This means that each time the price changes by $1, quantity changes (in the opposite direction) by 2 units. The equation for this demand curve then is:

\[ P = 10 - \frac{1}{2} Q^d \]

Though this is graphically the correct way to express it, in terms of economic logic, the quantity demanded is dependent on the price, rather than the other way about, so let us re-arrange the terms, as follows:

\[ Q^d = 20 - 2P \]

Now let’s look at the supply side of things. The following table and graph, in Figure A2, show the supply of soy milk in the market:

<table>
<thead>
<tr>
<th>Price ($)</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>—</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
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<td>4</td>
<td>3</td>
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<td>5</td>
<td>4</td>
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<td>6</td>
<td>5</td>
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<td>7</td>
<td>6</td>
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<td>8</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>

The general equation for the supply curve is:

\[ P = \alpha + \beta Q^s \]
As with the demand curve, $\alpha$ shows the value where the curve crosses the vertical (price) axis. This happens at a price of $1. The value of the slope is, again, the same as for the demand curve:

$$\frac{\Delta \text{ (change in) } P}{\Delta \text{ (change in) } Q}$$

For this supply curve, it equals:

$$\frac{1}{1}$$

A $1$ change in price causes a change of 1 unit in the quantity supplied. The equation for this supply curve, then is:

$$P = 1 + Q^s$$

As we did with the demand curve, let us rearrange this equation in terms of $Q^s$, thus:

$$Q^s = -1 + P$$

Bringing demand and supply together, in Figure A3, allows us to find the equilibrium values.

From either the table or the graph, it is easy to see that the equilibrium price is equal to $7. At this price, the quantity demanded and quantity supplied are both 6 units. Finding equilibrium algebraically is also straightforward. We want to find the price at which the quantity demanded equals the quantity supplied. We know the equations for each so we simply set them equal, as follows:

$$Q^d = Q^s$$

$$20 - 2P = -1 + P$$
This gives us:

\[ 3P = 21 \]

Therefore,

\[ P = 7 \]

Substituting \( P = 7 \) in either equation (and it’s best to do both to make sure we are correct) gives us:

\[ Q^d = 20 - 2(7) = 6 \]
\[ Q^s = -1 + (7) = 6 \]

Doing things algebraically sometimes makes things easier. For instance, suppose the market demand increased by 3 units, i.e., the quantities demanded increased by 3 units at every price. What effect would this have on the equilibrium price and quantity? Algebraically, this is quite straightforward to calculate. The increase in demand means that the value of the (quantity) intercept increases by 3, and gives us a new demand equation as follows:

\[ Q^{d_2} = 23 - 2P \]

The supply has not changed, so we can calculate the new equilibrium as follows:

\[ (Q^{d_2} = Q^s) : 23 - 2P = -1 + P \]

This gives us:

\[ 3P = 24 \]

Therefore,

\[ P = 8 \]

and the new equilibrium quantity becomes 7.

---

**STUDY GUIDE QUESTIONS FOR APPENDIX TO CHAPTER 2**

1. If \( Q^d = 40 - 2P \) and \( Q^s = 10 + 3P \), what are the equilibrium values of price and quantity?

2. a) If \( Q^d = 100 - 5P \) and \( Q^s = 10 + P \), what are the equilibrium values of price and quantity?
   b) What will be the new equilibrium values of price and quantity if the demand increases by 30?

3. a) If \( P = 11 - 0.25 Q^d \), what is the algebraic expression for \( Q^d \)?
   b) If \( P = -16 + 2 Q^s \), what is the algebraic expression for \( Q^s \)?
   c) What are the equilibrium values of price and quantity?