Supply and Demand

3

LEARNING OBJECTIVES

After reading this chapter, you should know:

LO1. The meaning of market demand and supply.

LO2. How market prices are established.

LO3. What causes market prices to change.

LO4. How government price controls affect market outcomes.

The lights went out in California in January 2001. With only minutes of warning, sections of high-tech Silicon Valley, San Francisco, the state capital of Sacramento, and a host of smaller cities went dark. Schools closed early, traffic signals malfunctioned, ATM machines shut down, and elevators abruptly stopped. "It's like we're living in Bosnia," said Michael Mischer, an Oakland, California, baker. "How could this happen?"[1]

California's then governor, Gray Davis, had a ready answer. He said out-of-state power company "pirates" were gouging California residents with exorbitant prices they could not pay. As he saw it, the electricity crisis was a classic example of market-driven greed. To resolve the crisis, the governor proposed stiff price controls, the state purchase of transmission lines, and state-ordered customer refunds from "profiteering" power companies. As he saw it, only the state government could keep the lights on.

Critics said the governor's explanation made for good politics but bad economics. Government intervention, not the market, was the cause of the electricity crisis, they said. Supply and demand were out of balance in California and only *higher* prices and *less* government intervention could keep the lights on. U.S. Treasury Secretary Paul O'Neill criticized the governor for trying "to defeat economics . . . I mean, you don't have to have an economics degree to understand that this is an unworkable situation." One of UC–Berkeley's Nobel-winning economists, Daniel McFadden, echoed that sentiment, blaming the state's "rigid regulation" for its energy woes.

California's 2001 energy crisis is a classic illustration of why the choice between market reliance and government intervention is so critical and often so controversial. The goal of this chapter is to put that choice into a coherent framework. To do so, we'll focus on how unregulated markets work. How does the market mechanism decide WHAT to produce, HOW to produce, and FOR WHOM to produce? Specifically,

- **What determines the price of a good or service?**
- **How does the price of a product affect its production and consumption?**
- **Why do prices and production levels often change?**

Once we've seen how unregulated markets work, we'll observe how government intervention may alter market outcomes—for better or worse. Hopefully, the lights won't go off before we finish.

[1]Rene Sanchez and William Booth, "California Forced to Turn the Lights Off," *Washington Post*, January 18, 2001, p. 1.

MARKET PARTICIPANTS

A good way to start figuring out how markets work is to see who participates in them. The answer is simple: just about every person and institution on the planet. Domestically, over 300 million consumers, about 20 million business firms, and tens of thousands of government agencies participate directly in the U.S. economy. Millions of international buyers and sellers also participate in U.S. markets.

Maximizing Behavior

All these market participants enter the marketplace to satisfy specific goals. Consumers, for example, come with a limited amount of income to spend. Their objective is to buy the most desirable goods and services that their limited budgets will permit. We can't afford *everything* we want, so we must make *choices* about how to spend our scarce dollars. Our goal is to *maximize* the utility (satisfaction) we get from our available incomes.

Businesses also try to maximize in the marketplace. In their case, the quest is for maximum *profits.* Business profits are the difference between sales receipts and total costs. To maximize profits, business firms try to use resources efficiently in producing products that consumers desire.

The public sector also has maximizing goals. The economic purpose of government is to use available resources to serve public needs. The resources available for this purpose are limited too. Hence, local, state, and federal governments must use scarce resources carefully, striving to maximize the general welfare of society. International consumers and producers pursue these same goals when participating in our markets.

Market participants sometimes lose sight of their respective goals. Consumers sometimes buy impulsively and later wish they'd used their income more wisely. Likewise, a producer may take a 2-hour lunch, even at the sacrifice of maximum profits. And elected officials sometimes put their personal interests ahead of the public's interest. In all sectors of the economy, however, ***the basic goals of utility maximization, profit maximization, and welfare maximization explain most market activity.***

Specialization and Exchange

We are driven to buy and sell goods and services in the market by two simple facts. First, most of us are incapable of producing everything we want to consume. Second, even if we *could* produce all our own goods and services, it would still make sense to *specialize,* producing only one product and *trading* it for other desired goods and services.

Suppose you were capable of growing your own food, stitching your own clothes, building your own shelter, and even writing your own economics text. Even in this little utopia, it would still make sense to decide how *best* to expend your limited time and energy, relying on others to fill in the gaps. If you were *most* proficient at growing food, you would be best off spending your time farming. You could then *exchange* some of your food output for the clothes, shelter, and books you wanted. In the end, you'd be able to consume *more* goods than if you'd tried to make everything yourself.

Our economic interactions with others are thus necessitated by two constraints:

1. Our absolute inability as individuals to produce all the things we need or desire.
2. The limited amount of time, energy, and resources we have for producing those things we could make for ourselves.

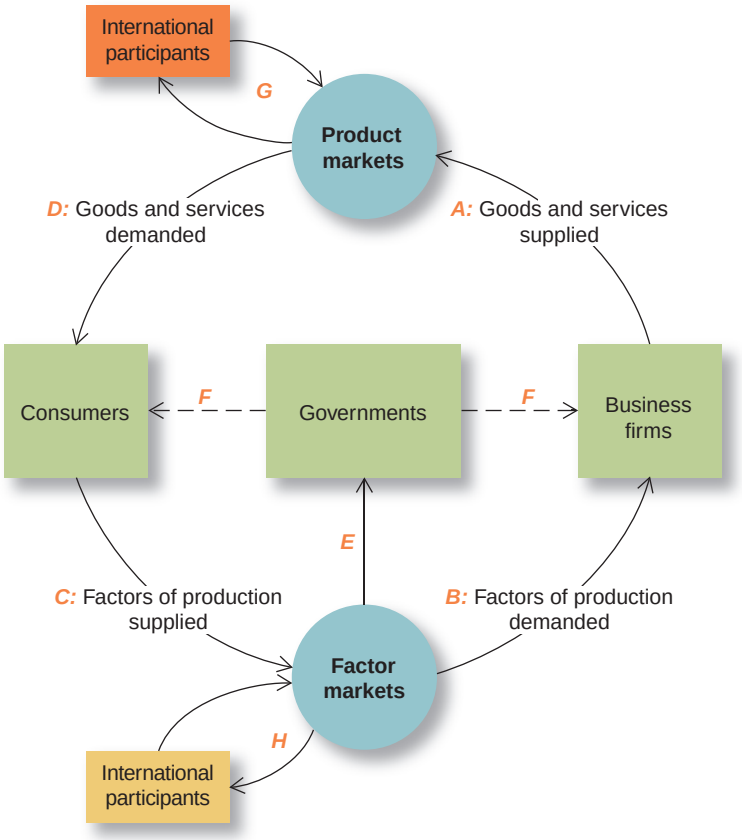
Together, these constraints lead us to specialize and interact. Most of the interactions that result take place in the market.

THE CIRCULAR FLOW

Figure 3.1 summarizes the kinds of interactions that occur among market participants. Note first that the figure identifies four separate groups of participants. Domestically, the rectangle labeled "Consumers" includes all 300 million consumers in the United States. In the "Business firms" box are grouped all the domestic business enterprises that buy and sell goods and services. The third participant, "Governments," includes the many separate agencies of the federal government, as well as state and local governments. Figure 3.1 also illustrates the role of global actors.

FIGURE 3.1
The Circular Flow

Business firms supply goods and services to product markets (point *A*) and purchase factors of production in factor markets (*B*). Individual consumers supply factors of production such as their own labor (*C*) and purchase final goods and services (*D*). Federal, state, and local governments acquire resources in factor markets (*E*) and provide services to both consumers and business (*F*). International participants also take part by supplying imports, purchasing exports (*G*), and buying and selling factors of production (*H*).



The Two Markets

factor market: Any place where factors of production (e.g., land, labor, capital) are bought and sold.

product market: Any place where finished goods and services (products) are bought and sold.

opportunity cost: The most desired goods or services that are forgone in order to obtain something else.

The easiest way to keep track of all this activity is to distinguish two basic markets. Figure 3.1 makes this distinction by portraying separate circles for product markets and factor markets. In **factor markets,** factors of production are exchanged. Market participants buy or sell land, labor, or capital that can be used in the production process. When you go looking for work, for example, you're making a factor of production—your labor—available to producers. The producers will hire you—purchase your services in the factor market—if you're offering the skills they need at a price they're willing to pay. The same kind of interaction occurs in factor markets when the government enlists workers into the armed services or when the Japanese buy farmland in Montana.

Interactions within factor markets are only half the story. At the end of a hard day's work, consumers go to the grocery store (or to a virtual store online) to buy desired goods and services—that is, to buy *products.* In this context, consumers again interact with business firms, this time purchasing goods and services those firms have produced. These interactions occur in **product markets.** Foreigners also participate in the product market by supplying goods and services (imports) to the United States and buying some of our output (exports).

The government sector also supplies services (e.g., education, national defense, highways). Most government services aren't explicitly sold in product markets, however. Typically, they're delivered "free," without an explicit price (e.g., public elementary schools, highways). This doesn't mean government services are truly free, though. There's still an **opportunity cost** associated with every service the government provides. Consumers and businesses pay that cost indirectly through taxes rather than directly through market prices.

In Figure 3.1, the arrow connecting product markets to consumers (point *D*) emphasizes the fact that consumers, by definition, don't supply products. When individuals produce

goods and services, they do so within the government or business sector. For instance, a doctor, a dentist, or an economic consultant functions in two sectors. When selling services in the market, this person is regarded as a "business"; when away from the office, he or she is regarded as a "consumer." This distinction is helpful in emphasizing that ***the consumer is the final recipient of all goods and services produced.***

Locating Markets. Although we refer repeatedly to two kinds of markets in this book, it would be a little foolish to go off in search of the product and factor markets. Neither market is a single, identifiable structure. The term *market* simply refers to a place or situation where an economic exchange occurs—where a buyer and seller interact. The exchange may take place on the street, in a taxicab, over the phone, by mail, or in cyberspace. In some cases, the market used may in fact be quite distinguishable, as in the case of a retail store, the Chicago Commodity Exchange, or a state employment office. But whatever it looks like, ***a market exists wherever and whenever an exchange takes place.***

Dollars and Exchange

Figure 3.1 provides a useful summary of market activities, but it neglects one critical element of market interactions: dollars. Each arrow in the figure actually has two dimensions. Consider again the arrow linking consumers to product markets: It's drawn in only one direction because consumers, by definition, don't provide goods and services directly to product markets. But they do provide something: dollars. If you want to obtain something from a product market, you must offer to pay for it (typically, with cash, check, or credit card). Consumers exchange dollars for goods and services in product markets.

The same kinds of exchange occur in factor markets. When you go to work, you exchange a factor of production (your labor) for income, typically a paycheck. Here again, the path connecting consumers to factor markets really goes in two directions: one of real resources, the other of dollars. Consumers receive wages, rent, and interest for the labor, land, and capital they bring to the factor markets. Indeed, nearly ***every market transaction involves an exchange of dollars for goods (in product markets) or resources (in factor markets).*** Money is thus critical in facilitating market exchanges and the specialization the exchanges permit.

Supply and Demand

In every market transaction there must be a buyer and a seller. The seller is on the **supply** side of the market; the buyer is on the **demand** side. As noted earlier, we *supply* resources to the market when we look for a job—that is, when we offer our labor in exchange for income. We *demand* goods when we shop in a supermarket—that is, when we're prepared to offer dollars in exchange for something to eat. Business firms may *supply* goods and services in product markets at the same time they're *demanding* factors of production in factor markets. Whether one is on the supply side or the demand side of any particular market transaction depends on the nature of the exchange, not on the people or institutions involved.

supply: The ability and willingness to sell (produce) specific quantities of a good at alternative prices in a given time period, *ceteris paribus.*

demand: The ability and willingness to buy specific quantities of a good at alternative prices in a given time period, *ceteris paribus.*

DEMAND

To get a sense of how the demand side of market transactions works, we'll focus first on a single consumer. Then we'll aggregate to illustrate *market* demand.

Individual Demand

We can begin to understand how market forces work by looking more closely at the behavior of a single market participant. Let us start with Tom, a senior at Clearview College. Tom has majored in everything from art history to government in his 3 years at Clearview. He didn't connect to any of those fields and is on the brink of academic dismissal. To make matters worse, his parents have threatened to cut him off financially unless he gets serious about his course work. By that, they mean he should enroll in courses that will lead to a job after graduation. Tom thinks he has found the perfect solution: Web design. Everything associated with the Internet pays big bucks. Plus, the girls seem to think Webbies are "cool." Or at least so Tom thinks. And his parents would definitely approve. So Tom has enrolled in Web-design courses.

Unfortunately for Tom, he never developed computer skills. Until he got to Clearview College, he thought mastering Sony's latest alien-attack video game was the pinnacle of electronic wizardry. Tom didn't have a clue about "streaming," "interfacing," "animation," or the other concepts the Web-design instructor outlined in the first lecture.

Given his circumstances, Tom was desperate to find someone who could tutor him in Web design. But desperation is not enough to secure the services of a Web architect. In a market-based economy, you must also be willing to *pay* for the things you want. Specifically, ***a demand exists only if someone is willing and able to pay for the good***—that is, exchange dollars for a good or service in the marketplace. Is Tom willing and able to *pay* for the Web-design tutoring he so obviously needs?

Let us assume that Tom has some income and is willing to spend some of it to get a tutor. Under these assumptions, we can claim that Tom is a participant in the *market* for Web-design services.

But how much is Tom willing to pay? Surely, Tom is not prepared to exchange *all* his income for help in mastering Web design. After all, Tom could use his income to buy more desirable goods and services. If he spent all his income on a Web tutor, that help would have an extremely high *opportunity cost.* He would be giving up the opportunity to spend that income on other goods and services. He'd pass his Web-design class but have little else. It doesn't sound like a good idea.

It seems more likely that there are *limits* to the amount Tom is willing to pay for any given quantity of Web-design tutoring. These limits will be determined by how much income Tom has to spend and how many other goods and services he must forsake in order to pay for a tutor.

Tom also knows that his grade in Web design will depend in part on how much tutoring service he buys. He can pass the course with only a few hours of design help. If he wants a better grade, however, the cost is going to escalate quickly.

Naturally, Tom wants it all: an A in Web design and a ticket to higher-paying jobs. But here again the distinction between *desire* and *demand* is relevant. He may *desire* to master Web design, but his actual proficiency will depend on how many hours of tutoring he is willing to *pay* for.

demand schedule: A table showing the quantities of a good a consumer is willing and able to buy at alternative prices in a given time period, *ceteris paribus.*

We assume, then, that when Tom starts looking for a Web-design tutor he has in mind some sort of **demand schedule,** like that described in Figure 3.2. According to row *A* of this schedule, Tom is willing and able to buy only 1 hour of tutoring service per semester if he must pay $50 an hour. At such an outrageous price he will learn minimal skills and just pass the course.

At lower prices, Tom would behave differently. According to Figure 3.2, Tom would purchase more tutoring services if the price per hour were less. At lower prices, he would not have to give up so many other goods and services for each hour of technical help. Indeed, we see from row *I* of the demand schedule that Tom is willing to purchase 20 hours per semester—the whole bag of design tricks—if the price of tutoring is as low as $10 per hour.

Notice that the demand schedule doesn't tell us anything about *why* this consumer is willing to pay specific prices for various amounts of tutoring. Tom's expressed willingness to pay for Web-design tutoring may reflect a desperate need to finish a Web-design course, a lot of income to spend, or a relatively small desire for other goods and services. All the demand schedule tells us is what the consumer is *willing and able* to buy, for whatever reasons.

Also observe that the demand schedule doesn't tell us how many hours of design help the consumer will *actually* buy. Figure 3.2 simply states that Tom is *willing and able* to pay for 1 hour of tutoring per semester at $50 per hour, for 2 hours at $45 each, and so on. How much tutoring he purchases will depend on the actual price of such services in the market. Until we know that price, we cannot tell how much service will be purchased. Hence ***"demand" is an expression of consumer buying intentions, of a willingness to buy, not a statement of actual purchases.***

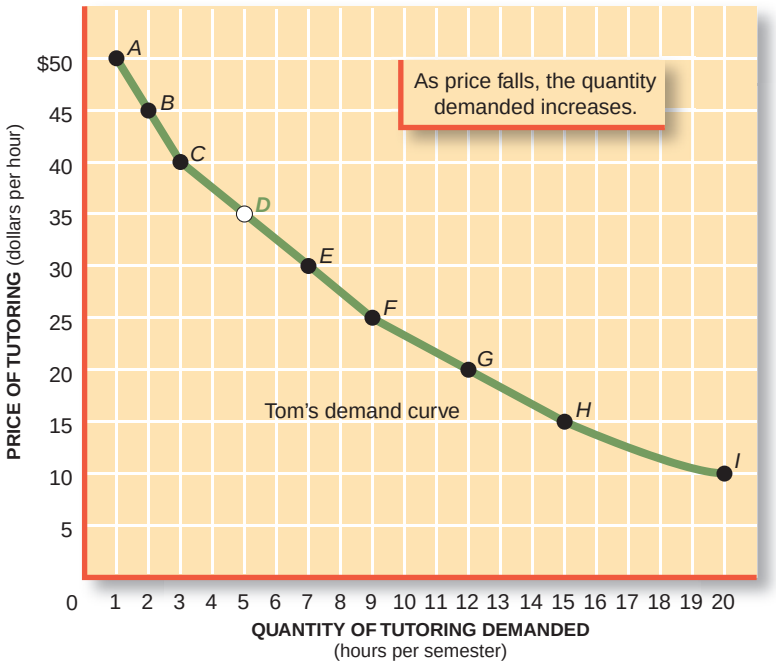


FIGURE 3.2
A Demand Schedule and Curve

A demand schedule indicates the quantities of a good a consumer is able and willing to buy at alternative prices (*ceteris paribus*). The demand schedule below indicates that Tom would buy 5 hours of Web tutoring per semester if the price were $35 per hour (row *D*). If Web tutoring were less expensive (rows *E*–*I*), Tom would purchase a larger quantity.

A demand curve is a graphical illustration of a demand schedule. Each point on the curve refers to a specific quantity that will be demanded at a given price. If, for example, the price of Web tutoring were $35 per hour, this curve tells us the consumer would purchase 5 hours per semester (point *D*). If Web tutoring cost $30 per hour, 7 hours per semester would be demanded (point *E*). Each point on the curve corresponds to a row in the schedule.

	Tom's Demand Schedule	
	Price of Tutoring (per hour)	Quantity of Tutoring Demanded (hours per semester)
A	$50	1
B	45	2
C	40	3
D	35	5
E	30	7
F	25	9
G	20	12
H	15	15
I	10	20

A convenient summary of buying intentions is the **demand curve,** a graphical illustration of the demand schedule. The demand curve in Figure 3.2 tells us again that this consumer is willing to pay for only 1 hour of tutoring per semester if the price is $50 per hour (point *A*), for 2 if the price is $45 (point *B*), for 3 at $40 an hour (point *C*), and so on. Once we know what the market price of tutoring actually is, a glance at the demand curve tells us how much service this consumer will buy.

demand curve: A curve describing the quantities of a good a consumer is willing and able to buy at alternative prices in a given time period, *ceteris paribus.*

What the notion of *demand* emphasizes is that ***the amount we buy of a good depends on its price.*** We seldom if ever decide to buy only a certain quantity of a good at whatever price is charged. Instead, we enter markets with a set of desires and a limited amount of money to spend. How much we actually buy of any good will depend on its price.

A common feature of demand curves is their downward slope. ***As the price of a good falls, people purchase more of it.*** In Figure 3.2 the quantity of Web-tutorial services demanded increases (moves rightward along the horizontal axis) as the price per hour

IN THE NEWS

Auto Makers Return to Deep Discounts

GM's Problems Prompt Price Cuts of up to $10,000; Ford, Chrysler Likely to Follow

General Motors reintroduced heavy incentives on many of its 2005 and 2006 models yesterday, slashing sticker prices by as much as $10,000 on some cars and trucks.

The huge price cuts come after General Motors Corp.'s sales plunged in October and are an acknowledgment that the world's largest auto maker needs to boost sales as it grapples with a $1.6 billion loss in the third quarter and decreasing market share. Some of the new discounts are even better deals for car buyers than this summer's popular employee-discount program.

All three U.S. car makers enjoyed a surge in sales this summer when they offered customers the same prices they had previously given their own employees. That boosted sales but cut deeply into profit margins, especially for GM and Ford. Each reported massive losses in North America in the third quarter.

More than a month ago, the Big Three cut off the employee-pricing discounts in a bid to set new prices that are above employee levels.

—Gina Chon

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Analysis: The law of demand predicted that General Motors would sell fewer cars if it raised its price and more cars if it reduced their price. That is exactly what happened.

law of demand: The quantity of a good demanded in a given time period increases as its price falls, *ceteris paribus*.

decreases (moves down the vertical axis). This inverse relationship between price and quantity is so common we refer to it as the **law of demand.** General Motors used this law to increase auto sales in 2005–2006 (see News).

Determinants of Demand

The demand curve in Figure 3.2 has only two dimensions—quantity demanded (on the horizontal axis) and price (on the vertical axis). This seems to imply that the amount of tutoring demanded depends only on the price of that service. This is surely not the case. A consumer's willingness and ability to buy a product at various prices depend on a variety of forces. ***The determinants of market demand include***

- ***Tastes*** (desire for this and other goods).
- ***Income*** (of the consumer).
- ***Other goods*** (their availability and price).
- ***Expectations*** (for income, prices, tastes).
- ***Number of buyers.***

Tom's "taste" for tutoring has nothing to do with taste buds. *Taste* is just another word for desire. In this case Tom's taste for Web-design services is clearly acquired. If he didn't have to pass a Web-design course, he would have no desire for related services, and thus no demand. If he had no income, he couldn't *demand* any Web-design tutoring either, no matter how much he might *desire* it.

substitute goods: Goods that substitute for each other; when the price of good *x* rises, the demand for good *y* increases, *ceteris paribus.*

Other goods also affect the demand for tutoring services. Their effect depends on whether they're *substitute* goods or *complementary* goods. A **substitute good** is one that might be purchased instead of tutoring services. In Tom's simple world, pizza is a substitute for tutoring. If the price of pizza fell, Tom would use his limited income to buy more pizzas and cut back on his purchases of Web tutoring. When the price of a substitute good falls, the demand for tutoring services declines.

complementary goods: Goods frequently consumed in combination; when the price of good *x* rises, the demand for good *y* falls, *ceteris paribus.*

A **complementary good** is one that's typically consumed with, rather than instead of, tutoring. If textbook prices or tuition increases, Tom might take fewer classes and demand *less* Web-design assistance. In this case, a price increase for a complementary good causes the demand for tutoring to decline.

Expectations also play a role in consumer decisions. If Tom expected to flunk his Web-design course anyway, he probably wouldn't waste any money getting tutorial help; his demand for such services would disappear. On the other hand, if he expects a Web tutor to determine his college fate, he might be more willing to buy such services.

Ceteris Paribus

If demand is in fact such a multidimensional decision, how can we reduce it to only the two dimensions of price and quantity? In Chapter 1 we first encountered this ***ceteris paribus*** trick. To simplify their models of the world, economists focus on only one or two forces at a time and *assume* nothing else changes. We know a consumer's tastes, income, other goods, and expectations all affect the decision to hire a tutor. But we want to focus on the relationship between quantity demanded and price. That is, we want to know what *independent* influence price has on consumption decisions. To find out, we must isolate that one influence, price, and assume that the determinants of demand remain unchanged.

ceteris paribus: The assumption of nothing else changing.

The *ceteris paribus* assumption is not as farfetched as it may seem. People's tastes, income, and expectations do not change quickly. Also, the prices and availability of other goods don't change all that fast. Hence, a change in the *price* of a product may be the only factor that prompts an immediate change in quantity demanded.

The ability to predict consumer responses to a price change is important. What would happen, for example, to enrollment at your school if tuition doubled? Must we guess? Or can we use demand curves to predict how the quantity of applications will change as the price of college goes up? ***Demand curves show us how changes in market prices alter consumer behavior.*** We used the demand curve in Figure 3.2 to predict how Tom's Web-design ability would change at different tutorial prices.

Shifts in Demand

Although demand curves are useful in predicting consumer responses to market signals, they aren't infallible. The problem is that ***the determinants of demand can and do change.*** When they do, a specific demand curve may become obsolete. A ***demand curve (schedule) is valid only so long as the underlying determinants of demand remain constant.*** If the *ceteris paribus* assumption is violated—if tastes, income, other goods, or expectations change—the ability or willingness to buy will change. When this happens, the demand curve will **shift** to a new position.

shift in demand: A change in the quantity demanded at any (every) given price.

Suppose, for example, that Tom won $1,000 in the state lottery. This increase in his income would greatly increase his ability to pay for tutoring services. Figure 3.3 shows the effect of this windfall on Tom's demand. The old demand curve, D_1, is no longer relevant. Tom's lottery winnings enable him to buy *more* tutoring at any price, as illustrated by the new demand curve, D_2. According to this new curve, lucky Tom is now willing and able to buy 12 hours per semester at the price of $35 per hour (point d_2). This is a large increase in demand; previously (before winning the lottery) he demanded only 5 hours at that price (point d_1).

With his higher income, Tom can buy more tutoring services at every price. Thus, ***the entire demand curve shifts to the right when income goes up.*** Figure 3.3 illustrates both the old (prelottery) and the new (postlottery) demand curves.

Income is only one of the basic determinants of demand. Changes in any of the other determinants of demand would also cause the demand curve to shift. Tom's taste for Web tutoring might increase dramatically, for example, if his parents promised to buy him a new car for passing Web design. In that case, he might be willing to forgo other goods and spend more of his income on tutors. ***An increase in taste (desire) also shifts the demand curve to the right.***

Pizza and Politics. A similar demand shift occurs at the White House when a political crisis erupts. On an average day, White House staffers order about $180 worth of pizza from the nearby Domino's. When a crisis hits, however, staffers work well into the night and their demand for pizza soars. On the days preceding the March 2003 invasion of Iraq, White House staffers ordered more than $1,000 worth of pizza

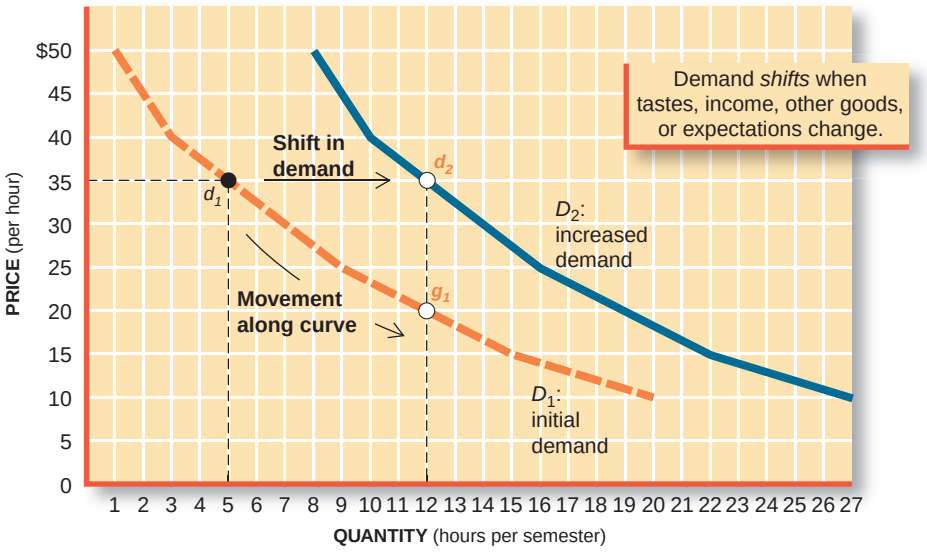
webnote

Priceline.com is an online service for purchasing airline tickets, vacation packages, and car rentals. The site allows you to specify the *highest* price you're willing to pay for air travel between two cities. In effect, you reveal your demand curve to Priceline. If you use the price-naming option and they find a ticket that costs no more than the price you're willing and able to pay, you must buy it. Priceline makes a profit by matching demand and supply. Try it at www.priceline.com

FIGURE 3.3
Shifts vs. Movements

A demand curve shows how a consumer responds to price changes. If the determinants of demand stay constant, the response is a *movement* along the curve to a new quantity demanded. In this case, the quantity demanded increases from 5 (point d_1), to 12 (point g_1), when price falls from $35 to $20 per hour.

If the determinants of demand change, the entire demand curve *shifts.* In this case, an increase in income increases demand. With more income, Tom is willing to buy 12 hours at the initial price of $35 (point d_2), not just the 5 hours he demanded before the lottery win.



	Price (per hour)	Quantity Demanded (hours per semester)	
		Initial Demand	After Increase in Income
A	$50	1	8
B	45	2	9
C	40	3	10
D	35	5	12
E	30	7	14
F	25	9	16
G	20	12	19
H	15	15	22
I	10	20	27

per day! Political analysts now use pizza deliveries to predict major White House announcements.

Movements vs. Shifts

It's important to distinguish shifts of the demand curve from movements along the demand curve. ***Movements along a demand curve are a response to price changes for that good.*** Such movements assume that determinants of demand are unchanged. By contrast, ***shifts of the demand curve occur when the determinants of demand change.*** When tastes, income, other goods, or expectations are altered, the basic relationship between price and quantity demanded is changed (shifts).

For convenience, movements along a demand curve and shifts of the demand curve have their own labels. Specifically, take care to distinguish

- ***Changes in quantity demanded:*** movements along a given demand curve, in response to price changes of that good.
- ***Changes in demand:*** shifts of the demand curve due to changes in tastes, income, other goods, or expectations.

Tom's behavior in the Web-tutoring market will change if either the price of tutoring changes (a movement) or the underlying determinants of his demand are altered (a shift).

Notice in Figure 3.3 that he ends up buying 12 hours of Web tutoring if either the price of tutoring falls (to $20 per hour) or his income increases. Demand curves help us predict those market responses.

Market Demand

Whatever we say about demand for Web-design tutoring on the part of one wannabe Web master, we can also say about every student at Clearview College (or, for that matter, about all consumers). Some students have no interest in Web design and aren't willing to pay for related services: They don't participate in the Web-tutoring market. Other students want such services but don't have enough income to pay for them: They too are excluded from the Web-tutoring market. A large number of students, however, not only have a need (or desire) for Web tutoring but also are willing and able to purchase such services.

What we start with in product markets, then, is many individual demand curves. Fortunately, it's possible to combine all the individual demand curves into a single **market demand.** The aggregation process is no more difficult than simple arithmetic. Suppose you would be willing to buy 1 hour of tutoring per semester at a price of $80 per hour. George, who is also desperate to learn Web design, would buy 2 at that price; and I would buy none, since my publisher (McGraw-Hill) creates a Web page for me (try mhhe.com/economics/Schiller11). What would our combined (market) demand for hours of tutoring be at that price? Clearly, our individual inclinations indicate that we would be willing to buy a total of 3 hours of tutoring per semester if the price were $80 per hour. Our combined willingness to buy—our collective market demand—is nothing more than the sum of our individual demands. The same kind of aggregation can be performed for all consumers, leading to a summary of the total market demand for a specific good or service. Thus ***market demand is determined by the number of potential buyers and their respective tastes, incomes, other goods, and expectations.***

market demand: The total quantities of a good or service people are willing and able to buy at alternative prices in a given time period; the sum of individual demands.

The Market Demand Curve

Figure 3.4 provides the basic market demand schedule for a situation in which only three consumers participate in the market. It illustrates the same market situation with demand curves. The three individuals who participate in the market demand for Web tutoring at Clearview College obviously differ greatly, as suggested by their respective demand schedules. Tom's demand schedule is portrayed in the first column of the table (and is identical to the one we examined in Figure 3.2). George is also desperate to acquire some job skills and is willing to pay relatively high prices for Web-design tutoring. His demand is summarized in the second column under Quantity Demanded in the table.

The third consumer in this market is Lisa. Lisa already knows the nuts and bolts of Web design, so she isn't so desperate for tutorial services. She would like to upgrade her skills, however, especially in animation and e-commerce applications. But her limited budget precludes paying a lot for help. She will buy some technical support only if the price falls to $30 per hour. Should tutors cost less, she'd even buy quite a few hours of design services. Finally, there is my demand schedule (column 4 under Quantity Demanded), which confirms that I really don't participate in the Web-tutoring market.

The differing personalities and consumption habits of Tom, George, Lisa, and me are expressed in our individual demand schedules and associated curves in Figure 3.4. To determine the *market* demand for tutoring from this information, we simply add these four separate demands. The end result of this aggregation is, first, a *market* demand schedule and, second, the resultant *market* demand curve. These market summaries describe the various quantities of tutoring that Clearview College students are *willing and able* to purchase each semester at various prices.

How much Web tutoring will be purchased each semester? Knowing how much help Tom, George, Lisa, and I are willing to buy at various prices doesn't tell you how much we're actually going to purchase. To determine the actual consumption of Web tutoring, we have to know something about prices and supplies. Which of the many different prices illustrated in Figures 3.3 and 3.4 will actually prevail? How will that price be determined?

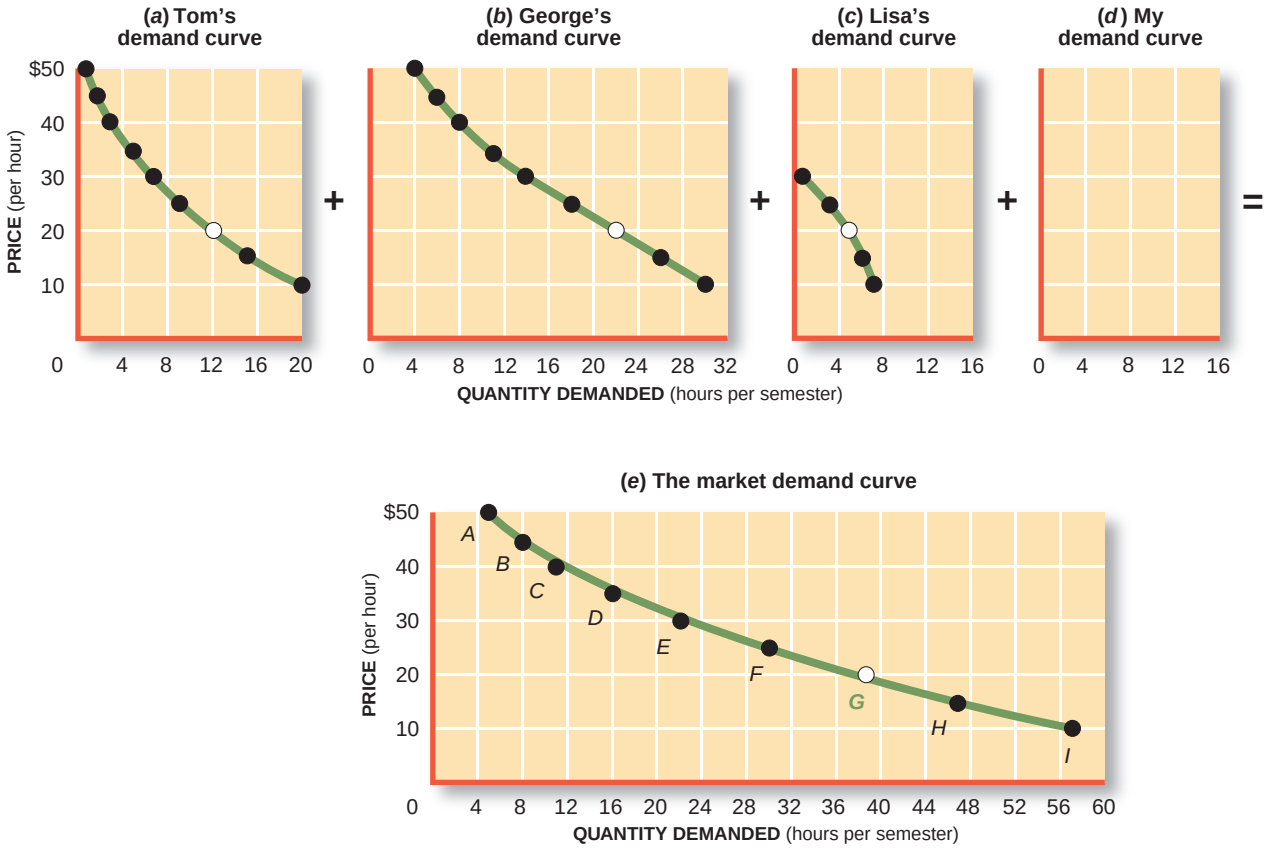


FIGURE 3.4
Construction of the Market Demand Curve

Market demand represents the combined demands of all market participants. To determine the total quantity of Web tutoring demanded at any given price, we add the separate demands of the individual consumers. Row *G* of this schedule indicates that a *total* quantity of 39 hours per semester will be demanded at a price of $20 per hour. This same conclusion is reached by adding the individual demand curves, leading to point *G* on the market demand curve (see above).

	Price (per hour)	Quantity of Tutoring Demanded (hours per semester)								
		Tom	+	George	+	Lisa	+	Me	=	Market Demand
A	$50	1		4		0		0		5
B	45	2		6		0		0		8
C	40	3		8		0		0		11
D	35	5		11		0		0		16
E	30	7		14		1		0		22
F	25	9		18		3		0		30
G	20	12		22		5		0		39
H	15	15		26		6		0		47
I	10	20		30		7		0		57

SUPPLY

To understand how the price of Web tutoring is established, we must also look at the other side of the market: the *supply* side. We need to know how many hours of tutoring services people are willing and able to *sell* at various prices, that is, the **market supply.** As on the demand side, the *market supply* depends on the behavior of all the individuals willing and able to supply Web tutoring at some price.

market supply: The total quantities of a good that sellers are willing and able to sell at alternative prices in a given time period, *ceteris paribus.*

Determinants of Supply

Let's return to the Clearview campus for a moment. What we need to know now is how much tutorial help people are willing and able to provide. Generally speaking, Web-page design can be fun, but it can also be drudge work, especially when you're doing it for someone else. Software programs like PhotoShop, Flash, and Fireworks have made Web-page design easier and more creative. And Wi-Fi laptops have made the job more convenient. But teaching someone else to design Web pages is still work. So why does anyone do it? Easy answer: for the money. People offer (supply) tutoring services to earn income that they, in turn, can spend on the goods and services they desire.

How much income must be offered to induce Web designers to do a job depends on a variety of things. The ***determinants of market supply include***

- ***Technology***
- ***Factor cost***
- ***Other goods***
- ***Taxes and subsidies***
- ***Expectations***
- ***Number of sellers***

The technology of Web design, for example, is always getting easier and more creative. With a program like PageOut, for example, it's very easy to create a bread-and-butter Web page. A continuous stream of new software programs (e.g., Fireworks, DreamWeaver) keeps stretching the possibilities for graphics, animation, interactivity, and content. These technological advances mean that Web-design services can be supplied more quickly and cheaply. They also make *teaching* Web design easier. As a result, they induce people to supply more tutoring services at every price.

How much Web-design service is offered at any given price also depends on the cost of factors of production. If the software programs needed to create Web pages are cheap (or, better yet, free), Web designers can afford to charge lower prices. If the required software inputs are expensive, however, they will have to charge more money per hour for their services.

Other goods can also affect the willingness to supply Web-design services. If you can make more income waiting tables than you can tutoring lazy students, why would you even boot up the computer? As the prices paid for other goods and services change, they will influence people's decision about whether to offer Web services.

In the real world, the decision to supply goods and services is also influenced by the long arm of Uncle Sam. Federal, state, and local governments impose taxes on income earned in the marketplace. When tax rates are high, people get to keep less of the income they earn. Once taxes start biting into paychecks, some people may conclude that tutoring is no longer worth the hassle and withdraw from the market.

Expectations are also important on the supply side of the market. If Web designers expect higher prices, lower costs, or reduced taxes, they may be more willing to learn new software programs. On the other hand, if they have poor expectations about the future, they may just sell their computers and find something else to do.

Finally, we note that the number of potential tutors will affect the quantity of service offered for sale at various prices. If there are lots of willing tutors on campus, a lot of tutorial service will be available at reasonable prices.

All these considerations—factor costs, technology, expectations—affect the decision to offer Web services and at what price. In general, we assume that Web architects will be willing to provide more tutoring if the per-hour price is high and less if the price is low. In other words, there is a **law of supply** that parallels the law of demand. ***The law of supply says that larger quantities will be offered for sale at higher prices.*** Here again, the laws rest on the *ceteris paribus* assumption: The quantity supplied increases at higher prices *if*

webnote

Sellers of books and cars post asking prices for their products on the Internet. With the help of search engines such as autoweb.com consumers can locate the seller who's offering the lowest price. By examining a lot of offers, you could also construct a supply curve showing how the quantity supplied increases at higher prices.

law of supply: The quantity of a good supplied in a given time period increases as its price increases, *ceteris paribus.*

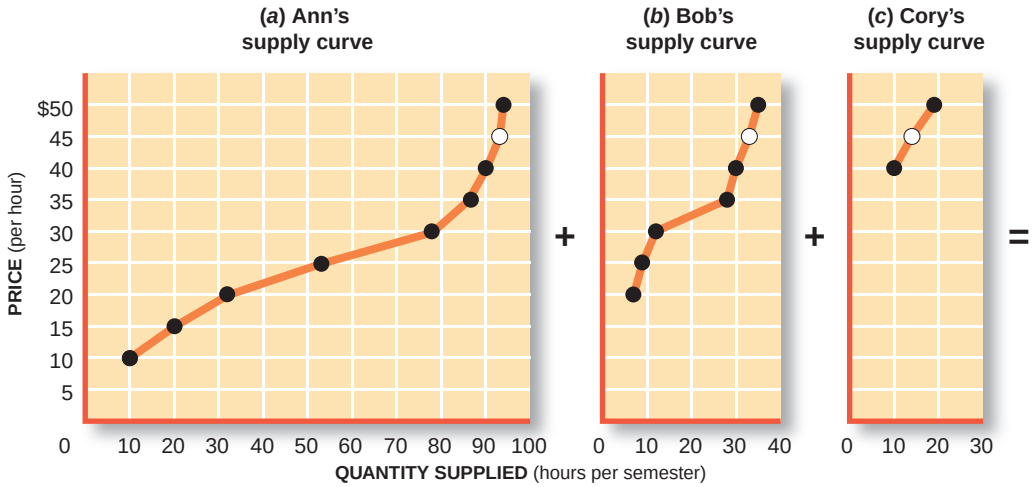
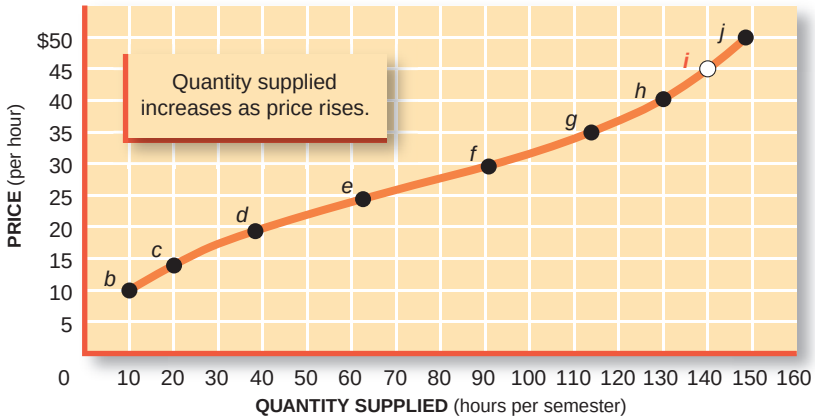


FIGURE 3.5
Market Supply

The market supply curve indicates the *combined* sales intentions of all market participants. If the price of tutoring were $45 per hour (point *i*), the *total* quantity of services supplied would be 140 hours per semester. This quantity is determined by adding the supply decisions of all individual producers. In this case, Ann supplies 93 hours, Bob supplies 33, and Cory supplies the rest.



	Price (per hour)	Quantity of Tutoring Supplied by: Ann	+	Bob	+	Cory	=	Market
j	$50	94		35		19		148
i	45	93		33		14		140
h	40	90		30		10		130
g	35	86		28		0		114
f	30	78		12		0		90
e	25	53		9		0		62
d	20	32		7		0		39
c	15	20		0		0		20
b	10	10		0		0		10

the determinants of supply are constant. ***Supply curves are upward-sloping to the right,*** as in Figure 3.5. Note how the *quantity supplied* jumps from 39 hours (point *d*) to 130 hours (point *h*) when the price of Web service doubles (from $20 to $40 per hour).

Market Supply

Figure 3.5 also illustrates how market supply is constructed from the supply decisions of individual sellers. In this case, only three Web masters are available. Ann is willing to

IN THE NEWS

Another Storm Casualty: Oil Prices

The region that produces and refines a major portion of the nation's **oil** and natural gas was largely shut down by Hurricane Katrina yesterday, further tightening strained energy markets and sending prices to new highs.

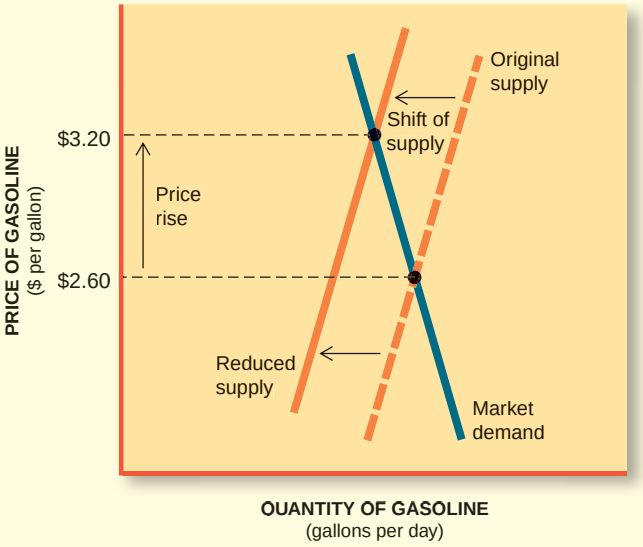
As **oil** companies evacuated offshore operations throughout the Gulf of Mexico, **oil** production in that region was reduced by 92 percent and gas output was cut by 83 percent.

The latest interruptions in **oil supplies** are likely to send retail gasoline prices even higher than the current average of $2.60 a gallon. . . .

The Gulf of Mexico, which produces 27 percent of the nation's **oil** and a fifth of its natural gas, is dotted with nearly 4,000 platforms linked by 33,000 miles of underwater pipelines. Over the weekend, **oil** companies withdrew their workers from 615 platforms and 96 drilling rigs in the gulf.

—Jad Mouawad and Simon Romero

Source: From "Another Storm Casualty: Oil Prices" by Jad Mouawad and Simon Romero, *The New York Times*, August 30, 2005, p. 1. Copyright © 2005 by The New York Times Co. Reprinted with permission.



Analysis: When factor costs or availability worsen, the supply curve shifts to the left. Such leftward supply-curve shifts push prices up the market demand curve.

provide a lot of tutoring at low prices, whereas Bob requires at least $20 an hour. Cory won't talk to students for less than $40 an hour.

By adding the quantity each Webhead is willing to offer at every price, we can construct the market supply curve. Notice in Figure 3.5, for example, how the quantity supplied to the market at $45 (point *i*) comes from the individual efforts of Ann (93 hours), Bob (33 hours), and Cory (14 hours). ***The market supply curve is just a summary of the supply intentions of all producers.***

None of the points on the market supply curve (Figure 3.5) tells us how much Web tutoring is actually being sold on the Clearview campus. ***Market supply is an expression of sellers' intentions—an offer to sell—not a statement of actual sales.*** My next-door neighbor may be willing to sell his 1994 Honda Civic for $8,000, but most likely he'll never find a buyer at that price. Nevertheless, his *willingness* to sell his car at that price is part of the *market supply* of used cars. (See Webnote for more detail on the market supply of used cars.)

Shifts of Supply

As with demand, there's nothing sacred about any given set of supply intentions. Supply curves *shift* when the underlying determinants of supply change. Thus, we again distinguish

- ***Changes in quantity supplied:*** movements along a given supply curve.
- ***Changes in supply:*** shifts of the supply curve.

Our Latin friend *ceteris paribus* is once again the decisive factor. If the price of a product is the only variable changing, then we can ***track changes in quantity supplied along the supply curve.*** But if *ceteris paribus* is violated—if technology, factor costs, the profitability of producing other goods, tax rates, expectations, or the number of sellers change—then ***changes in supply are illustrated by shifts of the supply curve.***

The accompanying News illustrates how a supply shift sent gasoline prices soaring in 2005. When Hurricane Katrina shut down oil-producing facilities in the Gulf of Mexico, the gasoline supply curve shifted leftward and price jumped.

EQUILIBRIUM

The abrupt spike in oil prices offers some clues as to how the forces of supply and demand set—and change—market prices. For a closer look at how those forces work, we'll return to Clearview College for a moment. How did supply and demand resolve the WHAT, HOW, and FOR WHOM questions in that Web-tutoring market?

Figure 3.6 helps answer that question by bringing together the market supply and demand curves we've already examined (Figures 3.4 and 3.5). When we put the two curves together, we see that ***only one price and quantity are compatible with the existing intentions of both buyers and sellers.*** **This equilibrium occurs at the intersection of the supply and demand curves,** as in Figure 3.6. Once it's established, Web tutoring will cost $20 per hour. At that **equilibrium price,** campus Webheads will sell a total of 39 hours of tutoring per semester—the same amount that students wish to buy at that price. Those 39 hours of tutoring service will be part of WHAT is produced.

equilibrium price: The price at which the quantity of a good demanded in a given time period equals the quantity supplied.

Market Clearing

An equilibrium doesn't imply that everyone is happy with the prevailing price or quantity. Notice in Figure 3.6, for example, that some students who want to buy Web-design assistance services don't get any. These would-be buyers are arrayed along the demand curve *below* the equilibrium. Because the price they're *willing* to pay is less than the equilibrium

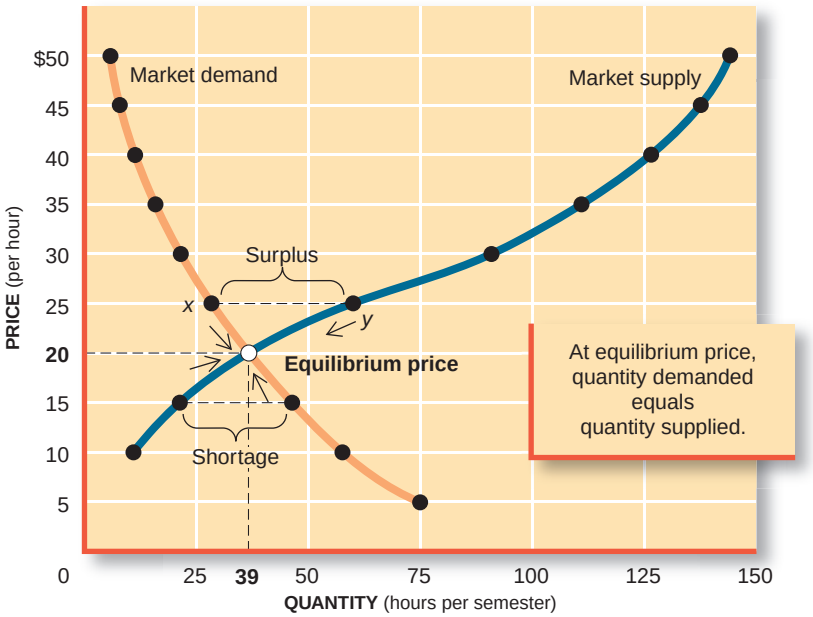


FIGURE 3.6
Equilibrium Price

The intersection of the demand and supply curves establishes the *equilibrium* price and output. Only at equilibrium is the quantity demanded equal to the quantity supplied. In this case, the equilibrium price is $20 per hour, and 39 hours is the equilibrium quantity.

At above-equilibrium prices, a market surplus exists—the quantity supplied exceeds the quantity demanded. At prices below equilibrium, a market shortage exists.

Price (per hour)	Quantity Supplied (hours per semester)		Quantity Demanded (hours per semester)
$50	148		5
45	140		8
40	130	market	11
35	114	surplus	16
30	90		22
25	62		30
20	39	equilibrium	39
15	20	market	47
10	10	shortage	57

*None*equilibrium prices create surpluses or shortages

price, they don't get any Web-design help. The market's FOR WHOM answer includes only those students willing and able to pay the equilibrium price.

Likewise, some would-be sellers are frustrated by this market outcome. These people are arrayed along the supply curve *above* the equilibrium. Because they insist on being paid *more* than the equilibrium price, they don't actually sell anything.

Although not everyone gets full satisfaction from the market equilibrium, that unique outcome is efficient. The equilibrium price and quantity reflect a compromise between buyers and sellers. No other compromise yields a quantity demanded that's exactly equal to the quantity supplied.

The Invisible Hand. The equilibrium price isn't determined by any single individual. Rather, it's determined by the collective behavior of many buyers and sellers, each acting out his or her own demand or supply schedule. It's this kind of impersonal price determination that gave rise to Adam Smith's characterization of the market mechanism as "the invisible hand." In attempting to explain how the **market mechanism** works, the famed eighteenth-century economist noted a remarkable feature of market prices. The market behaves as if some unseen force (the invisible hand) were examining each individual's supply or demand schedule and then selecting a price that assured an equilibrium. In practice, the process of price determination isn't so mysterious: It's a simple process of trial and error.

market mechanism: The use of market prices and sales to signal desired outputs (or resource allocations).

Surplus and Shortage

To appreciate the power of the market mechanism, consider interference in its operation. Suppose, for example, that campus Webheads banded together and agreed to charge a minimum price of $25 per hour. By establishing a **price floor,** a minimum price for their services, the Webheads hope to increase their incomes. But they won't be fully satisfied. Figure 3.6 illustrates the consequences of this *dis*equilibrium pricing. At $25 per hour, campus Webheads would be offering more tutoring services (point *y*) than Tom, George, and Lisa were willing to buy (point *x*) at that price. A **market surplus** of Web services would exist in the sense that more tutoring was being offered for sale (supplied) than students cared to purchase at the available price.

price floor: Lower limit set for the price of a good.

market surplus: The amount by which the quantity supplied exceeds the quantity demanded at a given price; excess supply.

As Figure 3.6 indicates, at a price of $25 per hour, a market surplus of 32 hours per semester exists. Under these circumstances, campus Webheads would be spending many idle hours at their keyboards waiting for customers to appear. Their waiting will be in vain because the quantity of Web tutoring demanded will not increase until the price of tutoring falls. That is the clear message of the demand curve. As would-be tutors get this message, they'll reduce their prices. This is the response the market mechanism signals.

As sellers' asking prices decline, the quantity demanded will increase. This concept is illustrated in Figure 3.6 by the movement along the demand curve from point *x* to lower prices and greater quantity demanded. As we move down the market demand curve, the *desire* for Web-design help doesn't change, but the quantity people are *able and willing to buy* increases. When the price falls to $20 per hour, the quantity demanded will finally equal the quantity supplied. This is the *equilibrium* illustrated in Figure 3.6.

An Initial Shortage. A very different sequence of events would occur if a market shortage existed. Suppose someone were to spread the word that Web-tutoring services were available at only $15 per hour. Tom, George, and Lisa would be standing in line to get tutorial help, but campus Web designers wouldn't be willing to supply the quantity demanded at that price. As Figure 3.6 confirms, at $15 per hour, the quantity demanded (47 hours per semester) would greatly exceed the quantity supplied (20 hours per semester). In this situation, we may speak of a **market shortage,** that is, an excess of quantity demanded over quantity supplied. At a price of $15 an hour, the shortage amounts to 27 hours of tutoring services.

market shortage: The amount by which the quantity demanded exceeds the quantity supplied at a given price; excess demand.

When a market shortage exists, not all consumer demands can be satisfied. Some people who are *willing* to buy Web help at the going price ($15) won't be able to do so. To assure themselves of sufficient help, Tom, George, Lisa, or some other consumer may offer to pay a *higher* price, thus initiating a move up the demand curve in Figure 3.6. The higher prices

IN THE NEWS

All the Web's a Stage for Ticket Sales

The Internet has become the ultimate selling bazaar for ticket scalpers.

No longer confined to hanging outside of coliseums or local turnkey operations, professional scalpers—along with thousands of small-time entrepreneurs—now use the Internet to sell hard-to-get tickets to concerts and sporting events.

Justin Aglialoro, 31, started his own ticket selling business at his Swedesboro. N.J., home. He now has season tickets for 22 professional baseball teams, 21 football teams and two NBA teams. He resells them on his website, sportseventsintl.com, and through online ticket clearinghouses such as StubHub and auctioneer eBay. . . .

With sports and concert fans willing to pay hundreds above face value for tickets, Aglialoro doesn't mind being called a scalper. He hopes to clear $100,000 this year, three times what he made as an assistant bank manager, a job he quit earlier this month.

Like Aglialoro, Mike Domek credits the Internet for jump-starting a new lucrative career. Domek used to scalp Chicago Cubs tickets in the early 1990s. He launched TicketsNow—which has become one of the Internet's largest clearinghouses for concert and sport tickets—in 1999.

Domek's company has since developed computer software that's licensed to scalpers, allowing them to link to central ticket-selling databases. Domek expects his company to do $100 million in business this year.

"The Internet made reselling efficient for sellers and secure for buyers," says Domek, 36. "It's become mainstream."

—Gary Strauss

Source: *USA TODAY*, June 17, 2005, p. 2A. Reprinted with permission.

Analysis: When tickets are sold initially at below-equilibrium prices, a market shortage is created. Scalpers resell tickets at prices closer to equilibrium, reaping a profit in the process.

offered will in turn induce other enterprising Webheads to tutor more, thus ensuring an upward movement along the market supply curve. Notice, again, that the *desire* to tutor Web design hasn't changed; only the quantity supplied has responded to a change in price. As this process continues, the quantity supplied will eventually equal the quantity demanded (39 hours in Figure 3.6).

Self-Adjusting Prices. What we observe, then, is that ***whenever the market price is set above or below the equilibrium price, either a market surplus or a market shortage will emerge.*** To overcome a surplus or shortage, buyers and sellers will change their behavior. Webheads will have to compete for customers by reducing prices when a market surplus exists. If a shortage exists, buyers will compete for service by offering to pay higher prices. Only at the *equilibrium* price will no further adjustments be required.

Sometimes the market price is slow to adjust, and a disequilibrium persists. This is often the case with tickets to rock concerts, football games, and other one-time events. People initially adjust their behavior by standing in ticket lines for hours, or hopping on the Internet, hoping to buy a ticket at the below-equilibrium price. The tickets are typically resold ("scalped"), however, at prices closer to equilibrium (see News).

Business firms can discover equilibrium prices by trial and error. If consumer purchases aren't keeping up with production, a firm may conclude that price is above the equilibrium price. To get rid of accumulated inventory, the firm will have to lower its price (a Grand End-of-Year Sale, perhaps). In the happier situation where consumer purchases are outpacing production, a firm might conclude that its price was a trifle too low and give it a nudge upward. In either case, the equilibrium price can be established after a few trials in the marketplace.

Changes in Equilibrium

No equilibrium price is permanent. The equilibrium price established in the Clearview College tutoring market, for example, was the unique outcome of specific demand and supply schedules. Those schedules themselves were based on our assumption of *ceteris*

paribus. We assumed that the "taste" (desire) for Web-design assistance was given, as were consumers' incomes, the price and availability of other goods, and expectations. Any of these determinants of demand could change. When one does, the demand curve has to be redrawn. Such a shift of the demand curve will lead to a new equilibrium price and quantity. Indeed, ***the equilibrium price will change whenever the supply or demand curve shifts.***

A Demand Shift. We can illustrate how equilibrium prices change by taking one last look at the Clearview College tutoring market. Our original supply and demand curves, together with the resulting equilibrium (point E_1), are depicted in Figure 3.7. Now suppose that all

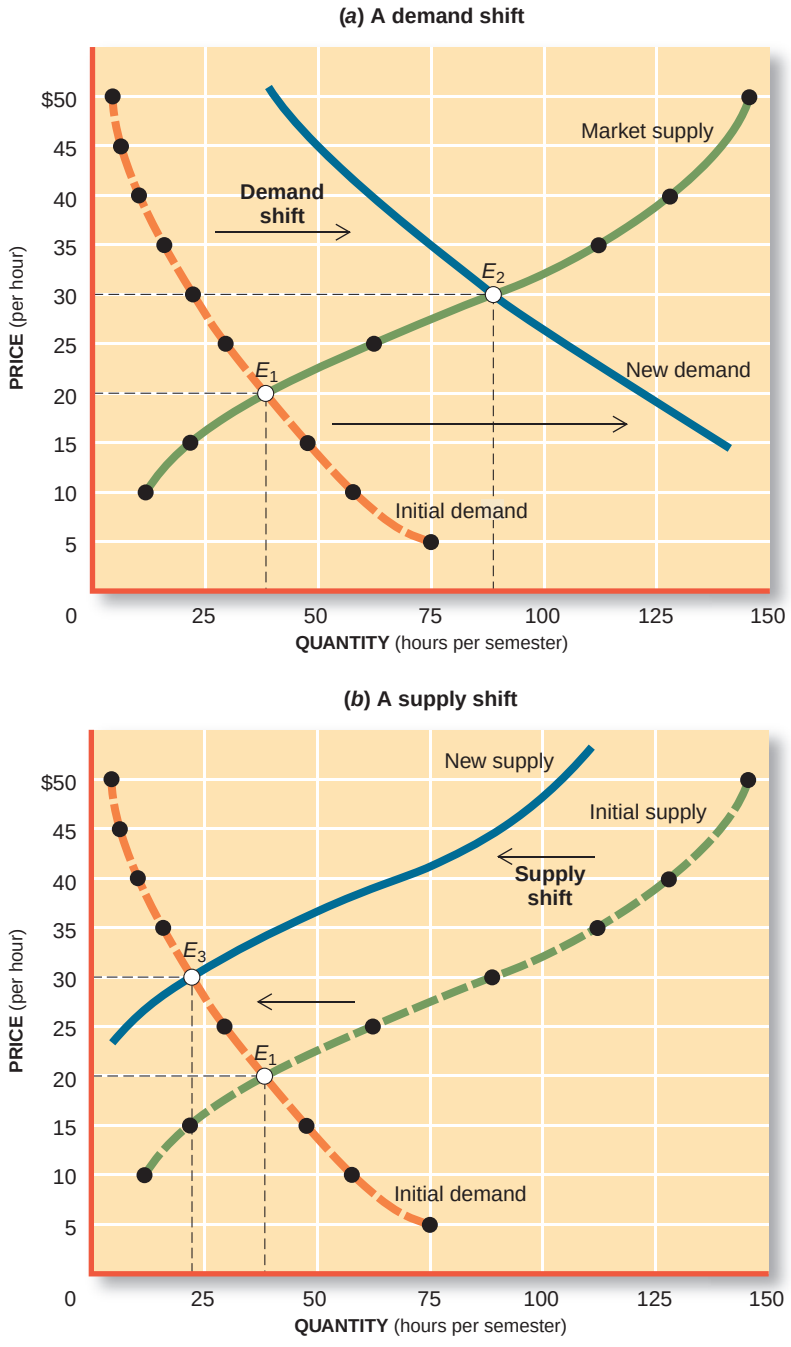


FIGURE 3.7
Changes in Equilibrium

If demand or supply changes (shifts), market equilibrium will change as well.

Demand shift. In (*a*), the rightward shift of the demand curve illustrates an increase in demand. When demand increases, the equilibrium price rises (from E_1 to E_2).

Supply shift. In (*b*), the leftward shift of the supply curve illustrates a decrease in supply. This raises the equilibrium price to E_3.

Demand and supply curves shift only when their underlying determinants change, that is, when *ceteris paribus* is violated.

WORLD VIEW

As Gas Nears $7 a Gallon, More Britons Take the Bus

LONDON, April 27—David Graham pulled up to the gas pump in his shiny black sport-utility vehicle with a "for sale" sign taped in the window.

Graham, 48, a London building contractor, pointed at the price on the pump—the equivalent of $6.62 a gallon, which means it costs him $125 to fill his tank. "That's why this is for sale," Graham said. "I can't afford it anymore. I have to walk everywhere. Things have gone mad."

The average gasoline price in Britain has risen 19 percent since January 2005. Many stations are charging well above the $6.48 national average; at least one in London's chic Chelsea neighborhood was charging nearly $8 a gallon last weekend.

"It's disgusting," said Elizabeth Jones, 50, a pharmacy assistant, who was pumping $40 worth of gas—for half a tank—into her little Ford Fiesta in a working-class neighborhood in west London.

Jones said she now takes the bus to the grocery store instead of driving. She and her husband sold their second car because they couldn't afford to fill two tanks.

—Kevin Sullivan

Source: *Washington Post*, April 28, 2006, p. A12. © **2006, The Washington Post, excerpted with permission.**

Analysis: When a determinant of demand changes, the demand curve shifts. In this case the price of other goods (driving) increased, causing a rightward shift of market demand for bus transportation.

the professors at Clearview begin requiring class-specific Web pages from each student. The increased need (desire) for Web-design ability will affect market demand. Tom, George, and Lisa will be willing to buy more Web tutoring at every price than they were before. That is, the *demand* for Web services has increased. We can represent this increased demand by a rightward *shift* of the market demand curve, as illustrated in Figure 3.7*a*.

Note that the new demand curve intersects the (unchanged) market supply curve at a new price (point E_2); the equilibrium price is now $30 per hour. This new equilibrium price will persist until either the demand curve or the supply curve shifts again.

A Supply Shift. Figure 3.7*b* illustrates a *supply* shift. The decrease (leftward shift) in supply might occur if some on-campus Webheads got sick. Or approaching exams might convince would-be tutors that they have no time to spare. ***Whenever supply decreases (shifts left), price tends to rise,*** as in Figure 3.7*b*.

The rock band U2 learned about changing equilibriums the hard way. Ticket prices for the band's 1992 tour were below equilibrium, creating a *market shortage.* So U2 raised prices to as much as $52.50 a ticket for their 1997 tour—nearly double the 1992 price. By then, however, demand had shifted to the left, due to a lack of U2 hits and an increased number of competing concerts. By the time they got to their second city they were playing in stadiums with lots of empty seats. The apparent *market surplus* led critics to label the 1997 "Pop Mart" tour a disaster. For their 2001 "Elevation Tour," U2 offered "festival seating" for only $35 in order to fill stadiums and concert halls. Demand shifted again in 2005. Buoyed by a spike of new hit songs (e.g., "Beautiful Day"), demand for U2's "Vertigo Tour" far outstripped available supply, sending ticket prices soaring (and scalpers celebrating).

British demand for bus transportation likewise increased in 2006. As the price of gasoline approached $7 a gallon, personal driving became awfully expensive. This higher price for "other goods" caused an increase (rightward shift) in the market demand for public transportation (see World View). Britons still *preferred* cars, but *demanded* more bus rides.

The World View on the next page shows how rapid price adjustments can alleviate market shortages and surpluses. In this unusual case, a restaurant continuously adjusts its prices to ensure that everything on the menu is ordered and no food is wasted.

MARKET OUTCOMES

Notice how the market mechanism resolves the basic economic questions of WHAT, HOW, and FOR WHOM.

WHAT

The WHAT question refers to the amount of Web tutorial services to include in society's mix of output. The answer at Clearview College was 39 hours of tutoring per semester. This decision wasn't reached in a referendum, but instead in the market equilibrium (Figure 3.6). In the same way but on a larger scale, millions of consumers and a handful of auto producers decide to include 16 million or so cars and trucks in each year's mix of output. Auto manufacturers use rebates, discounts, and variable interest rates to induce consumers to buy the same quantity that auto manufacturers are producing.

HOW

The market mechanism also determines HOW goods are produced. Profit-seeking producers will strive to produce Web designs and automobiles in the most efficient way. They'll use market prices to decide not only WHAT to produce but also what resources to use in the production process. If new software simplifies Web design—and is priced low enough—Webheads will use it. Likewise, auto manufacturers will use robots rather than humans on the assembly line if robots reduce costs and increase profits.

FOR WHOM

Finally, the invisible hand of the market will determine who gets the goods produced. At Clearview College, who got Web tutoring? Only those students who were willing and able to pay $20 per hour for that service. FOR WHOM are all those automobiles produced each year? The answer is the same: those consumers who are willing and able to pay the market price for a new car.

Optimal, Not Perfect

Not everyone is happy with these answers, of course. Tom would like to pay only $10 an hour for a tutor. And some of the Clearview students don't have enough income to buy any tutoring. They think it's unfair that they have to design their own Web pages while rich students can have someone else do their design work for them. Students who can't afford cars are even less happy with the market's answer to the FOR WHOM question.

WORLD VIEW

Dining on the Downtick

Americans aren't the only consumers who fall for packaging. Since late January, Parisians (not to mention TV crews from around the world) have been drawn to 6 rue Feydeau to try La Connivence, a restaurant with a new gimmick. The name means "collusion," and yes, of course, La Connivence is a block away from the Bourse, the French stock exchange.

What's the gimmick? Just that the restaurant's prices fluctuate according to supply and demand. The more a dish is ordered, the higher its price. A dish that's ignored gets cheaper.

Customers tune in to the day's menu (couched in trading terms) on computer screens. Among a typical day's options: *forte baisse du haddock* ("precipitous drop in haddock"), *vif recul de la côte de boeuf* ("rapid decline in beef ribs"), *la brochette de lotte au plus bas* ("fish kabob hits bottom"). Then comes the major decision—whether to opt for the price that's listed when you order or to gamble that the price will have gone down by the time you finish your meal.

So far, only main dishes are open to speculation, but co-owners Pierre Guette, an ex-professor at a top French business school, and Jean-Paul Trastour, an ex-journalist at *Le Nouvel Observateur*, are adding wine to the risk list.

La Connivence is open for dinner, but the midday "session" (as the owners call it) is the one to catch. That's when the traders of Paris leave the floor to push their luck *à table.* But here, at least, the return on their $15 investment (the average price of a meal) is immediate—and usually good.

—Christina de Liagre

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Analysis: A market surplus signals that price is too high; a market shortage suggests that price is too low. This restaurant adjusts price until the quantity supplied equals the quantity demanded.

Although the outcomes of the marketplace aren't perfect, they're often optimal. Optimal outcomes are the best possible *given* our incomes and scarce resources. Sure, we'd like everyone to have access to tutoring and to drive a new car. But there aren't enough resources available to create such a utopia. So we have to ration available tutors and cars. The market mechanism performs this rationing function. People who want to supply tutoring or build cars are free to make that choice. And consumers are free to decide how they want to spend their income. In the process, we expect market participants to make decisions that maximize their own welfare. If they do, then we conclude that everyone is doing as well as possible, given their available resources.

THE ECONOMY TOMORROW

DEADLY SHORTAGES: THE ORGAN-TRANSPLANT MARKET

Topic Podcast: Organ Transplants

As you were reading this chapter, dozens of Americans were dying from failed organs. More than 100,000 Americans are waiting for life-saving kidneys, livers, lungs, and other vital organs. They can't wait long, however. Every day at least 20 of these organ-diseased patients die. The clock is always ticking.

Modern technology can save most of these patients. Vital organs can be transplanted, extending the life of diseased patients. How many people are saved, however, depends on how well the organ "market" works.

The Supply of Organs. The only cure for liver disease and some other organ failures is a replacement organ. Over 50 years ago, doctors discovered that they could transplant an organ from one individual to another. Since then, medical technology has advanced to the point where organ transplants are exceptionally safe and successful. The constraint on this life-saving technique is the *supply* of transplantable organs.

Although over 2 million Americans die each year, most deaths do not create transplantable organs. Only 20,000 or so people die in circumstances—such as brain death after a car crash—that make them suitable donors for life-saving transplants. Additional kidneys can be "harvested" from live donors (we have two, but can function with only one; not true for liver, heart, or pancreas).

You don't have to die to supply an organ. Instead, you become a donor by agreeing to release your organs after death. The agreement is typically certified on a driver's license and sometimes on a bracelet or "dog tag." This allows emergency doctors to identify potential organ supplies.

People become donors for many reasons. Moral principles, religious convictions, and humanitarianism all play a role in the donation decision. It's the same with blood donations: People give blood (while alive!) because they want to help save other individuals.

Market Incentives. Monetary incentives could also play a role. When blood donations are inadequate, hospitals and medical schools *buy* blood in the marketplace. People who might not donate blood come forth to *sell* blood when a price is offered. In principle, the same incentive might increase the number of *organ* donors. If offered cash now for a postmortem organ, would the willingness to donate increase? The law of supply suggests it would. Offer $1,000 in cash for signing up, and potential donors will start lining up. Offer more, and the quantity supplied will increase further.

Zero Price Ceiling. The government doesn't permit this to happen. In 1984 Congress forbade the purchase or sale of human organs in the United States (the National Organ Transplantation Act). In part, the prohibition was rooted in moral and religious convictions. It was also motivated by equity concerns—the For Whom question. If organs could be bought and sold, then the rich would have a distinct advantage in living.

price ceiling: Upper limit imposed on the price of a good.

The prohibition on market sales is effectively a **price ceiling** set at zero. As a consequence, the only available organs are those supplied by altruistic donors. The quantity

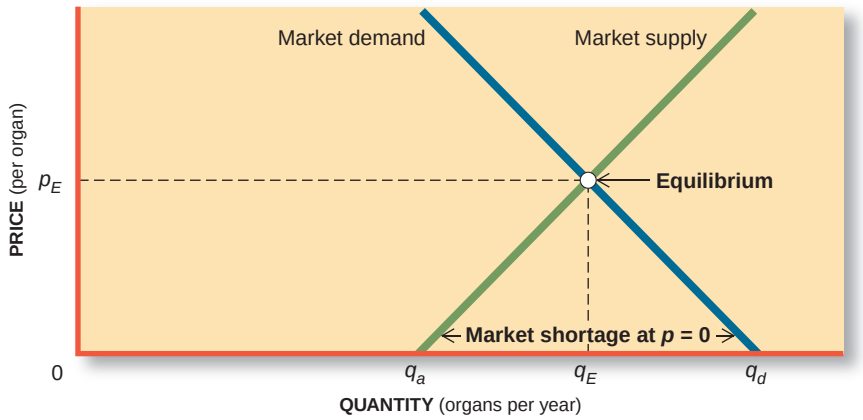

FIGURE 3.8
Organ-Transplant Market

A market in human organs would deliver the quantity q_E at a price of p_E. The government-set price ceiling ($p = 0$) reduces the quantity supplied to q_a.

supplied can't be increased with price incentives. In general, ***price ceilings have three predictable effects; they***

- ***Increase the quantity demanded.***
- ***Decrease the quantity supplied.***
- ***Create a market shortage.***

The Deadly Shortage. Figure 3.8 illustrates the consequence of this price ceiling. At a price of zero, only the quantity q_a of "altruistic" organs is available (roughly one-third of the potential supply). But the quantity q_d is demanded by all the organ-diseased individuals. The market shortage $q_d - q_a$ tells us how many patients will die. To escape this fate, many rich patients use the Internet to search for organs around the world (see World View).

Without the government-set price ceiling, more organ-diseased patients would live. Figure 3.8 shows that q_E people would get transplants in a market-driven system rather than only q_a in the government-regulated system. But they'd have to pay the price p_E—a feature regulators say is unfair. In the absence of the market mechanism, however, the government must set rules for who gets the even smaller quantity of organs supplied.

webnote

The United Network for Organ Sharing (www.UNOS.org) maintains data on organ waiting lists and transplants.

WORLD VIEW

Growing Organ-Supply Shortfall Creates Windfall for Online Brokers

Growing demand for organ transplants world-wide is bringing new clout to online middlemen who charge ailing customers enormous fees to match them with scarce body parts.

These brokers have stepped in to fill a breach created by steep shortfall in supply. In rich nations, people are living longer at the same time that a drop in deaths from automobile accidents has shrunk a key source of donated organs. Since buying and selling of organs is illegal almost everywhere, brokers say they match prospective patients with sources outside their own country's health system. Forbes located offers of transplants online priced at anywhere from 60% to 400% more than their typical costs. One California broker arranges kidney transplants for $140,000, and hearts, livers and lungs for $290,000. Most of these transplants are being carried out in hospitals in developing countries where medical and ethical standards "don't rise to Western levels."

—Wendy Pollack

Source: *The Wall Street Journal*, January 12, 2007. WALL STREET JOURNAL. Copyright 2007 by DOW JONES & COMPANY, INC. Reproduced with permission of DOW JONES & COMPANY, INC. in the format Textbook via Copyright Clearance Center.

Analysis: Where shortages exist, the market mechanism will try to find an equilibrium. The *global* market in human organs favors the rich, however.

SUMMARY

- Individual consumers, business firms, government agencies, and foreigners participate in the marketplace by offering to buy or sell goods and services, or factors of production. Participation is motivated by the desire to maximize utility (consumers), profits (business firms), or the general welfare (government agencies) from the limited resources each participant has. LO1
- All market transactions involve the exchange of either factors of production or finished products. Although the actual exchanges can occur anywhere, they take place in product markets or factor markets, depending on what is being exchanged. LO1
- People willing and able to buy a particular good at some price are part of the market demand for that product. All those willing and able to sell that good at some price are part of the market supply. Total market demand or supply is the sum of individual demands or supplies. LO1
- Supply and demand curves illustrate how the quantity demanded or supplied changes in response to a change in the price of that good, if nothing else changes *(ceteris paribus)*. Demand curves slope downward; supply curves slope upward. LO2
- Determinants of market demand include the number of potential buyers and their respective tastes (desires), incomes, other goods, and expectations. If any of these determinants change, the demand curve shifts. Movements along a demand curve are induced only by a change in the price of that good. LO3
- Determinants of market supply include factor costs, technology, profitability of other goods, expectations, tax rates, and number of sellers. Supply shifts when these underlying determinants change. LO3
- The quantity of goods or resources actually exchanged in each market depends on the behavior of all buyers and sellers, as summarized in market supply and demand curves. At the point where the two curves intersect, an equilibrium price—the price at which the quantity demanded equals the quantity supplied—is established. LO3
- A distinctive feature of the market equilibrium is that it's the only price-quantity combination acceptable to buyers and sellers alike. At higher prices, sellers supply more than buyers are willing to purchase (a market surplus); at lower prices, the amount demanded exceeds the quantity supplied (a market shortage). Only the equilibrium price clears the market. LO3
- Price ceilings are disequilibrium prices imposed on the marketplace. Such price controls create an imbalance between quantities demanded and supplied, resulting in market shortages. LO4

Key Terms

factor market
product market
opportunity cost
supply
demand
demand schedule
demand curve
law of demand
substitute goods
complementary goods
ceteris paribus
shift in demand
market demand
market supply
law of supply
equilibrium price
market mechanism
price floor
market surplus
market shortage
price ceiling

Questions for Discussion

1. In our story of Tom, the student confronted with a Web-design assignment, we emphasized the great urgency of his desire for Web tutoring. Many people would say that Tom had an "absolute need" for Web help and therefore was ready to "pay anything" to get it. If this were true, what shape would his demand curve have? Why isn't this realistic? LO1
2. With respect to the demand for college enrollment, which of the following would cause (1) a movement along the demand curve or (2) a shift of the demand curve? LO3
   a. An increase in incomes.
   b. Lower tuition.
   c. More student loans.
   d. An increase in textbook prices.
3. What would have happened to gasoline production and consumption if the government had prohibited post-Katrina price increases (see News, page 55)? LO4
4. Which determinants of pizza demand change when the White House is in crisis (page 49)? LO3
5. Why do Internet ticket resellers make so much money (News, p. 58)? How else might tickets be (re)distributed? LO2

6. In Figure 3.8, why is the organ demand curve downward-sloping rather than vertical? LO1
7. The shortage in the organ market (Figure 3.8) requires a nonmarket rationing scheme. Who should get the available (q_a) organs? Is this fairer than the market-driven distribution? LO4
8. What would happen in the apple market if the government set a *minimum* price of $2.00 per apple? What might motivate such a policy? LO4
9. The World View on page 61 describes the use of prices to achieve an equilibrium in the kitchen. What happens to the food at more traditional restaurants? LO2
10. Is there a shortage of on-campus parking at your school? How might the shortage be resolved? LO2

problems The Student Problem Set at the back of this book contains numerical and graphing problems for this chapter.

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web activities to accompany this chapter can be found on the Online Learning Center:
http://www.mhhe.com/economics/schiller11e