The following events occurred on a day in April.

3:15 P.M.
Bob Mason, 18 years old, walks to the mailbox in front of his house. He reaches inside the mailbox, pulls out the mail, and nervously looks through the letters. It’s there. He’s been anxiously waiting for the mail every day just for this letter. In the next few seconds, he’ll learn whether or not he’s been accepted by the college he so desperately wants to attend.

3:43 P.M.
Carl and Karen Jenkins, married one year, are in their real estate agent’s car driving to the next house they’ll look at today. Carl wonders out loud why houses are so expensive in their area. “A person can get twice the house for almost half the money in other parts of the country,” he says.

5:15 P.M.
Carlos is on the freeway, driving home from work. Traffic is heavy, as usual, and Carlos is driving about 30 mph at the moment. As he half listens to a talk show on the radio, Carlos picks up his cell phone and makes a call. Just as he ends his call, traffic slows down to 5 mph. I’m not sure how much longer I can take these commutes, Carlos thinks. This traffic is really getting ridiculous.

5:35 P.M.
Samantha Wilson is standing at the counter of American Airlines in the Dallas-Fort Worth airport. She asks for an aisle seat for her flight. The response: “I’m afraid the only seats I have left are center seats.”

How would an economist look at these events? Later in the chapter, discussions based on the following questions will help you analyze the scene the way an economist would.

- What is the relationship between the probability of Bob Mason being admitted to the college of his choice and the tuition the college charges?
- Why are house prices higher in some parts of the country than in other parts of the country?
- What do supply, demand, and price have to do with Carlos driving 5 mph on a freeway on his way home from work?
- Why aren’t any aisle seats left?
APPLICATION 1: WHY DO COLLEGES USE GPAs, ACTs, AND SATs FOR PURPOSES OF ADMISSION?

At many colleges and universities, a student pays part of the price of his or her education (by way of tuition payments) and taxpayers and private donors pay part (by way of tax payments and charitable donations, respectively). Thus, the tuition that students pay to attend colleges and universities is usually less than the equilibrium tuition. To illustrate, suppose a student pays tuition $T_1$ at a given college or university. As shown in Exhibit 1, $T_1$ is below the equilibrium tuition, $T_E$. At $T_1$, the number of students who want to attend the university ($N_1$) is greater than the number of openings at the university ($N_2$); that is, quantity demanded is greater than quantity supplied. The university receives more applications for admission than there are places available. Something has to be done. But what?

The college or university is likely to ration its available space by a combination of money price and some other nonprice rationing devices. The student must pay the tuition, $T_1$, and meet the standards of the nonprice rationing devices. Colleges and universities usually use such things as GPAs (grade point averages), ACT scores, and SAT scores as rationing devices.
SELF-TEST
(Answers to Self-Test questions are in the Self-Test Appendix.)

1. Suppose the demand rises for admission to a university but both the tuition and the number of openings in the entering class remain the same. Will this affect the admission standards of the university? Explain your answer.

2. Administrators and faculty at state colleges and universities often say that their standards of admission are independent of whether there is a shortage or surplus of openings at the university. Do you think this is true? Do you think that faculty and administrators ignore surpluses and shortages of openings when setting admission standards? Explain your answer.

APPLICATION 2: WHAT WILL HAPPEN TO THE PRICE OF MARIJUANA IF THE PURCHASE AND SALE OF MARIJUANA ARE LEGALIZED?

In the United States, the purchase or sale of marijuana is unlawful. However, there is still a demand for and supply of marijuana. There is also an equilibrium price of marijuana. Let’s say that price is $P_1$.

Suppose that beginning tomorrow, the purchase and sale of marijuana become legal. Will $P_1$ rise, fall, or remain the same?

The answer, of course, depends on what we think will happen to the demand for and supply of marijuana. If the purchase and sale of marijuana are legal, then some people currently producing corn and wheat will likely choose instead to produce and sell marijuana. So, the supply of marijuana will rise. If nothing else changes, the price of marijuana will fall.

But something else is likely to change. If marijuana consumption is no longer illegal, then the number of people who want to buy and consume marijuana will likely rise. In other words, there will be more buyers of marijuana. This will increase the demand for marijuana.

Thus, decriminalizing the purchase and sale of marijuana is likely to shift both the marijuana demand and supply curves to the right. What happens to the price of marijuana depends on how much the curves shift. Three possibilities exist:

1. The demand curve shifts to the right by the same amount as the supply curve shifts to the right. In this case, the price of marijuana will not change. (Try to visualize the demand and supply curves shifting.)
2. The demand curve shifts to the right by more than the supply curve shifts to the right. In this case, the price of marijuana will rise. (Try to visualize the demand curve shifting to the right by more than the supply curve shifts to the right. Can you see the higher price on the vertical axis?)
3. The supply curve shifts to the right by more than the demand curve shifts to the right. In this case, the price of marijuana will fall.

If you can't visualize the shifts of the demand and supply curves for the three possibilities, draw the original demand and supply curves, then draw the shift in each curve, and finally identify the new equilibrium price.

SELF-TEST

1. What will happen to the price of marijuana if the supply of marijuana increases by more than the demand for it?
2. What will happen to the quantity of marijuana (purchased and sold) if the demand for marijuana rises by more than the supply of marijuana falls?
APPLICATION 3: WHERE DID YOU GET THAT MUSIC?

In recent years, the recording industry feels it has suffered some reduced sales because of music piracy. People download music (or transfer files) from the Internet instead of buying the music on CDs sold by recording companies.

The recording industry, we expect, would like to reduce the amount of downloading and file transferring to zero. If zero piracy is not possible, the industry at least wants less than currently exists. In other words, if, on an average day, 100,000 songs are downloaded, the recording industry wants that number reduced to 50,000, or even better, to 25,000. The fewer the better. How can the recording industry get what it wants?

We can use a supply-and-demand framework to find out how to get less of something. Let's consider how to reduce the amount of apples purchased each day. Suppose that buyers are currently buying 30,000 apples a day. What has to happen for fewer apples to be purchased each day? One of three things:

1. A higher price will cause apple buyers to move up their demand curves (change in quantity demanded) and purchase fewer apples.
2. A lower demand (shift leftward in the demand curve) will result in buyers purchasing fewer apples.
3. A lower supply (shift leftward in the supply curve) will result in buyers purchasing fewer apples.

The recording industry has tried all three—higher price, lower demand, and lower supply—in its attempt to reduce the amount of pirated music.

To try to lower supply, the recording industry brought a legal suit against certain companies that made downloading possible—such as Napster. The recording industry charged Napster with “willful contributory and vicarious copyright infringement.” By getting rid of the “middlemen” that made music trading (some would say music pirating) possible, the recording industry would lower the supply of music available on the Internet.

The recording industry also stated that it would sue scores of people who download music. This statement by the recording industry was intended to raise the price of downloading music. The message to downloaers was: You thought the cost of downloading music was zero, but it is not. We may sue you and force you to pay damages. This attempt to reduce the amount of downloaded music worked. Soon after the announcement, the number of Internet users who said they downloaded music fell from about 35 million to 18 million.

Recently, the recording industry has run TV commercials to try to lower the demand for downloading music. One commercial shows many of the people who work in the recording industry. The ad shows the artists, of course, but it also shows the technicians behind the scenes and the scores of other people who depend on the recording industry for their livelihood. The message is that there are hundreds of everyday people working behind the scenes, and when you download music instead of buying it, you hurt these people—you jeopardize their jobs and their families. The recording industry hoped to affect a person's preferences in a way that would lead to a decline in the demand for downloading music. The industry wanted a person to think, “I didn’t know that I might put someone out of a job by downloading music. Maybe I shouldn’t download anymore, or at least do less of it.”
SELF-TEST

1. On January 21, 2004, the recording industry filed lawsuits against 532 people it accused of illegally swapping copyrighted music on the Internet. What does this have to do with supply, demand, or price?

2. Suppose the recording industry runs only a few TV commercials trying to lower demand for downloading music. Instead, it continually takes legal action against either the people who download the music or the companies that make downloading (and file transferring) possible. What might explain these actions?

APPLICATION 4: THE MINIMUM WAGE LAW

Recall that a price floor is a legislated minimum price below which trades cannot legally be made. The minimum wage is a price floor—a government-mandated minimum price for labor. It affects the market for unskilled labor. In Exhibit 2, we assume the minimum wage is $W_M$ and the equilibrium wage is $W_E$. At the equilibrium wage, $N_1$ workers are employed. At the higher minimum wage, $N_3$ workers want to work but only $N_2$ actually do work. There is a surplus of workers equal to $N_3 - N_2$ in this unskilled labor market. In addition, fewer workers are working at the minimum wage ($N_2$) than at the equilibrium wage ($N_1$). Overall, the effects of the minimum wage are (1) a surplus of unskilled workers and (2) fewer workers employed.

Exhibit 2

Effects of the Minimum Wage

At a minimum wage of $W_M$ an hour, there is a surplus of workers and fewer workers are employed than would be at the equilibrium wage $W_E$. 

- **Wage Rate (dollars)**
- **Minimum Wage**
- **Equilibrium Wage**
- **Surplus**
- **Number of Unskilled Workers**
- **Number of Workers Employed at Minimum Wage**
- **Number of Workers Who Want to Work at Minimum Wage**
- **Number of Workers Employed at Equilibrium Wage**
Part 1 Economics: The Science of Scarcity

Suppose two economists decide to test the theory that as the minimum wage rises, some unskilled workers will lose their jobs. They look at the number of unskilled workers before and after the minimum wage is raised, and, surprisingly, they find that the number of unskilled workers is the same. Is this sufficient evidence to conclude that an increase in the minimum wage does not cause some workers to lose their jobs?

We'll leave that question hanging while we consider whether or not the economists have adequately tested their theory. Suppose instead of focusing on the number of people who lose their jobs, they look at the people who keep their jobs but have their hours reduced as a result of the higher minimum wage.

Let's look at an example. Suppose a local hardware store currently employs David and Francesca to work after school cleaning up and stocking the store. The owner of the store pays each of them the minimum wage of, say, $5.15 an hour. Then, the minimum wage is raised to $6.75 an hour. Will either David or Francesca lose their jobs as a result? Not necessarily. Instead, the owner of the store could reduce the number of hours he employs the two workers. For example, instead of having each of them work 20 hours a week, he might ask each to work only 14 hours a week.¹

Now, let's reconsider our original question: Has the higher minimum wage eliminated jobs? In a way, no. It has, however, reduced the number of hours a person works in a job. (Of course, if we define a job as including both a particular task and a certain number of hours completing that task, then the minimum wage increase has eliminated “part” of the job.) This discussion argues for changing the label on the horizontal axis in Exhibit 2 from “Number of Unskilled Workers” to “Number of Unskilled Labor Hours.”

THINKING LIKE AN ECONOMIST

In economics, some questions relate to “direction” and some to “magnitude.” For example, suppose someone asks, “If the demand for labor is downward-sloping and the labor market is competitive, how will a minimum wage (above the equilibrium wage) affect employment?” This person is asking a question that relates to the direction of the change in employment. Usually, these types of questions can be answered by applying a theory. Applying the theory of demand, an economist might say, “At higher wages, the quantity demanded of labor, or the employment level, will be lower than at lower wages.” The word “lower” speaks to the directional change in employment.

Now suppose someone asks, “How much will employment decline?” This person is asking a question that relates to magnitude. Usually, questions that deal with magnitude can be answered only through some kind of empirical (data-collecting and analyzing) work. In other words, we would have to collect employment figures at the equilibrium wage and at the minimum wage and then find the difference.

SELF-TEST

1. When the labor supply curve is upward-sloping, a minimum wage law that sets the wage rate above its equilibrium level creates a surplus of labor. If the labor supply curve is vertical, does a surplus of labor still occur? Explain your answer.
2. Someone says that an increase in the minimum wage will not cause firms to hire fewer workers. What is this person assuming?

APPLICATION 5: PRICE CEILING IN THE KIDNEY MARKET

Just as there are people who want to buy houses, computers, and books, there are people who want to buy kidneys. These people have kidney failure and either will die without a new kidney or will have to endure years of costly and painful dialysis. This demand for kidneys is shown as \( D_K \) in Exhibit 3.

¹. Our two economists need to find data that relate not only to how many, if any, people lose their jobs as a result of the higher minimum wage but also to how many people who keep their jobs end up working fewer hours.
The supply of kidneys is shown as $S_K$ in Exhibit 3. Notice that at $0$ price, the quantity supplied of kidneys is 350. These kidneys are from people who donate their kidneys to others, asking nothing in return. They may donate their kidneys upon their death or may donate one of their two kidneys while living. We have drawn the supply curve as upward-sloping because we assume that some people who today are unwilling to donate a kidney for $0$ might be willing to do so for some positive dollar amount. Specifically, we assume that as the price of a kidney rises, the quantity supplied of kidneys will rise.

If there were a free market in kidneys, the price of a kidney would be $P_1$ in Exhibit 3. At this price, 1,000 kidneys would be purchased and sold—1,000 kidney transplants would occur.

Today, there is no free market in kidneys. Buying or selling kidneys is illegal at any dollar amount. In essence, then, there is a price ceiling in the kidney market and the ceiling is set at $0$. What is the effect of this price ceiling?

If the demand curve for kidneys and the supply curve of kidneys intersected at $0$, there would be neither a surplus nor a shortage of kidneys. But there is evidence that the demand and supply curves do not intersect at $0$; they look more like those shown in Exhibit 3. In other words, there is a shortage of kidneys at $0$: the quantity supplied of kidneys is 350 and the quantity demanded is 1,500. (Although these are not the actual numbers of kidneys demanded and supplied at $0$, they are representative of the current situation in the kidney market.)

The last chapter describes the possible effects of a price ceiling set below equilibrium price: shortages, nonprice rationing devices, fewer exchanges, tie-in sales, and buying and selling at prohibited prices (in other words, illegal trades). Are any of these effects occurring in the kidney market?

First, there is evidence of a shortage. In almost every country in the world, there are more people on national lists who want a kidney than there are kidneys available. Some of these people die waiting for a kidney.

Second, as just indicated, the nonprice rationing device used in the kidney market is (largely) first-come-first-served. A person who wants a kidney registers on a national waiting list. How long one waits is a function of how far down the list one’s name appears.
Third, there are fewer exchanges; not everyone who needs a kidney gets a kidney. With a price ceiling of $0, only 350 kidneys are supplied. All these kidneys are from people who freely donate their kidneys. If \( P_1 \) were permitted, some people who are unwilling to supply a kidney (at $0) would be willing to do so. In short, monetary payment would provide the incentive for some people to supply a kidney. At \( P_1 \), 1,000 kidneys are demanded and supplied, so more people would get kidney transplants when the price of a kidney is \( P_1 \) (1,000 in total) than when the price of a kidney is $0 (350 in total). More transplants, of course, means fewer people die waiting for a kidney.

Fourth, kidneys are bought and sold at prohibited prices. People buy and sell kidneys today; they just do so illegally. There are stories of people who need kidneys paying between $25,000 and $200,000 for a kidney.

Some people argue that a free market in kidneys would be wrong. Such a system would place the poor at a disadvantage. Think of it: A rich person who needed a kidney could buy the kidney he needed, but a poor person could not. The rich person would get a second chance at life, the poor person would not. No one particularly enjoys contemplating this stark reality.

But consider another stark reality. If it is unlawful to pay someone for a kidney, fewer kidneys will be forthcoming. In other words, the quantity supplied of kidneys is less at $0 than at, say, $20,000. Fewer kidneys supplied means, in turn, fewer kidney transplants. And fewer kidney transplants means more people will die from kidney failure.

**SELF-TEST**

1. A shortage of kidneys for transplants is a consequence of the price of a kidney being below equilibrium price. Do you agree or disagree? Explain your answer.

2. Assume the price ceiling in the kidney market is $0. Will there be a shortage of kidneys? Explain your answer.

**APPLICATION 6: HEALTH CARE AND THE RIGHT TO SU**

**YOUR HMO**

A discussion of renters, landlords, and eviction notices is relevant to the right to sue an HMO. So we begin with an analysis of two laws related to eviction of a renter. Under law 1, a renter has 30 days to vacate an apartment after being served with an eviction notice. Under law 2, the renter has 90 days to vacate.

Landlords will find it less expensive to rent apartments under law 1 than under law 2. Under law 1, the most money a landlord can lose after serving an eviction notice is 30 days’ rent. Under law 2, a landlord can lose 90 days’ rent. Obviously, losing 90 days’ rent is more costly than losing 30 days’ rent.

A different supply curve of apartments exists under each law. The supply curve under law 1 (\( S_1 \) in Exhibit 4) lies to the right of the supply curve under law 2 (\( S_2 \) in the exhibit). Again, that’s because it is less expensive to supply apartments under law 1 than under law 2.

If the supply curve is different under the two laws, the equilibrium rent will be different too. As shown in Exhibit 4, the equilibrium rent will be lower under law 1 (\( R_1 \)) than under law 2 (\( R_2 \)).

In conclusion, under law 1, a renter pays lower rent (good) and has fewer days to vacate the apartment (bad). Under law 2, a renter pays a higher rent (bad) and has more
days to vacate the apartment (good). Who pays for the additional days to vacate the apartment under law 2? The renter pays for these additional days by paying higher rent.

Now let’s turn from apartments to health care. You may frequently hear people complain about their health maintenance organizations (HMOs). The complaints are diverse and wide-ranging. One common complaint is that patients cannot sue their HMOs in state courts for denial of benefits and poor-quality care. Some people argue that patients should have the right to sue their HMOs.

Let’s consider two settings: one in which patients cannot sue their HMOs and one in which patients can sue. If patients cannot sue, an HMO’s liability cost is lower than if patients can sue. A difference in liability costs will be reflected in different supply curves.

To illustrate, recall that any single point on a supply curve is the minimum price sellers need to receive for them to be willing and able to sell that particular unit of a good. Suppose when patients cannot sue, an HMO is willing and able to provide health care to John for $300 a month. If patients can sue, is the HMO still willing and able to provide health care to John for $300 a month? Not likely. Because of the higher liability cost due to the patient’s ability to sue, the HMO is no longer willing and able to provide health care to John for $300 a month. It will, however, be willing and able to provide health care to John for, say, $350 a month.

Saying a seller’s minimum price for providing a good or service rises is the same as saying the seller’s supply curve has shifted upward and to the left. In other words, the supply curve of HMO-provided health care will shift upward and to the left if patients have the right to sue. This is the same way the supply curve of apartments moved in Exhibit 4.

Will a difference in supply curves affect the price patients pay for their HMO-provided health care coverage? Yes. One effect of moving from a setting where patients do not have the right to sue to one where patients do have the right to sue is that patients will have to pay more for their HMO-provided health care coverage.

Economists don’t determine whether patients having the right to sue is good or bad or right or wrong. Economists use their tools (in this instance, supply and demand) to point out that things people want, such as the right to sue their HMOs, often come with price tags. Individuals must decide whether the price they pay is worth what they receive in return.
SELF-TEST

1. Economists often say, “There is no such thing as a free lunch.” How is this saying related to patients moving from a system where they cannot sue their HMOs to one where they can?

2. A professor tells her students that they can have an extra week to complete their research papers. Under what condition are the students made better off with the extra week? Can you think of a case where the students would actually be made worse off by the extra week?

APPLICATION 7: IF GOLD PRICES ARE THE SAME EVERYWHERE, THEN WHY AREN’T HOUSE PRICES?

The price of an ounce of gold is the same everywhere in the world. For example, the price of an ounce of gold is the same in London as it is in New York City. House prices are not the same everywhere, though. For example, the median price of a house in Los Angeles, California, is higher than the median price of a house in Dubuque, Iowa. Why are gold prices the same everywhere while house prices are different?

To answer the question, let’s look at what would happen if gold prices were not the same everywhere in the world. Let’s assume the price of an ounce of gold is $250 in London and $300 in New York City. What happens? Obviously, this difference in prices for the same good presents a profit opportunity. People will buy gold in London for $250 an ounce, ship it to New York City, and sell it for $300 an ounce. If we ignore the costs of transporting the gold, a $50 profit per ounce is earned. When an opportunity exists for profit—by buying low and selling high—individuals are quick to try to capture the profit.

As gold is moved from London to New York City in search of profit, the supply of gold in London will fall and the supply of gold in New York City will rise. A falling gold supply in London will push up the price of gold (from $250), and a rising gold supply in New York City will push down the price of gold (from $300). As the London gold price rises and the New York City gold price falls, a point will eventually be reached where the two prices are the same. When the London price and New York City price for gold are the same, profit cannot be earned by moving gold from London to New York City. In short, any difference in the price of gold in various locations will quickly be eliminated by changes in the supply of gold in the various locations.

Can the same hold for houses? If the price of a house in Los Angeles is higher than the price of a house in Dubuque, is it possible to move houses and land from Dubuque to Los Angeles? Of course not. We can’t pick up a house and its lot in Dubuque and move them to Los Angeles, in the process reducing the supply of houses and land in Dubuque and increasing the supply of houses and land in Los Angeles. Because the supply of houses and land cannot be reshuffled the way the supply of gold can be, we expect differences in house prices in various locations but not differences in gold prices.

SELF-TEST

1. What causes the price of gold to be the same in New York City and London?
2. The price of a Honda Pilot is nearly the same in Miami as it is in Dallas. Why?
APPLICATION 8: DO YOU PAY FOR GOOD WEATHER?

Some places in the country are considered to have better weather than other places have. For example, most people would say the weather in San Diego, California, is better than the weather in Fargo, North Dakota. Often, a person in San Diego will say, “You can’t beat the weather today. And the good thing about it is that you don’t have to pay a thing for it. It’s free.”

In one sense, the San Diegan is correct: There is no weather market. Specifically, no one comes around and asks San Diegans to pay a certain dollar amount for the weather on a given day.

But in another sense, the San Diegan is incorrect. Fact is, San Diegans indirectly pay for their good weather. How do they pay? To enjoy the weather in San Diego on a regular basis, you have to live in San Diego—you have to have housing. There is a demand for housing in San Diego, just as there is a demand for housing in other places. Is the demand for housing in San Diego higher than it would be if the weather were not so good? Without the good weather, living in San Diego would not be as pleasurable and, therefore, the demand to live there would be lower. In short, the demand for housing in San Diego is higher because San Diego enjoys good weather. It follows that the price of housing is higher too. Thus, San Diegans indirectly pay for their good weather because they pay higher housing prices than they would if San Diego had bad weather.

Was our representative San Diegan right when he said the good weather was free?

APPLICATION 9: PAYING ALL PROFESSORS THE SAME SALARY

In college, you take various courses. You may take courses in accounting, economics, English, and history. From your perspective, the professors in the courses may do much the same work. Each professor regularly comes to class, lectures and leads discussions, holds office hours, gives tests and exams, grades those tests and exams, and so on. Does it
follow, then, that all professors of equal experience ought to be paid the same salary? In other words, if a professor in computer science with 10 years of experience earns $100,000 a year, should a professor in history with 10 years of experience earn $100,000 a year too? If your answer is yes, then what might the effects of such a policy be?

Let’s again turn to supply and demand for an answer. Exhibit 5a shows the market for accounting professors; Exhibit 5b, the market for history professors. In each market, there is a demand for and supply of professors. However, the equilibrium wage in the accounting market ($W_A$) is higher than the equilibrium wage in the history market ($W_H$).

If accounting and history professors are each paid their respective equilibrium wage, neither market will be in shortage or surplus. But pay both professors the same wage when their equilibrium wages are different, and shortages or surpluses will appear.

For example, suppose both accounting and history professors are paid the higher wage, $W_A$. The accounting market remains in equilibrium, but a surplus appears in the history market. There will be more historians who want to work at colleges ($N_2$) than colleges will hire ($N_3$).

Or suppose both accounting and history professors are paid the lower wage, $W_H$. The history market remains in equilibrium, but a shortage appears in the accounting market. Colleges will want to hire more accountants ($N_2$) than will be willing to work at the colleges ($N_3$).

Sitting in class, you may think that while the supply-and-demand analysis of the accounting and history markets is interesting, it does not affect you. What does it matter if your professors are paid the same or not?

But look at the number of professors hired in each market at the equilibrium wage and at the disequilibrium wage. In the accounting market, when the wage is $W_A$, $N_1$ accounting professors are hired. At $W_H$ only $N_3$ are hired because $N_3$ is the number of accounting professors who are willing and able to work at $W_H$. $N_3$ is less than $N_1$.

In the history market, when the wage is $W_H$, $N_1$ history professors are hired. At $W_A$, $N_3$ are hired because $N_3$ is the number of history professors colleges are willing and able to hire at $W_A$. $N_3$ is less than $N_1$. 

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**Exhibit 5**

**Paying Professors the Same Salary**

Suppose the market supply and demand conditions are as shown in (a) for accounting professors and as shown in (b) for history professors. Consequently, the equilibrium wage in the two markets would be different. As shown, the equilibrium wage for accounting professors ($W_A$) is higher than the equilibrium wage for history professors ($W_H$). What happens if both accounting and history professors are paid $W_A$? A surplus of history professors appears. What happens if both accounting and history professors are paid $W_H$? A shortage of accounting professors appears. Paying all college professors the same salary when there are differences in demand and supply creates shortages and surpluses.
In short, more professors are working at colleges teaching students when professors are paid equilibrium wages than when they are paid disequilibrium wages. So, how professors are paid affects the student-to-faculty ratio. Instead of 40 students per faculty member at disequilibrium wages, we might have 30 students per faculty member at equilibrium wages.

**Self-Test**

1. Suppose the supply of biology and computer science professors is the same but the demand for computer scientists is greater than the demand for biologists. Furthermore, suppose both biologists and computer scientists are paid the same wage. If a shortage exists in both fields, in which field is the shortage greater? Explain your answer.

2. Under what condition might an economist propose that all college professors (irrespective of their field) be paid the same?

**Application 10: Price Floors and Winners and Losers**

Exhibit 6 shows the demand for and supply of an agricultural foodstuff (corn, wheat, soybeans, and so on) If the market is allowed to move to equilibrium, the equilibrium price will be $P_1$ and the equilibrium quantity will be $Q_1$. Consumers’ surplus will equal the area under the demand curve and above the equilibrium price: areas $1 + 2 + 3$. Producers’ surplus will equal the area under the equilibrium price and above the supply curve: areas $4 + 5$. Total surplus, of course, is the sum of consumers’ surplus and producers’ surplus: areas $1 + 2 + 3 + 4 + 5$.

Now suppose that the suppliers of the foodstuff argue for (and receive) a price floor, $P_F$. At this higher price, consumers do not buy as much as they once did. They now buy $Q_2$, whereas they used to buy $Q_1$. In addition, consumers’ surplus is now only area 1 and producers’ surplus is areas $2 + 4$.

![Exhibit 6: Agricultural Price Floors](image)

**Agricultural Price Floors**

The demand for and supply of an agricultural foodstuff are shown in the exhibit. The equilibrium price is $P_1$; consumers’ surplus (CS) is areas $1 + 2 + 3$; producers’ surplus (PS) is areas $4 + 5$. A price floor of $P_F$ effectively transfers some of the consumers’ surplus to producers in the form of a gain in producers’ surplus. Specifically, at $P_F$, consumers’ surplus is area 1 and producers’ surplus is areas $2 + 4$. Consumers are net losers because consumers’ surplus has decreased by areas $2 + 3$. Producers are net gainers because producers’ surplus has increased from areas $4 + 5$ to areas $2 + 4$ and area 2 is larger than area 5. Overall, the economic pie of $CS + PS$ has decreased from areas $1 + 2 + 3 + 4 + 5$ to areas $1 + 2 + 4$. 

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Obviously, consumers have been hurt by the new higher (government-mandated) price of $P_F$; specifically, they have lost consumers’ surplus equal to areas $2 + 3$.

How have suppliers fared? Whereas their producers’ surplus was equal to areas $4 + 5$ at $P_1$, it is now equal to areas $2 + 4$. (Area 2, which used to be part of consumers’ surplus, has been transferred to producers and is now part of producers’ surplus.) Whether or not producers are better off depends on whether or not area 2 (what they gain from $P_F$) is larger than area 5 (what they lose from $P_F$). Visually, we can tell that area 2 is larger than area 5, so producers are better off.

What is the overall effect of the price floor? Have producers gained more than consumers have lost, or have consumers lost more than producers have gained? To answer this question, we note that consumers lose areas $2 + 3$ in consumers’ surplus; producers gain area 2 in producers’ surplus and lose area 5 in producers’ surplus. So, the gains and losses are:

- **Losses to consumers:** areas $2 + 3$
- **Gains to producers:** area 2
- **Losses to producers:** area 5

Part of the loss to consumers is offset by the gain to producers (area 2), so net losses amount to areas $3 + 5$. In other words, total surplus—the sum of consumers’ surplus and producers’ surplus—is lower than it was. Whereas it used to be areas $1 + 2 + 3 + 4 + 5$, it now is areas $1 + 2 + 4$. The total surplus lost is areas $3 + 5$.

In short, (1) consumers lose, (2) producers gain, and (3) society (which is the sum of consumers and producers) loses.

You can think of this example in terms of a pie. Initially, the pie was made up of areas $1 + 2 + 3 + 4 + 5$. This rather large pie registered all the gains of consumers and producers. After the price floor of $P_F$ was imposed, the pie shrank to areas $1 + 2 + 4$; in other words, the pie was smaller by areas $3 + 5$.

A loss in total surplus—in our example, areas $3 + 5$—is sometimes called a **deadweight loss**. It is the loss to society of not producing the competitive, or supply-and-demand determined, level of output. In terms of Exhibit 6, it is the loss to society of producing $Q_2$ instead of producing $Q_1$.

**Deadweight Loss**

The loss to society of not producing the competitive, or supply-and-demand determined, level of output.

**SELF-TEST**

1. Look at the area equal to areas $3 + 5$ in Exhibit 6. If there is a price floor, this area ends up being a deadweight loss. It is the loss to society of not producing $Q_1$. Are there mutually beneficial trades that exist between $Q_2$ and $Q_1$, and if so, how do you know this?

2. Why might producers argue for a price floor if it ends up making society worse off?

**APPLICATION 11: COLLEGE SUPERATHLETES**

Let’s consider a young man, 17 years old, who is one of the best high school football players in the country. As a superathlete, the young man will be recruited by many college and university football coaches. Every one of those colleges and universities will likely want its coach to be successful at getting the young athlete; after all, at many universities, athletics is a moneymaker.
Our superathlete decides to attend college $A$, where he receives a “full ride”—a full scholarship. How should this full scholarship be viewed? One way is to say the superathlete is charged zero tuition to attend the college. (In other words, whereas some students pay a price of $10,000 a year to attend the college, the superathlete pays nothing.)

Another way to view the full scholarship involves a two-step process. First, the college pays the superathlete a dollar amount equal to the full tuition. Second, it then charges the superathlete the full tuition. (In other words, the college gives the athlete $10,000 with one hand and then collects the $10,000 with the other hand.)

Although it ends up being the same for the athlete regardless of which way we view the full scholarship, for purposes of our analysis, let’s view the full scholarship the second way: as a payment to the athlete combined with full price being charged. This way of viewing the scholarship leads to two important questions:

1. Can the college pay the athlete more than the full tuition of the college? In other words, if the full tuition is $10,000 a year, can the college pay the athlete, say, $15,000 a year?
2. Is the superathlete being paid what he is worth?

Because of NCAA rules, the answer to the first question is essentially no. The NCAA states that a college or university cannot pay a student to attend, and for all practical purposes, the NCAA views payment as anything more than a full scholarship. The NCAA takes the position that college athletes are amateurs and amateurs cannot be paid to play their sport.

How does the NCAA rule affect our second question? What if the athlete's worth to the college or university is greater than the dollar amount of the full tuition? For example, suppose the athlete will increase the revenues of the college by $50,000 a year and the full tuition is only $10,000 a year. In this case, the NCAA rule sets a price ceiling for the college. It sets a ceiling on what the college can pay an athlete. What is the effect of this price ceiling?

Let’s consider the demand (on the part of various colleges) for a single superathlete and the supply of this single superathlete. (See Exhibit 7.) We assume that the supply curve is vertical at 1 “athletic service.”

Now suppose the representative college charges a tuition of $10,000. Because of the NCAA rule, this dollar amount is the effective price ceiling (or wage ceiling). Furthermore, let’s suppose that the single college athlete’s market equilibrium wage, is $15,000. So, if the NCAA rule did not exist, the athlete’s wage would rise to $15,000. This dollar amount is equal to areas $B + C$ in Exhibit 7. What is the consumers’ surplus for the college that buys the athlete’s services for $15,000? Obviously, it is equal to area $A$.

However, the NCAA rule stipulates that the college cannot pay the athlete more than $10,000 (full tuition). So, the athlete's payment falls from $15,000 to $10,000, or from areas $B + C$ to simply area $C$. The college's consumers' surplus increases to areas $A + B$. Essentially, the NCAA rule transfers part of the athlete's income—area $B$—to the college in the form of greater consumers' surplus.

Just as the price floor in Application 10 leads to a transfer (from consumers to producers), a price ceiling leads to a transfer. The price ceiling set by the NCAA rule results in a transfer from the athlete to the college. In short, the athlete loses and the college gains.
The College Athlete
The exhibit shows the demand for and supply of a college athlete. If the market wage for the college athlete is $15,000, then the buyer of the athlete—in this case, the college—receives consumers’ surplus equal to area A. If the wage can be held down to the tuition cost of attending the college—$10,000 in this example—then the college receives consumers’ surplus of areas B + C.

Moreover, in this case, the college gain in consumers’ surplus equals the income loss for the athlete.

SELF-TEST

1. University X is a large university with a major football team. A new field house and track was just added to the university. What might this have to do with the discussion in this application?

2. Sometimes it is argued that if colleges paid student athletes, the demand for college sports would decline. In other words, the demand for college sports is as high as it is because student athletes are not paid (the way athletes in professional sports are paid). How would the analysis in this application change if we assume this argument is true?

APPLICATION 12: SUPPLY AND DEMAND ON A FREEWAY
What does a traffic jam on a busy freeway in any large city have to do with supply and demand? Actually, it has quite a bit to do with supply and demand. Look at it this way: There is a demand for driving on the freeway and a supply of freeway space. The supply of freeway space is fixed (freeways do not expand and contract over a day, week, or month). The demand, however, fluctuates. It is higher at some times than at other times. For example, we would expect the demand for driving on the freeway to be higher at 8 A.M. (rush hour) than at 11 P.M. But even though the demand may vary, the money price for driving on the freeway is always the same—zero. A zero money price means that motorists do not pay tolls to drive on the freeway.

Exhibit 8 shows two demand curves for driving on the freeway: \( D_{8 \text{ A.M.}} \) and \( D_{11 \text{ P.M.}} \). We have assumed the demand at 8 A.M. is greater than at 11 P.M. We have also assumed that at \( D_{11 \text{ P.M.}} \) and zero money price the freeway market clears: Quantity demanded of freeway space equals quantity supplied of freeway space. At the higher demand, \( D_{8 \text{ A.M.}} \), however, this is not the case. At zero money price, a shortage of freeway space exists: Quantity demanded of freeway space is greater than quantity supplied of freeway space. The shortage appears in the form of freeway congestion, bumper-to-bumper traffic. One way to
eliminate the shortage is through an increase in the money price of driving on the freeway at 8 A.M. For example, as Exhibit 8 shows, a toll of 70 cents would clear the freeway market at 8 A.M.

If charging different prices (tolls) at different times of the day on freeways sounds like an unusual idea, consider how Miami Beach hotels price their rooms. They charge different prices for their rooms at different times of the year. During the winter months when the demand for vacationing in Miami Beach is high, the hotels charge higher prices than when the demand is (relatively) low. If different prices were charged for freeway space at different times of the day, freeway space would be rationed the same way Miami Beach hotel rooms are rationed.

Before we leave this topic, let's consider the three alternatives usually proposed for freeway congestion. Some people propose tolls, some propose building more freeways, and others propose encouraging carpooling. Tolls deal with the congestion problem by adjusting price to its equilibrium level, as shown in Exhibit 8. Building more freeways deals with the problem by increasing supply. In Exhibit 8, it would be necessary to shift the supply curve of freeway space to the right so there is no longer any shortage of space at 8 A.M. More carpooling deals with the problem by decreasing demand. Two people in one car takes up less space on a freeway than two people in two cars. In Exhibit 8, if through carpooling the demand at 8 A.M. begins to look like the demand at 11 P.M., then there is no longer a shortage of freeway space at 8 A.M.

**THINKING LIKE AN ECONOMIST**

The economist knows that when there are buyers and sellers of anything (bread, cars, or freeway space), only three conditions are possible—equilibrium, shortage, or surplus. When the economist sees traffic congestion, the first thing that comes to mind is that there is a shortage of road space. Buy why is there a shortage? The economist knows that shortages occur at prices below equilibrium price. In other words, price is too low.

**ANALYZING THE SCENE**

Question from Setting the Scene: What do supply, demand, and price have to do with Carlos driving 5 mph on a freeway on his way home from work?

Carlos is frustrated because congestion has caused traffic to slow to 5 mph on the freeway. Application 12 discusses how supply, demand, and price affect freeway traffic. If the price of driving on a freeway is below the equilibrium price, quantity demanded of freeway space is greater than quantity supplied. The result is a shortage of freeway space, and Carlos and other drivers having to drive slower than perhaps they would like to drive.

**SELF-TEST**

1. In Exhibit 8, at what price is there a surplus of freeway space at 8 A.M.?
2. If the driving population increases in an area and the supply of freeway space remains constant, what will happen to freeway congestion? Explain your answer.

**APPLICATION 13: WHAT DOES PRICE HAVE TO DO WITH GETTING TO CLASS ON TIME?**

Class starts at 10 o’clock in the morning. At 10:09, Pam Ferrario walks in late. She apologizes to the instructor, saying, “I’ve been on campus for 20 minutes, but I couldn’t find a parking space.” Her classmates nod, knowing full well what she is talking about. At Pam’s university, especially between the hours of 8 A.M. and 2 P.M., parking spaces are hard to find.
This scene is replayed every day at many universities and colleges across the country. Students are late for class because on many days there isn’t a parking space to be found. Why can't students find parking spaces? The immediate answer is because there is a shortage of parking spaces. But why is there a shortage of parking spaces? There is a shortage of parking spaces for the same reason there is any shortage: the equilibrium price is not being charged.

Who pays for the shortage of parking spaces? The students pay—not in money, but in time. Because students know parking spaces on campus are hard to find, they often leave home or work sooner than they would if there were no shortages. Or like Pam Ferrario, they pay by being late to class.

Are there alternatives to the pay-in-time and pay-in-being-late-to-class schemes for rationing campus parking spots? Some economists have suggested a pay-in-price scheme. For example, the university could install meters in the parking lot and raise the fee high enough so that between the hours of 8 A.M. and 2 P.M., the quantity demanded for parking spaces equals the quantity supplied.

Such suggestions are sometimes criticized on the basis that students must pay the parking fee, no matter how high, in order to attend classes. But that’s not exactly true. Parking off campus and using public transportation are sometimes alternatives. But this is not really the main point. The issue isn’t paying or not paying, but choosing how to pay—in dollar price, time, or being late for class.

Some economists have taken the pay-in-price scheme further and have argued that parking spots should be auctioned on a yearly basis. In other words, a student would rent a parking spot for a year. This way the student would always know that a parking spot would be open when he or she arrived at the campus. People who parked in someone else’s spot would be ticketed by campus police.

Additionally, under this scheme, a student who rented a parking spot and chose not to use it between certain hours of the day could rent it to someone else during this period. So we would expect to see notices like this on campus billboards:

**PARKING SPOT FOR RENT**
Near Arts Building and Student Union. Ideal for liberal arts students. Available on a 2–12 hour basis between 12 noon and 12 midnight. Rate: $1 per hour. Call Jenny at 555-5309.

**SELF-TEST**

1. If a person pays for something in terms of time, he or she is really paying in terms of money. Do you agree or disagree? Explain your answer.

2. Suppose at the price of $1 a day for parking, quantity supplied is equal to quantity demanded. What happens if the demand for parking rises more than the supply of parking and the price of parking is kept constant at $1 a day?
APPLICATION 14: AISLE SEATS ON COMMERCIAL AIRPLANES

You may have noticed that there are the same number of aisle seats as there are center (middle of the row) seats on commercial airplanes. For example, if there are 50 aisle seats, there are 50 center seats too. Thus, the supply curve for aisle seats and center seats is the same (a vertical line at 50 seats). But demand is not the same for the two types of seats because most people prefer aisle seats. So, the demand curve for aisle seats is to the right of the demand curve for center seats.

What effect will this preference have on price? Well, if the demand for aisle seats is higher than the demand for center seats but the supply of both types of seats is the same, then the equilibrium price will be higher for aisle seats than for center seats. For example, suppose the equilibrium price for a center seat is $100. Then, the equilibrium price for an aisle seat will be, perhaps, $145.

But airlines charge the same price for aisle and center seats. In other words, if they are charging the equilibrium price for the center seat, then they must be charging a below-equilibrium price for the aisle seat. At a below-equilibrium price, there will be a shortage of aisle seats. More people will want aisle seats (say, 80) than there are aisle seats available (say, 50). Suppose you are one of the 80 people who wants an aisle seat. How can you be one of the first 50 people to get one? One way is to be one of the first 50 people to ask for an aisle seat. In other words, aisle seats are likely to be rationed by first-come-first-served. The people who are first to check in at the airport get the aisle seats (no flyer ever asks for a center seat); the latecomers get the center seats.

This analysis raises some additional questions for you to think about: If the equilibrium price for an aisle seat is higher than the equilibrium price for a center seat, then why don’t the airlines charge higher prices for aisle seats than for center seats? Why not fully ration all seats by dollar price instead of rationing aisle seats partly by dollar price and partly by first-come-first-served?

THINKING LIKE AN ECONOMIST

The economist knows that it is often possible to break one market into submarkets. For example, the market for seats on an airplane can be broken into three submarkets: one for window seats, one for aisle seats, and one for center seats. If the demand and supply conditions in these submarkets are not identical, then neither will be the equilibrium price. When airlines sell all seats for the same price, one or more submarkets will be out of equilibrium. Economists look for the consequences of disequilibria in markets.

ANALYZING THE SCENE

Question from Setting the Scene: Why aren’t any aisle seats left?

When Samantha Wilson asks for an aisle seat, she’s told that only center seats are left. Why are aisle seats taken before center seats? The short answer is because most people prefer aisle seats to center seats. Let’s look a little further. A greater preference for aisle seats indicates a higher demand for aisle seats than for center seats. If the airlines charge the same price for both aisle and center seats and that price equals the equilibrium price for center seats, then there will likely be a shortage of aisle seats. The seats will be rationed partly by price and partly by first-come-first-served. Samantha doesn’t get an aisle seat partly because of the airlines pricing policy.

SELF-TEST

1. Southwest Airlines is one of the few airlines that will not reserve seats for customers. In other words, buying a ticket on Southwest permits one to enter the airplane, but once on the airplane, it is up to the customer to locate a seat. Will the lines of people waiting to board a
Southwest Airlines flight be longer than, shorter than, or the same length as the lines of people waiting to board airline flights where reserved seats are permitted?

2. There are two flights, A and B. The demand for aisle seats on flight A is greater than the demand for aisle seats on flight B, but the demand for center seats on both flights is the same. If the same price is charged for an aisle seat and a center seat and that price equals the equilibrium price for center seats, then on which flight will the rationing device first-come-first-served be more extensively employed?

3. How is the discussion about seats on a commercial airline similar to the discussion about paying all professors the same wage?

**APPLICATION 15: 10 A.M. CLASSES IN COLLEGE**

A situation similar to aisle seats on an airplane occurs for some university and college classes. Suppose an economics class is offered in the same classroom at 10 A.M. in the morning and at 8 A.M. at night. Most students would prefer the 10 A.M. class to the 8 P.M. class. Notice in Exhibit 9 that the supply of seats in the class is the same at each time but the demand to occupy those seats is not. Because the demand is greater for the 10 A.M. class than for the 8 P.M. class, the equilibrium price for the 10 A.M. class is higher than the equilibrium price for the 8 P.M. class.

But the university or college charges the same tuition no matter what time students choose to take the class. The university doesn't charge students a higher tuition if they enroll in 10 A.M. classes than if they enroll in 8 P.M. classes.

Suppose a tuition of $T_1$ is charged for all classes and $T_1$ is the equilibrium tuition for 8 P.M. classes (see Exhibit 9). It follows that $T_1$ is below the equilibrium tuition for 10 A.M. classes. At $T_1$, the quantity demanded of seats for 10 o'clock classes will be greater than the quantity supplied; more students will want the 10 o'clock class than there is space available.

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**THINKING LIKE AN ECONOMIST**

The layperson sees students clamoring to get 10 A.M. classes and concludes that the demand is high for classes at this time. He then wonders why the university doesn't schedule more 10 A.M. classes. The economist knows that what the layperson sees is as much an effect of price as of demand. The demand for 10 A.M. classes may be high, but the quantity demanded may not be if the price is high enough. In fact, even though the demand for various classes at various times may be different, there is some set of prices that will make the quantity demanded of each class the same.

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**Exhibit 9**

**The Supply and Demand for College Classes at Different Times**

A given class is offered at two times, 10 A.M. and 8 P.M. The supply of seats in the classroom is the same at both times; however, the student demand for the 10 A.M. class is higher than the demand for the 8 P.M. class. The university charges the same tuition, $T_1$, regardless of which class a student takes. At this tuition, there is a shortage of seats for the 10 A.M. class. Seats are likely to be rationed on a first-come-first-served (first to register) basis or on seniority (seniors take precedence over juniors, etc.).
How will the university allocate the available seats? It may do it the same way that airlines ration aisle seats, that is, on a first-come-first-served basis. Those students who are first to register get the 10 A.M. class; the latecomers have to take the 8 P.M. class. Or the university could ration these “high demand classes” by giving their upperclass students (seniors) first priority.

**SELF-TEST**

1. Suppose college students are given two options. With option A, the price a student pays for a class is always the equilibrium price. For example, if the equilibrium price to take Economics 101 is $600 at 10 A.M. and is $400 at 4 P.M., then students pay more for the 10 A.M. class than they do for the 4 P.M. class. With option B, the price a student pays for a class is the same regardless of the time the class is taken. When given the choice between options A and B, many students would say they prefer option B to option A. Is this the case for you? If so, why would this be your choice?

2. How is the analysis of the 10 A.M. class similar to the analysis of aisle seats on commercial airplanes?

**APPLICATION 16: WHAT IS THE PRICE OF AN A?**

*The law of demand doesn’t operate just on goods with explicit prices. Unpopular teachers sometimes try to increase class enrollment by raising the average grade of the students in their courses, thereby reducing the price of the course to the student.*

—Richard Posner, Economic Analysis of the Law

At many universities and colleges, students can take a given course from any one of several professors. For example, Francine may be able to take English 101 from Professor Brown or Professor Lawson. Now suppose that both Professor Brown and Professor Lawson are considered good instructors, but students consider Professor Lawson slightly better than Professor Brown. For example, on a scale of 1 to 10, Professor Brown gets an 8 and Professor Lawson gets a 10. Will Francine necessarily take the course from Professor Lawson instead of Professor Brown? No. Professor Brown may “compensate” for a relatively lesser reputation by lowering the price of the course to the student. For example, Professor Brown may lower the time it takes a student in his class to get a good grade.

To illustrate, suppose that the average student has to work seven hours a week to get an A in Professor Lawson’s class, but only six hours a week to get an A in Professor Brown’s class. The demand (of students) to get into Lawson’s class may be higher than the demand to get into Brown’s class (because Lawson is considered a better instructor, she is, in some sense, a “higher-quality” good). However, the price of an A in Brown’s class is certainly lower than in Lawson’s class. (See Exhibit 10.)

Is it possible for the same number of students to want to be in each of the two professors’ classes? It certainly is, as Exhibit 10 shows. Quantity demanded of seats in class (1 seat = 1 student) is 30 in both Brown’s class and Lawson’s class.

**THINKING LIKE AN ECONOMIST**

The economist knows that low demand and low price can generate the same quantity demanded as high demand and high price. In fact, low demand and low price can generate an even greater quantity demanded than that generated by high demand and high price. For example, suppose students choose professor A over professor B for a given course. Does it follow that the demand is greater for professor A than for professor B? Not necessarily, says the economist. Professor A may simply charge a much lower price for a good grade than professor B charges. In fact, the demand for professor B may be higher than the demand for professor A, but professor B charges such a high price for a good grade relative to professor A that more students want to take professor A’s class.
The Price of an A

Both Brown and Lawson are good professors, but students perceive Lawson as slightly better than Brown. The demand (by students) to be in Lawson’s class is greater than the demand to be in Brown’s class. However, Brown charges a lower price for an A than does Lawson. At the prices that each charges, the same number of students want to be in Brown’s class (30) as want to be in Lawson’s class (30).

\[
\begin{array}{c|c}
\text{Quantity Demanded of Seats in Class} & \text{Demand for Lawson’s class} \\
\hline
0 & \text{Demand for Brown’s class} \\
30 & 7 \text{ hours = Price Lawson charges for an A} \\
60 & 6 \text{ hours = Price Brown charges for an A}
\end{array}
\]

SELF-TEST

1. If more people want to read romance novels than classic novels, it holds that the demand for romance novels is greater than the demand for classic novels. Do you agree or disagree? Explain your answer.

2. Popularity is a function of demand, not price. Do you agree or disagree? Explain your answer.

READER ASKS

How Do I Find My Own Supply-and-Demand Applications?

I can understand an economist’s applications of supply and demand, but I don’t know how to apply supply and demand myself. How do I find my own supply-and-demand applications?

You can proceed in several ways, two of which we discuss here. First, you can heed the words of Robert Solow: “I am a supply-and-demand economist. When I come across something, I ask myself what is being transferred here and where does the supply come from and where does the demand come from.”

We can reformulate what Solow has said into a single question: Is trade involved? This is the relevant supply-and-demand question because supply and demand are about trade. In other words, when you observe something, simply ask: Is this about trade? If you are driving on a freeway, ask: Is driving on a freeway about trade? Specifically, is something being “bought” and “sold”? If so, what? If you are applying to college, ask: Is this about trade? What is being bought and sold?

A second way to proceed is to look for surpluses and shortages around you. Surpluses and shortages are manifestations of market disequilibrium. If you find them, you can be fairly sure that supply and demand are relevant. If you are sitting in a classroom with empty seats, ask: Is there a surplus or shortage here? In this case, of course, there is a surplus, which should lead you to think about price. Surpluses exist when prices are too high. Why is the price too high? If you observe more people applying to a particular college than the college will admit, ask: Is there a surplus or shortage here? In this case there is a shortage, which again should lead you to think about price. Shortages exist when prices are too low. Why is price too low?

The key to finding your own supply-and-demand applications is to (1) observe things around you and then (2) ask questions about the things you observe. If you are sitting in a restaurant eating a meal, ask questions about what you observe. Is trade involved here? Yes. Is the restaurant filled to capacity and is there a line of people waiting to get in? Yes. Are there more people who want to eat at this restaurant than there are spaces to accommodate them? Yes. Is there a shortage here? Yes. Why do shortages exist? Prices are too low. Why doesn’t the restaurant raise its prices and eliminate the shortage?

The process isn’t that hard, is it?

Chapter Summary

Why Do Colleges Use GPAs, ACTs, and SATs for Purposes of Admission?
> Colleges and universities charging students less than the equilibrium tuition for admission create a shortage of spaces at the colleges or universities. Consequently, colleges and universities have to impose some nonprice rationing device, such as GPAs or ACT or SAT scores.

Legalization of Marijuana
> If the purchase and sale of marijuana are legalized, the price of marijuana may rise, fall, or remain the same. The price will depend on whether the rise in the demand for marijuana is more than, less than, or equal to the rise in the supply of marijuana.

Where Did You Get That Music?
> The recording industry can do, and has done, three things to reduce the amount of music piracy. (1) Raise the price of downloading music. The industry has done this by pursuing legal suits against some individuals. (2) Reduce the supply of music that can be downloaded. The industry has done this by bringing suit against companies such as Napster. (3) Reduce the demand for downloadable music. The industry has done this by running TV commercials that send the message that if you download music you are affecting everyday workers in the recording industry in a negative way.

The Minimum Wage
> A minimum wage (above equilibrium wage) reduces the number of unskilled workers working or reduces the number of unskilled labor hours purchased by employers.

Price Ceiling in the Kidney Market
> Currently, there is a price ceiling in the kidney market, and the price is set at $0. Many of the effects of a price ceiling (shortages, fewer exchanges, and so on) are seen in the kidney market.

Health Care and the Right to Sue Your HMO
> The supply curve of HMO-provided health care will shift upward and to the left if patients have the right to sue. As a result, patients will pay more for their HMO-provided health care coverage when they have the right to sue than when they do not have the right to sue.

Gold Prices and House Prices
> Gold prices are the same everywhere in the world, but house prices are not. When the price of a good is higher in one location than in another location and that good can be moved from the lower-priced location to the higher-priced location, then the price of the good will end up being the same in both locations. Obviously, if the good cannot be moved from the lower-priced location to the higher-priced location, then the price of the good will not end up being the same in both locations.

Do You Pay for Good Weather?
> If good weather gives people utility, then the demand for and the price of housing will be higher in a city with good weather than in a city with bad weather. Conclusion: People who buy houses in good-weather locations indirectly pay for the good weather.

Paying All Professors the Same Salary
> Suppose the equilibrium wage rate as determined by supply and demand conditions is higher, say, for a biology professor than for a history professor. If both professors are paid the equilibrium wage in biology, then there will be a surplus of history professors. If both professors are paid the equilibrium wage in history, then there will be a shortage of biology professors.

Price Floors and Winners and Losers
> A price floor placed on an agricultural foodstuff ends up lowering consumers’ surplus, raising producers’ surplus, and creating a deadweight loss. In short, a price floor can transfer “surplus” from consumers to producers and leave society (as a whole) worse off too.

College Superathletes
> If a college superathlete receives a full scholarship to play a sport at a university and if the full scholarship is less than the equilibrium wage for the superathlete (because of a prohibition mandating that the athlete cannot be paid the difference between his higher equilibrium wage and the dollar amount of his full scholarship), then the university gains at the expense of the athlete.

Supply and Demand on a Freeway
> The effect of a disequilibrium price for driving on a freeway is a traffic jam. If the price to drive on a freeway is $0 and at this price the quantity demanded of freeway space is greater than the quantity supplied, then there will be a shortage of freeway space that will manifest itself as freeway congestion.

What Does Price Have to Do With Getting to Class on Time?
> If price doesn’t fully ration campus parking spots, something will. The rationing device may be first-come-first-served, which often prompts students to leave for campus at earlier times than they would if price rationed parking spots.
Aisle Seats on Commercial Airplanes

If the supply for two goods is the same but the demand is different, then charging the same price for the two goods means that equilibrium is not achieved for at least one of the goods. If equilibrium is not achieved, then there is either a shortage or a surplus. In the commercial airplanes application, there is a shortage of aisle seats. This prompted a nonprice rationing device: first-come-first-served.

10 A.M. Classes in College

Colleges usually charge the same tuition for a class no matter when the class is taken. The supply of seats in the class may be the same at each time, but the demand for the class may be different at different times. At least for some classes, the quantity demanded of seats (in the class) will be greater than the quantity supplied. Thus, some nonprice rationing device will have to be used to achieve equilibrium.

What Is the Price of an A?

The law of demand can explain how a difference in the price of earning an A in two different classes results in a difference in the quantity demanded of each class. The lower the price, the greater the quantity demanded, ceteris paribus.

Key Terms and Concepts

Deadweight Loss

Questions and Problems

1. Harvard, Stanford, and Yale all charge relatively high tuition. Still, each uses ACT and SAT scores as admission criteria. Are charging a relatively high tuition and using standardized test scores (as admission criteria) inconsistent? Explain your answer.

2. Suppose the purchase and sale of marijuana are legalized and the price of marijuana falls. What explains the lower price of marijuana?

3. The minimum wage in year 1 is $1 higher than the equilibrium wage. In year 2, the minimum wage is increased so that it is $2 above the equilibrium wage. We observe that the same number of people are working at the minimum wage in year 2 as in year 1. Does it follow that an increase in the minimum wage does not cause some workers to lose their jobs? Explain your answer.

4. Using supply and demand analysis, explain the recording industry's efforts to reduce the amount of pirated music.

5. In our discussion of the kidney market, we represent the demand curve for kidneys as downward-sloping and the supply curve of kidneys as upward-sloping. At the end of the discussion we state, “If it is unlawful to pay someone for a kidney, fewer kidneys will be forthcoming.” In other words, the quantity supplied of kidneys is less at $0 than at, say, $20,000. Fewer kidneys supplied means, in turn, fewer kidney transplants. Would there be fewer kidney transplants if the supply curve of kidneys is vertical? Explain your answer.

6. What do the applications about freeway congestion, campus parking, and 10 A.M. classes have in common?

7. Economics has been called the “dismal science” because it sometimes “tells us” that things are true when we would prefer they were false. For example, although there are no free lunches, might we prefer that there were? Was there anything in this chapter that you learned was true that you would have preferred to be false? If so, identify it. Then explain why you would have preferred it to be false.

8. In the discussion of health care and the right to sue your HMO, we state, “Saying a seller’s minimum price for providing a good or service rises is the same as saying the seller’s supply curve has shifted upward and to the left.” Does it follow that if a seller’s minimum price falls, the supply curve shifts downward and to the right? Explain your answer.

9. Application 8 explains that even though no one directly and explicitly pays for good weather (“Here is $100 for the good weather”), still it is possible to pay for good weather indirectly, such as through housing prices. Identify three other things (besides good weather) that you believe people pay for indirectly.

10. If the equilibrium wage for economics professors is higher than the equilibrium wage for history professors, which professors (do you think) are more likely to argue that all professors should be paid the same? Explain your answer.

11. Suppose there exists a costless way to charge drivers on the freeway. Under this costless system, tolls on the freeway would be adjusted according to traffic conditions. For example, when traffic is usually heavy, such as from 6:30 A.M. to 9:00 A.M. on a weekday, the toll to drive on the freeway would be higher than the toll would be when traffic is light. In other words, freeway tolls would be used to equate the demand for freeway space and the supply of freeway space. Would you be in favor of such a system to replace our current (largely, zero-price) system? Explain your answer.

12. Wilson walks into his economics class 10 minutes late because he couldn’t find a place to park. Because of his tardiness, he doesn’t hear the professor tell the class there will be a quiz at
the next class session. At the next class session, Wilson is unprepared for the quiz and ends up failing it.

a. Might Wilson’s failing the quiz have anything to do with the price of parking? Explain your answer.

b. Suppose Wilson says to his professor: “If this university had set equilibrium prices for parking, I wouldn’t have been late to class, and therefore, I would have heard about the upcoming quiz, studied for it, and probably passed it. It’s not my fault I failed the quiz. It’s the university’s fault for not setting the equilibrium price for parking.” What would you say if you were the professor?

13. University A charges more for a class for which there is high demand than for a class for which there is low demand. University B charges the same for all classes. All other things being equal between the two universities, which university would you prefer to attend? Explain your answer.

14. Explain and diagrammatically represent how a price floor can bring about a transfer from consumers to producers.

15. Suppose the equilibrium wage for a college athlete is $40,000, but because of NCAA rules, the university can offer him only $22,000 (full tuition). How might the university administrators, coaches, or university alumni lure the college athlete to choose them over others?

16. Consider the theater in which a Broadway play is performed. If tickets for all seats are the same price (say, $70), what might you expect?

17. People buy more Honda Accords than Cadillac Escalades. Does it follow that the demand for Honda Accords is greater than the demand for Cadillac Escalades? Explain your answer.

Working With Numbers and Graphs

1. The price to drive on a freeway is $0 at all times of the day. This price establishes equilibrium at 3 A.M. but is too low to establish equilibrium at 5 P.M. There is a shortage of freeway space at 5 P.M.
   a. Graphically show and explain how carpooling may eliminate the shortage.
   b. Graphically show and explain how building more freeways may eliminate the shortage.

2. Diagrammatically show and explain why there is a shortage of classroom space for some college classes and a surplus for others.

3. Smith has been trying to sell his house for six months, but so far, there are no buyers. Draw the market for Smith’s house.

4. According to students, Professor Smith teaches a better economics class than Professor Jones. Everything else between the two professors is the same—how they grade, the number of assignments they give, the time they teach their classes, and so on.
   a. Draw the student demand to get into Professor Smith’s class in relation to the student demand to get into Professor Jones’s class.
   b. If the same dollar tuition is charged for both classes, whose class is more likely to have a shortage of seats? Explain your answer.

Internet Activities

1. Go to http://www.whitehouse.gov/news/fsbr.html, the official White House site for federal government statistics. Select “Prices.” Find the retail gasoline prices and the Spot West Texas Intermediate (wholesale) prices for crude oil (WTI) and gasoline.
   a. Crude oil is an input in the gasoline market. How would increases in the price of crude oil affect the supply of gasoline? How would price increases affect the quantity demanded of gasoline? the price of gasoline?
   b. Would you expect the price of gasoline to be higher during the summer months? If so, why?
   c. Use the concepts of demand and supply to explain recent changes in the markets for gasoline and crude oil.

2. Go to http://news.yahoo.com. Select and read any current news item. What was the news item about? Put the central idea of the news item into economic terms or diagrams, if it is possible to do so.

3. Go to http://www.forbes.com. Select and read any story. What was the story about? Put the central idea of the story into economic terms or diagrams, if it is possible to do so.
Musical Notes, Economic Notes

All music is made up of just seven notes, A–G. The seven notes of music are the white keys on a piano. These seven notes simply repeat over and over for the entire length of the keyboard. The black keys on a piano represent the sharp or flat versions of these seven notes, such as B flat or C sharp. When you listen to a song—any song—what you hear are these seven notes (at various octaves). Isn’t it amazing that so much music—different music—can have as its base simply seven notes?

The economic concepts in the last four chapters are a little like the seven notes of music. You will find them in a lot of economic settings—the “economic songs of life.” Just as a musician can listen to a piece of music and easily identify middle C, an economist can look at the world and easily identify the “economic notes” of scarcity, opportunity cost, or efficiency.

One of the ways you can learn to think like an economist is to listen to a lot of “economic songs” and work at picking out the “economic notes.” To some degree, you have already done this. Think back to Chapter 1 where Stephanie buys two books in her campus bookstore. Can you “hear” the “economic note” of scarcity being played? It’s there—loud and clear—when Stephanie pays the dollar price of the books. Dollar price is a “economic note” of scarcity being played? It’s there—loud and clear—when Stephanie pays the dollar price of the books. Dollar price is a rationing device, and rationing devices are needed in a world where people’s wants outstrip the resources available to satisfy those wants.

Let’s see if we can speed up the process of training your “economic ear.” Various economic settings are described below. After you read each, ask yourself which of the various “economic notes” (economic concepts) discussed in the last four chapters appears in that particular economic setting. The answers, along with explanations, are at the end of the feature.

The Economic Settings—The Songs

1. Jack jogs for 45 minutes, 6 days a week.
2. Miriam’s house has been on the market (been available for sale) for eight months.
3. Ivan loses his temper with Robert but never with Olivia.
4. Economists at a conference argue that the current unemployment rate is high when compared to the unemployment rate in previous years.
5. George calls a plumber to fix his kitchen sink.
6. Both Frank and Quentin ask Yvonne for a date for the same evening. Yvonne chooses Quentin.
7. Wilson asks, “Why don’t we produce bananas here in the United States?”
8. Patricia, who works in a store at the mall, says to her boyfriend, “Today sure was busy. That one-day sale really brought in a lot of customers.”
9. The airline employee at Gate 33B makes an announcement: “Ladies and gentlemen, we are overbooked for this flight. We are offering a $200 voucher that may be applied to a future flight to any passenger willing to take a later flight today. Please come to the desk if you are interested in this offer.” Ten minutes later, the same employee states that no one has accepted the $200 voucher, so the airline has increased the voucher to $400.

The Economic Concepts—The Notes

1. Each additional minute of exercise comes with additional benefits (marginal benefits) and additional costs (marginal costs). Jack seeks to maximize the net benefits of exercise. He seeks to exercise for the efficient amount of time—which is where his marginal benefits (of exercise) equal his marginal costs (of exercise). For Jack, the efficient amount of time is 45 minutes a day, 6 days a week. Economic concepts: marginal benefits, marginal costs, maximizing net benefits, efficiency.
2. At equilibrium price, quantity demanded equals quantity supplied. The fact that Miriam has not been able to sell her house for eight months tells us that at the current posted price for the house, quantity supplied (1 house) is greater than quantity demanded (0). This situation is descriptive of a surplus. Miriam will have to lower the price in order to sell her house. At a lower price, quantity demanded rises. Economic concepts: Disequilibrium price (above equilibrium price), surplus, supply and demand.
3. Someone might say that Ivan loses his temper with Robert but not with Olivia because Robert frustrates Ivan and Olivia does not. But let’s assume that Robert and Olivia frustrate Ivan equally. Might he still lose his temper with Robert and not with Olivia? Yes, if the costs of losing his temper with each individual were different. If the cost of losing his temper with Olivia is high (suppose “she gives as good as she gets”) relative to the cost of losing his temper with Robert (suppose he just sits back and “takes what is dished out to him”), then Ivan will more likely lose his temper with Robert than with Olivia. Economic concept: the higher the opportunity cost of doing X, the less likely one will do X (however X is defined).
4. Relatively high unemployment indicates that the economy is operating below its production possibilities frontier, or that it is inefficient. It could do better. Economic concepts: PPF, (productive) inefficiency.
5. We often buy a good or service from a person who has chosen to specialize in the production of the particular good or service. Thus, George calls a plumber—a specialist in plumbing services—when his sink needs to be fixed. We live in a world of specialists because of the benefits of producing the good or service in which we have a comparative advantage. George is better off when he specializes in producing the good in which he has a comparative advantage, sell-
ing that good, and then using the proceeds to hire a plumber than he is when he doesn't specialize. Economic concepts: comparative advantage, specialization.

6. There are a couple of ways to look at this setting. First, we can say that Yvonne will choose to go out with the person with whom she expects to receive the greater net benefits. In other words, going out with Frank has benefits and costs and going out with Quentin has benefits and costs. If there are net benefits in both cases, Yvonne will go out with the person who offers her the higher net benefits.

Or we could say that Yvonne has been placed in a setting where she needs to “ration” herself. What rationing device will she use? She will use "personality" or “appearance” or something else. Economic concepts: benefits, costs, maximizing net benefits, rationing device.

7. Bananas can be produced in the United States (many fruits and flowers can be produced in greenhouses), but it's more costly to produce bananas in the United States than it is to produce bananas in some other countries. In other words, the United States does not have a comparative advantage in the production of bananas. Economic concept: comparative advantage.

8. The sale (which is just another way of saying “lower prices”) brought in a lot of customers. Obviously, individuals buy more (or more individuals buy) at lower prices than at higher prices. This is the law of demand. Economic concept: law of demand.

9. At the $200 price the airline first offered to passengers to give up their seats on the current flight, quantity supplied was zero. Will the $400 price bring about a quantity supplied greater than zero? If it does, then we are talking about an upward-sloping supply curve. Economic concept: Upward-sloping supply curve.

As an aside, an economist was the one who came up with the idea of offering passengers a dollar payment to sell their seats on a flight. Airlines often overbook flights; that is, they accept more reservations for a flight than there are seats available on the flight. They do this because they know that a certain (usually small) percentage of individuals with reservations will not show up. An empty seat means that the airline's cost per actual passenger on board is higher than it would be if the seat were occupied by a paying passenger. So airlines try to make sure there are few empty seats.

One way to reduce the number of empty seats is to overbook. Awhile back, when an airline was confronted with more people with reservations showing up for a flight than there were seats available, it would simply “bump” passengers. In other words, the airline would simply tell some passengers that they could not fly on a particular flight. Obviously, the bumped passengers were disappointed and angry.

One day while shaving, economist Julian Simon (1932–1998), came up with an idea of how to better deal with overbooking. He argued that the airline should enter into a market transaction with those persons who had reserved seats for an overbooked flight. Instead of bumping people randomly, an airline should ask passengers to sell their seats back to the airline. Those passengers who absolutely had to get from X to Y would not sell their seats, but those passengers who did not have to get from X to Y right away might be willing to sell their ticket for a given flight.

Simon wrote the executives of various airlines and outlined the details of his plan. He even told them that the first airline that enacted the plan would likely reap larger sales. It could, after all, guarantee its passengers that they would not get bumped. Most airline executives wrote back and told him it was a reasonably good idea but unworkable.

Simon contacted various economists asking them to publicly support his idea. Some did, some didn’t. For years, Simon pushed his idea with airline executives and government officials.

Then Alfred Kahn, an economist, was appointed chairman of the Civil Aeronautics Board. Simon contacted Kahn with his plan and Kahn liked it. According to Simon, “Kahn announced something like the scheme in his first press conference. He also had the great persuasive skill to repackage it as a ‘voluntary’ bumping plan, and at the same time to increase the penalties that airlines must pay to involuntary bumpees, a nice carrot-and-stick combination.”

The rest, as people say, is history. Simon's plan has been in operation since 1978. Simon wrote, "The volunteer system for handling airline over-sales exemplifies how markets can improve life for all concerned parties. In case of an oversale, the airline agent proceeds from lowest bidder upwards until the required number of bumpees is achieved. Low bidders take the next flight, happy about it. All other passengers fly as scheduled, also happy. The airlines can overbook more, making them happy too."

2. Ibid.