

# Chapter 1

## Check Your Understanding

1. What is wrong with the statement “Economics is everything to do with money”?

**Answer:** Economics involves making choices with limited resources. Money is just one type of resource. Time, intellect, and ability are other resources to be considered. Focusing only on money issues ignores the vast array of nonmoney issues in which economics plays an important role.

2. Does your going to college have anything to do with expanding choices or reducing scarcity? Explain.

**Answer:** Yes, clearly going to college instead of going immediately to work represents a choice to get additional skills now and enter the labor force later. Even if you are working and going to school, you are choosing between investing in your education versus another activity. You will see the benefits in the future, when your skills command greater resources.

3. What is the difference between a positive question and a normative question?

**Answer:** A positive question attempts to study the relationship between two variables in an economy, while a normative question is based on a value judgment. A positive question would ask what is likely to happen when an activity is undertaken, while a normative question would ask whether that activity should or should not be undertaken.

4. You normally stay at home on Wednesday nights and study. Next Wednesday night, your best friend is having his big 21st birthday party. What is the opportunity cost of going to the party?

**Answer:** Opportunity cost is the value of what you give up in order to attend the party. Because you would normally be at home studying, the opportunity cost of the party is the benefit (such as a higher homework or exam grade) that you would have gained from studying that night.

5. What is the incentive to spend four years of one’s life and tens of thousands of dollars to earn a college degree?

**Answer:** An incentive encourages individuals to take actions that are in their best self-interest. Although attending college is both costly and time-consuming, the potential rewards from significantly higher lifetime earnings more than offsets what one gives up to attend college.

6. Why do markets typically lead to an efficient outcome for buyers and sellers?

**Answer:** Markets allow buyers and sellers to interact in such a way that sellers who wish to sell items can find buyers wishing to buy them. Markets are flexible, meaning that prices adjust until every unit of a good that sellers wish to sell is eventually purchased by a consumer wishing to buy it.

## Apply the Concepts

7. In contrasting equity and efficiency, why do high-tech firms seem to treat their employees better (better wages, benefits, working environments, vacations, etc.) compared to how landscaping or fast-food franchises treat their employees? Is this fair? Is it efficient?

**Answer:** High-tech firms are hiring expensive, sophisticated people who are in high demand. This leads to better treatment of employees. If the firm does not offer these amenities to its employees, they soon become employees of other high-tech companies. Individuals with low skill levels do not command high salaries or benefits. They are not in as high demand as highly skilled people. It is efficient, but many would argue that it is not fair. Markets, as you will see, are efficient allocative mechanisms, but fairness is difficult to determine.

8. Stores sometimes offer “mail-in rebates” to customers who purchase a certain good to get a portion of the purchase price refunded. Typically, a mail-in rebate requires proof of purchase (like a UPC from the actual product along with a store receipt) and a completed form to be mailed in for processing, with the rebate being mailed in the form of a check or a prepaid debit card six to eight weeks later. Why would some customers, but not all, take advantage of mail-in rebates?

**Answer:** Mail-in rebates allow individuals to recoup a fixed amount of money if they complete and submit the required paperwork. Submitting documents for a rebate involves opportunity costs in

terms of the time required to complete the paperwork as well as monetary costs such as a stamp, envelope, and auto expenses incurred to deposit the check. The value of time varies from person to person. Therefore, a person with a lower opportunity cost of time (such as a retiree) is more likely to submit rebate requests than someone with a higher opportunity cost of time (such as a bank executive).

9. The black rhinoceros is extremely endangered. Its horn is considered a powerful aphrodisiac in many Asian countries, and a single horn fetches many thousands of dollars on the black market, creating a great incentive for poachers. Unlike other stories of endangered species, this one might have a simple solution. Conservationists could simply capture as many rhinos as possible and remove their horns, reducing the incentive to poach. Do you think this will help reduce poaching? Why or why not?

**Answer:** It is probably bound to help somewhat. If only some have horns removed, however, poachers might still kill the rhino to keep from having to track this animal in the future. After all, poachers are concerned with efficiency as well. Thus, the more animals with horns removed, the better the result. Also, dehorning may make the animals more susceptible to predators. But incentives do matter, and removing the horn on balance may help the effort to save the black rhino. See Charles Wheelan, *Naked Economics: Undressing the Dismal Science* (New York: W. W. Norton), 2002, Chapter 2.

10. Most amusement parks in the United States charge a fixed price for admission, which includes unlimited roller coaster rides for the day. Some people attempt to ride the roller coasters as often as possible in order to maximize the value of their admission. Why is riding a roller coaster at an amusement park over and over to “get your money’s worth” not considered *thinking on the margin*?

**Answer:** Attempting to ride the roller coaster as many times as possible allows one to minimize the average cost per ride. However, this does not necessarily maximize one’s satisfaction. After riding a roller coaster several times, one may get bored or even physically sick from riding again. If riding the roller coaster one more time makes a person worse off, then total satisfaction would fall. Therefore, thinking on the margin says that one should continue riding the roller coaster as long as the marginal benefit is greater than the marginal cost.

11. With higher gasoline prices, the U.S. government wants people to buy more hybrid cars that use much less gasoline. Unfortunately, hybrids are approximately \$4,000 to \$5,000 more expensive to purchase than comparable cars. Because people follow incentives, what can the government do to encourage the purchase of hybrids?

**Answer:** The government can subsidize hybrid purchases directly, by offering people, say, \$2,000 to purchase cars that get greater than 40 miles per gallon, or offering tax credits. The government could add significant taxes on gasoline, increasing the price, making hybrid cars more attractive to consumers.

12. Some colleges and universities charge tuition by the credit hour, while others charge tuition by the semester, allowing students to take as many classes as they desire. How do these tuition structures affect the incentives students face when deciding how many classes to take? Provide an example of a beneficial effect and an example of a potentially harmful effect resulting from the incentives created with each system. How does marginal analysis affect the incentives with each system?

**Answer:** If tuition is charged as a fixed rate per term regardless of the number of courses taken, students would have an incentive to take more classes per term. It might encourage students to forgo working and take additional classes to complete their degrees more quickly. A beneficial effect of the fixed rate is that it encourages students to focus on their studies and complete degrees more quickly. A beneficial effect of the per credit system is that it allows working students to complete their degrees part time while holding a job. A potentially harmful effect of the fixed rate system is that students may enroll in more classes than they can handle, resulting in lower grades. Marginal analysis guides students into determining whether it is in their best interest to take an additional class: Under the per credit system, the marginal cost of an additional class is the monetary cost of tuition and the time commitment, while under the fixed tuition system, the marginal cost of tuition is zero, but the time commitment still creates a marginal cost.

## In the News

13. *The New York Times* reported on January 18, 2012, in an article titled “What the Top 1% of Earners Majored In” that 8.2% of Americans who majored in economics for their undergraduate degree are in the top 1% of salary earners. Only those who majored in pre-med had a higher percentage in the top 1%. What might be some reasons why economics majors have done well in the job market?

**Answer:** Economics is an analytical subject that prepares students for a very broad range of careers. Economics majors can find jobs in corporations, banks, and government institutions. Economics is also a popular major for those wishing to pursue a law degree. In sum, economics provides a well-rounded background for many well-paying careers.

14. Ticketmaster, the largest event ticket seller in the country, recently expanded its use of paperless tickets that requires buyers to pick up tickets on the day of the event and show identification (*Reuters*, “Paperless Tickets: Is Ticketmaster Hurting Consumers?” March 29, 2011) rather than mailing paper tickets weeks before the event. What are some reasons Ticketmaster is expanding this method of ticket delivery? How does this change the incentives in the secondary (resale) market?

**Answer:** Ticketmaster is attempting to curtail the growth of resale markets, which include ticket scalping and online Web sites such as StubHub, which facilitate the resale of tickets. By requiring the purchaser to show up in person to pick up tickets, it makes it difficult for a person to make money by buying and selling tickets to events they have no intention of attending. A benefit of this policy is that it gives true fans a better opportunity to buy tickets at face value.

## Solving Problems

15. Suppose your favorite band is on tour and coming to your area. Tickets are \$100, and you take a day off of work where you could have earned \$60. What is your opportunity cost of going to the concert?

**Answer:** The opportunity cost is the \$100 that you could have spent on something else plus the \$60 you would have earned by working, for a total of \$160.

16. Suppose you pay \$10 to watch a movie at the local multiplex cinema, and then afterward sneak into the next theater to watch a second movie without paying. What would be your marginal cost of watching the second movie?

**Answer:** The marginal cost of watching the second movie is \$0 because you do not pay for another ticket to watch it.

## Using the Numbers

17. According to *By the Numbers*, the average percentage of income spent on various items has changed since 1960.

- What percent of income did Food represent in 1960? In 2010? This represents a drop of approximately what percent? (Hint: It is *not* 8%.)
- What percent of income did Health Care represent in 1960? In 2010? This represents an increase of approximately what percent? (Hint: It is *not* 9%.)

**Answer:**

- About 17.5% in 1960, and about 9.5% in 2010. Food spending as a percentage of income fell approximately 46% over this time period.
- About 8.5% in 1960 and about 17.5% in 2010. Health care spending as a percentage of income rose approximately 106% over this time period.

18. According to *By the Numbers*, about how many economics degrees were awarded to college graduates in 2011? How does this number compare to the number of nursing degrees? Communications degrees?

**Answer:** About 80,000 economics degrees were awarded in 2011. This is fewer than the approximately 150,000 nursing degrees awarded, but more than the approximately 70,000 communications degrees awarded.

## Chapter 2

### Check Your Understanding

1. When can an economy increase the production of one good without reducing the output of another?

**Answer:** When there are unemployed resources, and the economy is operating within the production possibilities frontier.

2. In which of the three basic questions facing any society does technology play the greatest role?

**Answer:** Technology will be most important in the how to produce question.

3. Explain the important difference between a straight line PPF and the PPF that is concave to (bowed away from) the origin.

**Answer:** A straight line PPF curve has constant opportunity costs, whereas the bowed out (concave to the origin) curve has increasing opportunity costs as the production of one good is increased.

4. How would unemployment be shown on the PPF?

**Answer:** Any time the economy is operating inside the PPF, some resources will be unemployed, thus any point inside the PPF represents unemployment.

5. List three factors that can contribute to an economy's growth.

**Answer:** Economies can grow through increases in the quality or quantity of labor, land, capital, and entrepreneurial activity. Increases in resources expand the PPF outward. Improvements in technological progress can increase growth in an economy.

6. How can a country that does not have an absolute advantage in producing goods still benefit from trade?

**Answer:** All countries can benefit from trade as long as they specialize in the production of the good in which they have a comparative advantage. All countries have a comparative advantage in producing something because comparative advantage deals with relative abilities rather than absolute abilities.

### Apply the Concepts

7. China has experienced levels of economic growth in the last decade that have been about 5 times that of the United States (10% versus 2% per year in the United States). Has China's high growth rate eliminated scarcity in China?

**Answer:** No. Scarcity still exists in China. Growth alone does not eliminate scarcity: The PPF shifts outward, but still there are tradeoffs between products, and time is still a limited resource for us all. As rich as America is, we still face scarcity. Economic growth typically does improve standards of living, and the level (or degree) of scarcity declines.

8. Describe how a country producing more capital goods rather than consumption goods ends up in the future with a PPF that is larger than a country that produces more consumption goods and fewer capital goods.

**Answer:** Capital goods are those goods used to produce other goods. Producing more capital goods represents an investment in the economy. This investment leads to the ability of the country to produce more goods and services in the future.

9. The United States has an absolute advantage in making many goods, such as short-sleeved cotton golf shirts. Why do Indonesia and Bangladesh make these shirts and export them to the United States?

**Answer:** Indonesia and Bangladesh, while smaller, have a comparative advantage in the production of shirts, making it profitable for both countries to specialize and ship shirts to the United States.

10. Why is it that America uses heavy street cleaning machines driven by one person to clean the streets, while China and India use many people with brooms to do the same job?

**Answer:** Both China and India have huge labor resources relative to available capital, therefore the job is done with a lot of labor and a little capital. The United States has less labor relative to capital, thus wages are higher, and capital is substituted for labor.

11. If specialization and trade as discussed in this chapter lead to a win-win situation in which both countries gain, why is there often opposition to trade agreements and globalization?

**Answer:** While trade is typically beneficial to both countries in the aggregate, individuals and groups within each country lose when their product faces competition from a country with a comparative advantage.

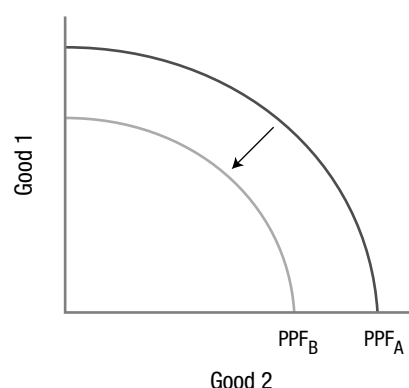
12. American attitudes about the tradeoff between the environment and economic growth shown in *By the Numbers* at the beginning of the chapter changed significantly when the economy entered a recession. However, during the recession in 2009, Americans were roughly equally split between their concerns for the environment and economic growth. What would you expect to find in a similar survey in a relatively poor developing nation?

**Answer:** People living on \$1 to \$2 a day in poor developing nations would probably be more focused on economic growth and undoubtedly find it difficult to fret about the environmental impacts. Once their income reaches a reasonable level, more of their attention would turn to protecting and improving the environment.

### In the News

13. According to a March 8, 2012, *New York Times* report, the 2011 earthquake in Japan that triggered a devastating tsunami led to a near complete shutdown of Japan's nuclear energy industry, which generates one-third of the country's total electricity. The resulting energy crisis caused severe supply disruptions in nearly all industries. How do natural disasters such as the tsunami in Japan affect a country's ability to achieve economic growth? Illustrate your answer using a PPF.

**Answer:** A natural disaster reduces the productive capacity of a country. In Japan, the loss of power prevented many factories from operating at full capacity, and many workers who were hurt in the disaster were unable to work. The loss of productive capacity is represented by the PPF shifting inward (from  $PPF_A$  to  $PPF_B$ ), indicating a reduction in the maximum amount of goods that can be produced.



14. The recession of 2007–2009 and its slow recovery led to severe budget cuts in state governments across the United States. Public colleges and universities, which are highly subsidized by state governments, saw dramatic cuts in their budgets, making it more difficult for students to attend and/or complete their degrees. The *Chronicle of Higher Education* of January 17, 2012, argued that cuts to higher education will “imperil competitiveness” in America. How might the cost savings from reduced educational spending end up costing states even more in the future?

**Answer:** Investments in education result in an increase in long-term productivity through a more productive workforce. By reducing education subsidies, a government can use the savings for other short-term expenditures. However, the consequences of these cost savings may be felt in the long run if the United States continues to lose competitiveness with other countries that are increasing investment in education.

### Solving Problems

15. Political commentators often make the argument that growth in another country (most notably China) is detrimental to the economic interests of the United States. Look back at Tables 2 to 4 in the Gains from Trade section of the chapter. Then, assume that Mexico doubles in size, and make those

changes to Table 2. Reconstruct Tables 3 and 4 given Mexico's greater capacity. Has the United States benefited by Mexico being able to produce more?

**Answer:**

**Table 2 Initial Consumption-Production Pattern**

|       | United States | Mexico | Total |
|-------|---------------|--------|-------|
| Oil   | 20            | 20     | 40    |
| Chips | 20            | 8      | 28    |

**Table 3 Production after Mexico Specializes in Producing Crude Oil**

|       | United States | Mexico | Total |
|-------|---------------|--------|-------|
| Oil   | 0             | 40     | 40    |
| Chips | 40            | 0      | 40    |

**Table 4 Final Consumption Patterns after Trade**

|       | United States | Mexico | Total |
|-------|---------------|--------|-------|
| Oil   | 20            | 20     | 40    |
| Chips | 26            | 14     | 40    |

Both Mexico and the United States are better off.

16. The table below shows the potential output combinations of oranges and jars of prickly pear jelly (from the flower of the prickly pear cactus) for Florida and Arizona.
- Compute the opportunity cost for Florida of oranges in terms of jars of prickly pear jelly. Do the same for prickly pear jelly in terms of oranges.
  - Compute the opportunity cost for Arizona of oranges in terms of jars of prickly pear jelly. Do the same for prickly pear jelly in terms of oranges.
  - Would it make sense for Florida to specialize in producing oranges and for Arizona to specialize in producing prickly pear jelly and then trade? Why or why not?

| Florida |                    | Arizona |                    |
|---------|--------------------|---------|--------------------|
| Oranges | Prickly Pear Jelly | Oranges | Prickly Pear Jelly |
| 0       | 10                 | 0       | 500                |
| 50      | 8                  | 20      | 400                |
| 100     | 6                  | 40      | 300                |
| 150     | 4                  | 60      | 200                |
| 200     | 2                  | 80      | 100                |
| 250     | 0                  | 100     | 0                  |

**Answer:**

- Florida's opportunity cost of oranges:  $2/50 = .04$ , or .04 jar of prickly pear jelly for each orange. The opportunity cost of a jar of prickly pear jelly:  $50/2 = 25$ , or 25 oranges must be given up for each jar of prickly pear jelly.
- Arizona's opportunity cost of oranges:  $100/20 = 5$ , or 5 jars of prickly pear jelly for each orange. The opportunity cost of a jar of prickly pear jelly:  $20/100 = .2$ , or .2 orange must be given up for each jar of prickly pear jelly.

- c. Total combined output for both states will rise to 250 oranges and 500 jars of prickly pear jelly. This is larger than the sum of any two combinations available to both states. They will be able to share the excess through trade.

## Using the Numbers

17. According to By the Numbers, in which period (1960 to 1985 or 1985 to 2010) did corn and soybean production increase faster in terms of yield per acre?

**Answer:** Production of corn and soybeans increased faster from 1960 to 1985.

18. According to By the Numbers, in the period between 1990 and 2012, in how many years did the U.S. trade balance improve from the previous year and in how many years did the trade balance deteriorate (assume the trade balance deteriorated from 1989 [not shown in the figure] to 1990)?

**Answer:** The U.S. trade balance improved in 6 of the 23 years: 1991, 1995, 2001, 2007, 2008, 2009 (although years 1995 and 2008 were only very slight improvements). In all other years, the U.S. trade balance deteriorated.

## Chapter 3

### Check Your Understanding

1. Product prices give consumers and businesses a lot of information besides just the price. What are they?

**Answer:** Price can be a reflection of quality (albeit imperfectly), and provide businesses with information about levels of demand. Prices provide consumers with relative comparisons between products.

2. Describe the determinants of demand. Why are they important?

**Answer:** The determinants of demand are consumer tastes and preferences; income; prices of related goods; the number of buyers; and expectations regarding future prices, income, and product availability. When a determinant changes, the demand curve shifts.

3. As the world population ages, will the demand for cholesterol drugs increase, decrease, or remain the same? Assume there is a positive relationship between aging and cholesterol levels. Would this cause a change in demand or a change in quantity demanded?

**Answer:** Increase; change in demand.

4. Describe some of the reasons why supply changes. Improved technology typically results in lower prices for most products. Why do you think this is true? Describe the difference between a change in supply and a change in quantity supplied.

**Answer:** Supply will rise if any of the six determinants of supply changes. Improved technology increases productivity, resulting in more output for lower costs. A change in quantity supplied results from a change in price, while a change in supply results from a change in one or more of the determinants.

5. If a strong economic recovery boosts average incomes, what would happen to the equilibrium price and quantity for a normal good? How about an inferior good?

**Answer:** When incomes increase, demand for normal goods increases, which would increase both the equilibrium price and quantity. Meanwhile, demand for inferior goods decreases, which would decrease the equilibrium price and quantity.

6. Suppose the market for tomatoes is in equilibrium, and events occur that simultaneously shift both the demand and supply curves to the right. Is it possible to determine how the equilibrium price and/or quantity would change?

**Answer:** When both the demand and supply curves shift to the right, the overall equilibrium quantity will increase because both shifts result in a higher quantity. However, it is not possible to determine the overall effect on equilibrium price without additional information on the magnitudes of the changes, because an increase in demand pushes prices higher, while an increase in supply pushes prices lower.

### Apply the Concepts

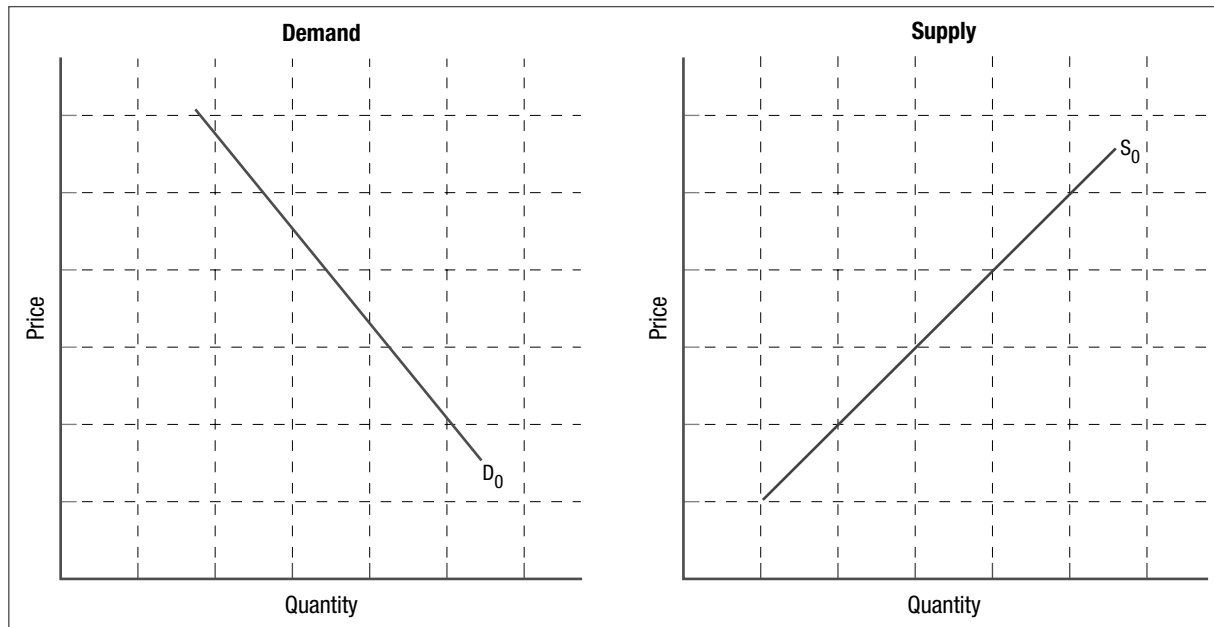
7. Demand for tickets to sporting events such as the Super Bowl has increased. Has supply increased? What does the answer to this tell you about the price of these tickets compared to prices a few years ago?

**Answer:** Demand has increased, but supply has not, therefore prices are undoubtedly higher.

8. Suppose the price of monthly data plans required to access the Internet anywhere using a tablet computer falls in price. How would this affect the market for tablet computers?

**Answer:** Monthly data plans are a complement to tablets, which require a data plan in order to operate fully. If data plans fall in price, it would encourage more consumers to buy tablets, increasing the demand for tablets and their equilibrium price and quantity.

9.



Using the figures above, answer the following questions:

a. On the Demand panel:

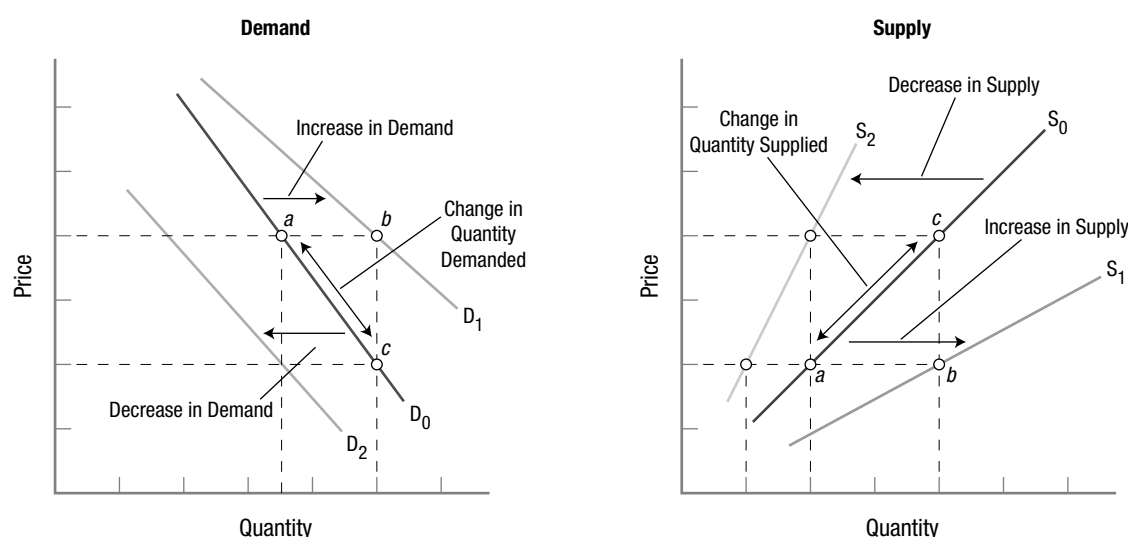
- Show an increase in demand and label it  $D_1$ .
- Show a decrease in demand and label it  $D_2$ .
- Show an increase in quantity demanded.
- Show a decrease in quantity demanded.
- What causes demand to change?
- What causes quantity demanded to change?

b. On the Supply panel:

- Show an increase in supply and label it  $S_1$ .
- Show a decrease in supply and label it  $S_2$ .
- Show an increase in quantity supplied.
- Show a decrease in quantity supplied.
- What causes supply to change?
- What causes quantity supplied to change?



**Answer:** See the figure below. A change in demand is a shift in the entire demand curve and is caused by a change in one or more of the determinants. In contrast, a change in quantity demanded is a movement along an existing demand curve caused by a change in price. This distinction is important if, for example, you want to distinguish between rising sales due to an expanded advertising program and rising sales due to a sale or a reduction in price. A change in supply shifts the curve and is caused by a change in one or more of the determinants. A change in quantity supplied is caused by a change in price.



10. Several medical studies have shown that drinking red wine in moderation is good for the heart. How would such a study affect the public's demand for wine? Would it have an impact on the type of grapes planted in new vineyards?

**Answer:** The market demand for red wine would increase (shift to the right). More vineyards would plant grape varieties that produce red wines rather than white wines.

11. Assume initially that the demand and supply for premium coffees (one-pound bags) are in equilibrium. Now assume Starbucks introduces the world to premium blends, and so demand rises substantially. Describe what will happen in this market as it moves to a new equilibrium. If a hard freeze eliminates Brazil's premium coffee crop, what will happen to the price of premium coffee?

**Answer:** A growing demand will cause prices to rise as more consumers want what is initially only a modest available supply. Given the higher prices for premium coffee, more trees will be planted and supplies can be expected to rise in the longer term. A hard freeze results in lower supplies and higher prices.

12. Over the past decade, cruise ship companies have dramatically increased the number of mega-ships (those that carry 3,000 passengers or more), increasing the supply of cruises. At the same time, the popularity of cruising has increased among consumers, increasing demand. Explain how these two effects can coincide with a decrease in the average price of cruise travel.

**Answer:** An increase in the supply pushes quantity higher and prices lower, while an increase in demand (due to the rising popularity of cruises) pushes both prices and quantity higher. In order for the average price of cruise travel to decrease, the increase in the supply of cruises must be greater than the increase in the demand for cruises. In other words, the supply curve must shift farther out than the demand curve.

## In the News

13. In China, a small but increasing number of people are choosing to work as professional queuers, and exactly as it sounds, they are paid to wait in line for others. An NPR story in July 25, 2011, tells the story of a few professional queuers who earn about \$3 an hour to wait in line, a wage that is about double that of the typical factory worker in China. Given this new business in which one can easily pay someone else to wait, what do you think will happen in the market for goods and services most prone to long waiting lines, such as concert tickets, the latest technology gadget, or low-cost apartments?

**Answer:** Waiting in line for a new product or a good deal adds to the cost of acquiring a good. For those with higher opportunity costs of time, hiring a professional queuer reduces this cost, making the product more affordable. Therefore, professional queuers would cause an increase in demand for goods and services more prone to lines, causing even greater lines and shortages if prices do not adjust upward.

14. An August 12, 2011, article in *Time*, “As Regular Malls Struggle, Outlet Malls Are Booming,” analyzed trends in how consumers shop, and found that more and more consumers are visiting outlet malls as a way to save money on name brand clothing and housewares. Given that most stores offer an outlet option, why would anyone choose to pay more at regular malls? Use supply and demand analysis to explain why prices differ between regular stores and outlet stores. Why would outlet stores be a strategic way for businesses to sell their unsold (surplus) goods instead of just offering a sale at their regular stores?

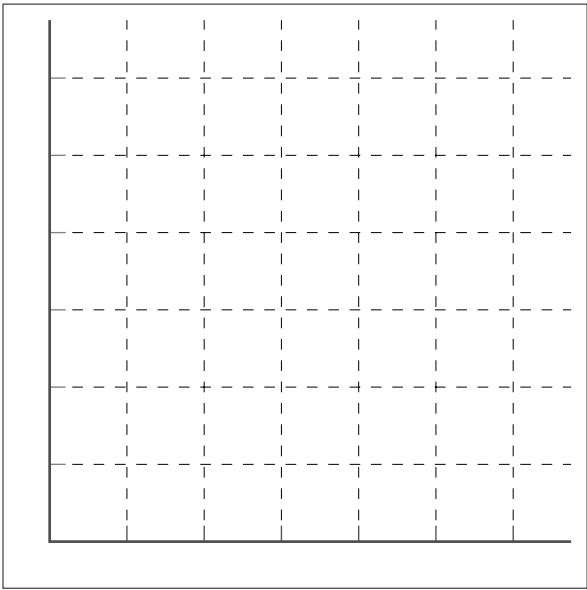
**Answer:** Prices at nonoutlet malls tend to be higher than prices at outlet malls because nonoutlet malls target customers with a higher willingness-to-pay. These customers are willing to pay more for the convenience of a less crowded and less chaotic shopping experience. Nonoutlet malls usually have a greater selection of the latest fashions, and a greater choice of colors and sizes. Rather than discounting unsold inventory, stores often will transfer the unsold merchandise to outlet malls to target a different subset of customers. Outlet mall customers are more budget conscious: They are willing to spend more time searching for a bargain. By segmenting the market, stores are able to maintain higher prices at their nonoutlet stores.

Solving Problems

15. The table below represents the world supply and demand for natural vanilla in thousands of pounds. A large portion of natural vanilla is grown in Madagascar and comes from orchids that require a lot of time to cultivate. The sequence of events described below actually happened, but the numbers have been altered to make the calculations easier (see James Altucher, “Supply, Demand, and Edible Orchids,” *Financial Times*, September 20, 2005, p. 12). Assume the original supply and demand curves are represented in the table below.

| Price (\$/pound) | Quantity Demanded (thousands) | Quantity Supplied (thousands) |
|------------------|-------------------------------|-------------------------------|
| 0                | 20                            | 0                             |
| 10               | 16                            | 6                             |
| 20               | 12                            | 12                            |
| 30               | 8                             | 18                            |
| 40               | 4                             | 24                            |
| 50               | 0                             | 30                            |

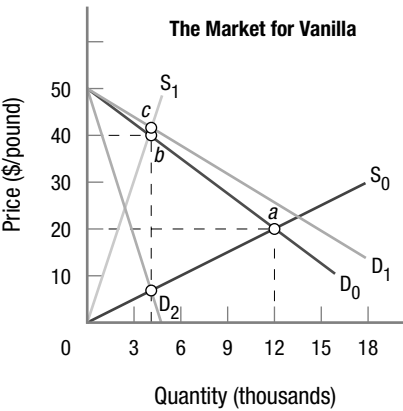
- a. Graph both the supply ( $S_0$ ) and demand ( $D_0$ ) curves. What is the current equilibrium price? Label that point  $a$ .



- b. Assume that Madagascar is hit by a hurricane (which actually occurred in 2000), and the world's supply of vanilla is reduced by five-sixths, or 83%. Label the new supply curve ( $S_1$ ). What will be the new equilibrium price in the market? Label that point  $b$ .
- c. Now assume that Coca-Cola announces plans to introduce a new "Vanilla Coke," and this increases the demand for natural vanilla by 25%. Label the new demand curve ( $D_1$ ). What will be the new equilibrium price? Label this new equilibrium point  $c$ . Remember that the supply of natural vanilla was reduced by the hurricane earlier.
- d. Growing the orchids that produce natural vanilla requires a climate with roughly 80% humidity, and the possible grower countries generally fall within 20° north or south of the equator. A doubling of prices encouraged several other countries (e.g., Uganda and Indonesia) to begin growing orchids or increase their current production. Within several years, supply was back to normal ( $S_0$ ), but by then, synthetic vanilla had replaced 80% of the original demand ( $D_0$ ). Label this new demand curve ( $D_2$ ). What is the new equilibrium price and output?

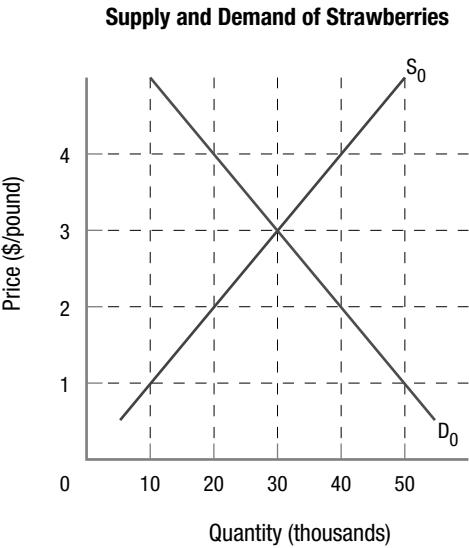
**Answer:**

- a. \$20 a pound. See graph.



| Price (\$/pound) | Demand ( $D_0$ ) | Supply ( $S_0$ ) | Supply ( $S_1$ ) | Demand ( $D_1$ ) | Demand ( $D_2$ ) |
|------------------|------------------|------------------|------------------|------------------|------------------|
| 0                | 20               | 0                | 0                | 25               | 4                |
| 10               | 16               | 6                | 1                | 20               | 3.2              |
| 20               | 12               | 12               | 2                | 15               | 2.4              |
| 30               | 8                | 18               | 3                | 10               | 1.6              |
| 40               | 4                | 24               | 4                | 5                | .8               |
| 50               | 0                | 30               | 5                | 0                | 0                |

- b. Supply has been cut by five-sixths, therefore equilibrium price will rise to \$40 a pound. See table and graph.
- c. Coke's impact on the demand curve is shown in the table and graph; equilibrium price will be somewhat above \$40 a pound.
- d. Demand falls to  $D_2$ , while supply returns to  $S_0$ ; equilibrium price will be roughly \$6 a pound, and equilibrium output will be roughly 3,600 pounds.
16. The following figure shows the supply and demand for strawberries. Answer the questions that follow.

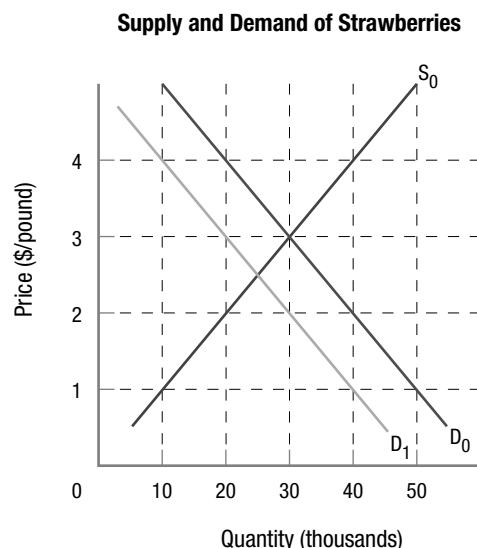


- a. Indicate the equilibrium price and equilibrium quantity.
- b. Suppose sellers try to sell strawberries at \$4 a pound. How much of a shortage or a surplus of strawberries would result?
- c. Now suppose that the demand for strawberries falls by 10,000 pounds at every price. Draw the new demand curve in the figure, and estimate what the new equilibrium price and equilibrium quantity would be.
- d. If sellers still try to sell strawberries at \$4 a pound, would the shortage or the surplus increase or decrease?

**Answer:**

- a. The equilibrium price is \$3 a pound and the equilibrium quantity is 30,000 pounds.
- b. At \$4 a pound, quantity demanded is 20,000 pounds and quantity supplied is 40,000 pounds, creating a surplus of 20,000 pounds.

- c. If quantity demand falls by 10,000 pounds at every price, the demand curve would shift to the left. The new equilibrium price would be about \$2.50 a pound and the equilibrium quantity would be about 25,000 pounds.



- d. At \$4 a pound, the new quantity demanded is 10,000 pounds while quantity supplied is still 40,000 pounds, causing the surplus to increase to 30,000 pounds.

### Using the Numbers

17. According to By the Numbers, about how many times larger is the bottled water market in the United States in the year 2012 compared to 1982?

**Answer:** The bottled water market in 2012 was about 10 times larger than it was in 1982.

18. According to By the Numbers, which of the following categories of college/university enrollment have risen from 1996 to 2012: public two-year, public four-year, private not-for-profit, private for-profit? Which of these categories have fallen in enrollment from 1996 to 2012?

**Answer:** Enrollment rose for private for-profit colleges and universities from 1996 to 2012. Enrollment fell over this period for public two-year, public four-year, and private not-for-profit colleges and universities.

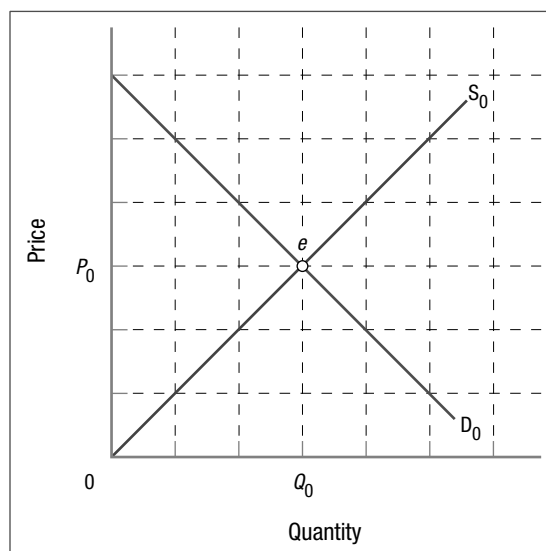
## Chapter 4

### Check Your Understanding

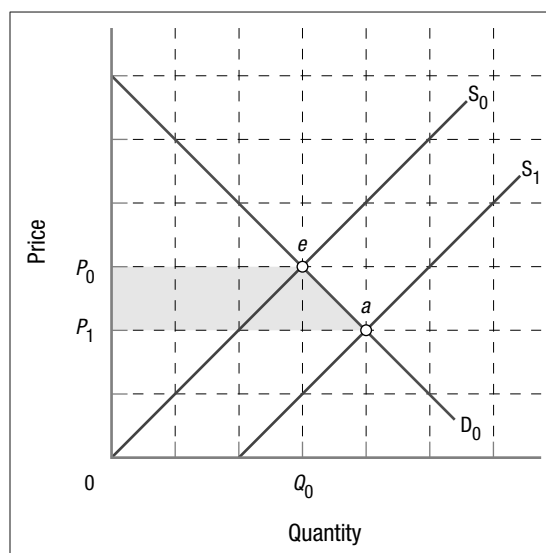
1. Describe how consumer surplus and producer surplus are measured.

**Answer:** Consumer surplus is the difference between an individual's willingness-to-pay for a product and the price paid. For a market, consumer surplus is measured as the difference between the demand curve and the price. Producer surplus is the difference between the price of a good and a seller's willingness-to-sell. For a market, producer surplus is measured as the difference between the price and the supply curve.

2. Using the graph below, show what happens to consumer surplus when a new technology reduces the cost of production.



**Answer:** When production costs decline, supply increases to  $S_1$  in the figure, which increases consumer surplus by the area  $P_1P_0ea$  (the shaded area).



3. Explain why deadweight loss can occur with a price below equilibrium even when some consumers benefit from it.

**Answer:** When a price is below equilibrium, a shortage occurs because suppliers are unwilling to supply all that is demanded at that price. Therefore, consumers who are lucky enough to buy the good at the lower price benefit; however, the reduction in overall output creates a deadweight loss, because some mutually beneficial transactions do not take place unless prices rise toward equilibrium.

4. Provide three examples of activities that generate external benefits and three activities that generate external costs.

**Answer:** Many activities generate external benefits, such as getting a flu shot, picking up litter, planting trees, keeping one's yard clean, using public transportation, recycling, acquiring more education, and participating in a class discussion. Many activities generate external costs, such as driving during rush hour, smoking, talking loudly on cell phones, reclining an airline seat, going to work with a contagious illness, and cheating on an exam.

5. Why does an effective price ceiling appear below the equilibrium rather than above it?

**Answer:** A price ceiling is only effective (binding) when it is low enough so that the market price is restricted. Therefore, in order for a price ceiling to be effective, it must be set below the market equilibrium price.

6. If a price floor is reduced toward equilibrium but not below it, does the surplus and deadweight loss in this market increase or decrease?

**Answer:** A price floor that is set above the equilibrium price creates a surplus and results in a deadweight loss. As the price floor is reduced, it becomes less restrictive, which means that the surplus of goods falls and the deadweight loss decreases. Once the price floor reaches the equilibrium price, both the surplus and deadweight loss disappear.

## Apply the Concepts

7. An increasing number of charities have turned to online auctions as a way to raise money by selling unique experiences donated by celebrities (such as a *meet-and-greet* with a celebrity before a concert or a walk-on role on a television show). Why would the use of auctions lead to a better outcome for the charity as opposed to just setting a fixed price? Explain using the concepts of consumer surplus and producer surplus.

**Answer:** The use of auctions allows the seller to find the buyer with the highest willingness-to-pay, which increases the producer surplus (and reduces the consumer surplus) from the transaction. Although the same outcome can occur with a fixed price, the seller would have to guess correctly what this price would be. If the price is set too low, a buyer with a much higher willingness-to-pay would reap more consumer surplus.

8. Luigi's is the only pizzeria in a small town in northern Alaska. It is constantly busy but there is never a wait for a table. One of Luigi's friends suggests that he would earn much more money if he raises his menu prices by 25%, because no one would likely open a new pizzeria in the near future. If Luigi follows his friend's advice, what would happen to consumer and producer surplus, and efficiency in this market?

**Answer:** Raising the price of pizza might cause some customers to not consume pizza, causing some producer surplus to be lost. But for those customers that continue to buy pizza, producer surplus rises and consumer surplus falls due to the higher price. Efficiency is reduced in this market because fewer pizzas are bought and sold. This outcome is common for businesses with market power (little to no competition), because consumers have few alternatives if prices are raised.

9. "If millions of people are desperate to buy and millions more desperate to sell, the trades will happen, whether we like it or not." This quote from Martin Wolf ("The Profit Motive May Be Universal but Virtue Is Not," *Financial Times*, November 16, 2005, p. 13) refers to trades in illicit goods like narcotics, knockoffs (counterfeit goods), slaves, organs, and other goods we generally refer to as "bads." He suggests that the only way to eliminate traffic in these illicit goods is to eliminate their profitability. Do you agree? Why or why not?

**Answer:** In general the answer is yes. If you eliminate the profit, you eliminate the incentive to sell these goods. This is, however, easier said than done. In some instances, it may be accomplished fairly easily. For example, if you want to eliminate illegal immigration, establish a universal ID card and put a large penalty on employers who hire undocumented workers. Treat illegal narcotics as we do liquor: legalize, regulate, and tax. While the economic answers are fairly straightforward, the politics of these measures are not.

10. Academic studies suggest that the amount people tip at restaurants is only slightly related to the quality of service, and that tips are poor measures of how happy people are with the service. Is this another example of market failure? What might account for this situation?

**Answer:** To some degree it is probably a form of market failure. If consumers and markets were rational, tips would be based on the quality of service, but they appear not to be. Even returning customers often do not vary their tips (or over-tip) based on service. This fact is probably recognition by customers that people with some jobs are underpaid, and tips are important and fair to bring the salary up. It is also a cultural norm to tip.

11. In the 1940s, rent controls were widely used in New York City, and to this day, tenants in rent-controlled apartments continue to pay low rents as long as they do not move. As a result, some of New York's prime real estate is renting for a fraction of the true market value. Explain how the existence of rent controls affects the market prices for non-rent-controlled apartments. How are incentives by New York landlords affected in terms of maintaining rent-controlled and non-rent-controlled apartments?

**Answer:** The existence of rent controls makes residents of rent-controlled apartments unwilling to leave, creating a shortage of apartments. People looking for apartments are forced to look at non-rent-controlled apartments, pushing these rents higher, and widening the difference in rent between the two types of apartments. Because landlords of non-rent-controlled apartments can charge the much higher market price, landlords are much more interested in keeping these tenants happy than keeping those paying below-market equilibrium rents happy.

12. The U.S. Department of Labor reports that of the roughly 155 million people employed, just over half are paid hourly, but less than 5% earn the minimum wage or less; 95% of wage earners earn more. And of those earning the minimum wage or less, 25% are teenagers living at home. If so few people are affected by the minimum wage, why does it often seem to be such a contentious political issue?

**Answer:** The minimum wage draws attention probably for several reasons. The first is political: One party—Democratic—is more inclined toward government intervention in the marketplace, and raising the minimum wage is part of its platform. The Republican Party generally favors freer markets, reacts to intervention with skepticism, and focuses on the unemployment caused by increasing the required wage above equilibrium. Second, \$7.25 an hour (the U.S. federal minimum wage in 2013) seems unfairly low to many people, and they focus on this unfairness. Third, there is some evidence that increasing the minimum wage increases other wages as well. Thus, unions and others are in favor of increasing the minimum wage because this will enhance their chances of getting wage increases for their members in the future.

## In the News

13. In 2009, the Hershey Company of Pennsylvania became the latest company to open a candy factory in Mexico (*USA Today*, February 13, 2009), joining other American candy companies including Brach's Confections and Ferrara Pan Candy, which had opened plants there earlier. The reason for Hershey's move was more than just lower wages; it was also because of lower sugar prices. Sugar prices in the United States have for many decades been supported in order to protect the American sugar industry and the thousands of farmers it employs. Using the tools of consumer and producer surplus, explain how the events described may have resulted from price supports for sugar.

**Answer:** The United States has long supported the sugar industry by limiting the amount of sugar purchased from other countries. This has the effect of raising the price of sugar substantially in the United States to more than triple the price of sugar in Canada or Mexico. Because sugar is the key ingredient in candy, it has become too costly for candy manufacturers to continue producing candy in the United States. Moving factories to Mexico allows production costs to fall, which shifts the supply curve to the right, allowing producer surplus to increase. The lower price benefits candy buyers as well by increasing consumer surplus.

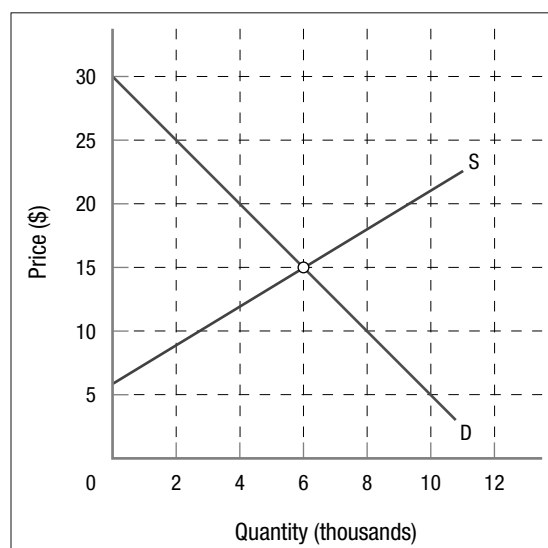
14. Professor Donald Boudreaux wrote (*Wall Street Journal*, August 23, 2006, p. A11) that "there are heaps of bad arguments for raising the minimum wage. Perhaps the worst . . . is that a minimum wage increase is justified if a full-time worker earning the current minimum wage cannot afford to live in a city such as Chicago." He then asked "why settle for enabling workers to live only in the likes of Chicago? Why not raise the minimum wage so that everyone can afford to live in, say, Nantucket, Hyannis Port or Beverly Hills, within walking distance of Rodeo Drive?" Should the minimum wage be a "living wage," so a full-time worker can live comfortably in a given locale? What would be the impact if minimum wages were structured this way?

**Answer:** Probably not. Most workers earning the minimum wage are low-skilled teenagers, getting their first job experience, or other very-low-skilled employees. Expecting low-skilled individuals to earn wages that yield a comfortable lifestyle is probably unrealistic. Raising minimum wages to the \$13 to \$16 range would price many of these workers out of the market.



## Solving Problems

15. Consider the market shown in the graph below.



a. Compute the consumer surplus.

b. Compute the producer surplus.

Now assume that government puts a price floor on this product at \$20 a unit.

c. Compute the new consumer surplus.

d. Compute the new producer surplus.

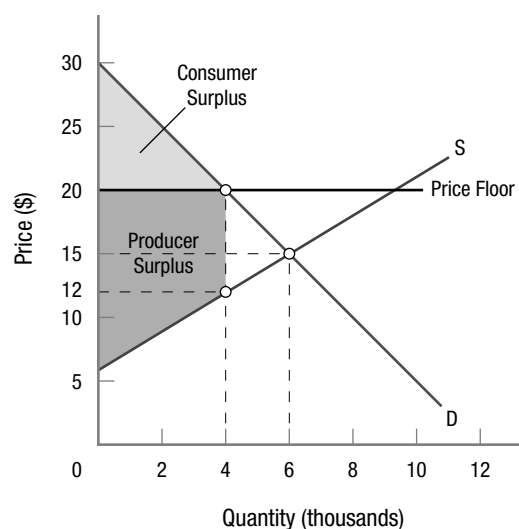
e. What group would tend to have their advocates or lobbyists support price floors?

**Answer:** See original figure for answers a and b.

a. Consumer surplus =  $[(\$30 - \$15) \times 6,000]/2 = (\$15 \times 6,000)/2 = \$90,000/2 = \$45,000$ .

b. Producer surplus =  $[(\$15 - \$6) \times 6,000]/2 = (\$9 \times 6,000)/2 = \$54,000/2 = \$27,000$ .

See figure below for answers c and d.



c. New consumer surplus =  $[(\$30 - \$20) \times 4,000]/2 = (\$10 \times 4,000)/2 = \$40,000/2 = \$20,000$ .

d. New producer surplus =  $(\$20 - \$12) \times 4,000 = \$8 \times 4,000 = \$32,000$  plus  $[(\$12 - \$6) \times 4,000]/2 = (\$6 \times 4,000)/2 = \$24,000/2 = \$12,000$ . Thus, total producer surplus =  $\$32,000 + \$12,000 = \$44,000$ .

- e. Producers typically support price floors such as agricultural price supports, whereas labor groups tend to support minimum wage laws.
16. Suppose the U.S. government places a price ceiling on the sale of gasoline at \$3 per gallon in the figure below.
- How much of a shortage or surplus of gasoline would result?
  - Calculate the effects of this policy in terms of the changes in consumer surplus and producer surplus.
  - How much deadweight loss is created?
  - What would happen if the price ceiling is raised to \$6 per gallon?



**Answer:**

- A price ceiling of \$3 would create a shortage of 30 million – 10 million = 20 million gallons.
- Consumer surplus increases for the consumers who purchase the 10 million gallons available for sale, but is offset as a result of the reduction in output. Producer surplus falls as a result of the price ceiling. Producers earn \$1 less for each of the 10 million gallons sold, in addition to the loss resulting from the reduction in output.
- Deadweight loss is represented by the triangle between quantities 10 million and 20 million and between the \$3 and \$5 price. This value is  $\frac{1}{2} \times (20 \text{ million} - 10 \text{ million}) \times (\$5 - \$3) = \$10 \text{ million}$ .
- If the price ceiling is raised to \$6 per gallon, the price ceiling would no longer be binding. The market equilibrium would prevail, and no deadweight loss would be created.

### Using the Numbers

17. According to By the Numbers, how much would you earn in one year if you worked 2,000 hours (50 weeks  $\times$  40 hours) at the federal minimum wage? How much more would you earn per year if you worked at the minimum wage rate in Washington State?

**Answer:** 2,000 hours  $\times$  \$7.25 = \$14,500. In Washington State: 2,000 hours  $\times$  \$9.19 = \$18,380.

18. According to By the Numbers, which state received the highest average federal telephone support per capita in 2011? Approximately how much support did this state receive per resident? (Hint: Search for the population of each state online to calculate the average support per person.)

**Answer:** Alaska received the highest average federal telephone support per capita in 2011. It received about \$382 in support per person (\$280 million  $\div$  731,449 persons).

## Chapter 5

### Check Your Understanding

1. When the demand curve is relatively inelastic and the price falls, what happens to total revenue? If the demand is relatively elastic and price rises, what happens to total revenue?

**Answer:** Falls; falls.

2. Why is the demand for gasoline relatively inelastic, while the demand for Exxon's gasoline is relatively elastic?

**Answer:** The demand for gasoline as a whole is relatively inelastic because there are no close substitutes, gas purchases are a small part of our overall budget, and gas-guzzling cars last a long time. Gasoline, given our current lifestyles, is a necessity. Exxon's gas is just one brand of many, and if Exxon raises its price, many consumers will switch to another brand because gasoline is essentially a commodity (one brand is as good as another).

3. Describe cross elasticity of demand. Why do substitutes have positive cross elasticities? Describe income elasticity of demand. What is the difference between normal and inferior goods?

**Answer:** Cross elasticity of demand measures how responsive the quantity demanded of one product is to the price of another product. A positive cross elasticity means that as the price of one product rises, the quantity demanded for the other rises. Thus, for example, if the price of beef rises, the quantity of chicken demanded rises, and beef and chicken are substitutes because chicken is substituted for beef when beef's price increases.

Income elasticity of demand measures how responsive quantity demanded is to consumer income. When consumer income rises, the demand for normal goods rises as well, but falls for inferior goods.

4. Describe the impact of time on the price elasticity of supply.

**Answer:** For firms to expand output in response to price changes requires time: time to hire more labor, time to order raw materials, and so on. In the market period, supplies are essentially fixed. In the short run, plant capacity is fixed, but in the long run all factors are variable. The elasticity of supply will be most elastic in the long run, less so in the short run, and least in the market period.

5. Why would the demand for business airline travel be less elastic than the demand for vacation airline travel by retirees?

**Answer:** Business travelers have less flexibility (they need to solve some problem or make a sale tomorrow) and typically decide to travel with a shorter time horizon than do retirees, who can travel when they can get better prices.

6. Would an excise tax placed on cereal be more likely or less likely to be passed on to consumers than an excise tax on wireless phone and data services? Why or why not?

**Answer:** An excise tax on cereal is less likely to be passed to consumers because cereal is more elastic than wireless phone and data services. In other words, if cereal prices rise, consumers can switch to muffins, bagels, and other breakfast items. If wireless phone and data service prices rise, most individuals are unwilling to give these items up. Therefore, a tax on these services is more likely to be passed on. Note that we are not referring to a specific cereal or a specific wireless company, but to the products in general, in which demand for wireless phones and data services is more inelastic than cereal.

### Apply the Concepts

7. One major rationale for farm price supports is that rapidly improving technology, better crop strains, improved fertilizer, and better farming methods increased supply so significantly that farm incomes were severely depressed. Explain how the elasticity of demand for these crops influences this rationale.

**Answer:** Many farm products tend to have inelastic demands; therefore, a significant increase in supply would push prices down a great deal, causing farming incomes to fall.

8. If the price of chicken rises by 15% and the sales of turkey breasts expand by 10%, what is the cross elasticity of demand for these two products? Are they complements or substitutes?

**Answer:** The cross elasticity of demand is  $10\%/15\% = +0.67$ , therefore they are substitutes.

9. For which of the following pairs of goods and services would the cross elasticity of demand be negative: (a) iPods and songs downloaded from iTunes, (b) digital satellite service and digital video recorders, (c) recreational vehicles and camping tents, (d) bowling and coed softball, (e) textbooks and study guides.

**Answer:** A negative cross elasticity of demand means that the goods are complements. Therefore, (a), (b), and (e) are the only complements.

10. Consider chip plants: potato and computer. Assume there is a large rise in the demand for computer chips and potato chips.
- How responsive to demand is each in the market period?
  - Describe what a manufacturer of each product might do in the short run to increase production.
  - How does the long run differ for these products?

**Answer:**

- Neither would be very responsive in the market period.
  - Both can hire extra employees, but computer chip manufacturers need to hire and train new employees, and this will take longer for them than for potato chip firms.
  - Computer chip factories are extremely expensive to set up (approaching 1 billion dollars) and it takes a long time to obtain permits, build, and make them ready for production. They must locate where a skilled labor force is available and where high-skilled high-tech workers want to live. Potato chip manufacturing is not done on the same scale, and the time needed to increase production is much shorter.
11. If one automobile brand has an income elasticity of demand of 1.5 and another has an income elasticity equal to  $-0.3$ , what would account for the difference? Give an example of a specific brand for each type of car.

**Answer:** An income elasticity of demand of 1.5 suggests a luxury brand such as BMW or Mercedes. The car with the income elasticity equal to  $-0.3$  would be an “inferior good” brand. Any inexpensive car brand may fall into this category.

12. Suppose you estimated the cross elasticities of demand for three pairs of products and came up with the following three values: 2.3, 0.1,  $-1.7$ . What could you conclude about these three pairs of products? If you wanted to know if two products from two different firms competed with each other in the marketplace, what would you look for?

**Answer:** When the cross elasticity estimate is 2.3, these products are close substitutes; for 0.1, the products are really unrelated; and a value of  $-1.7$  would represent complements. To find out if the products of two firms compete in the market, we would look for a positive cross elasticity number: the higher the number, the more competitive the products (substitutable).

## In the News

13. A February 24, 2012, *New York Times* article titled “Access to the Car Pool Lane Can Be Yours, for a Price” describes the growing number of cities implementing express toll lanes alongside free lanes, allowing drivers to pay to avoid traffic (with higher tolls during times of greater traffic). However, when Atlanta introduced its express tolls lanes in October 2011, hardly anyone used them, causing even greater gridlock on the free lanes. Within a week and after much criticism, Governor Nathan Deal slashed the maximum toll from \$5.50 to \$3.05. When the express toll lanes were put in, what did the policymakers in Atlanta believe about the elasticity of demand for using the express toll lanes? Given the evidence, were they correct? By reducing the maximum toll, how would total revenues change given the elasticity of demand of Atlanta motorists?

**Answer:** Policymakers in Atlanta thought that motorists would be relatively inelastic to tolls, allowing them to charge high tolls to motorists wanting to avoid traffic. However, the response was much more drastic, as few drivers wanted to pay, which means demand was more elastic than anticipated. By slashing the tolls almost in half, toll revenues should increase with an elastic demand.

14. According to a report from the Federal Trade Commission (FTC), in the first three weeks of August 2003, gas prices in Phoenix, Arizona, jumped from \$1.52 to \$2.11 a gallon, roughly a 40% increase,

due to a ruptured pipeline between Tucson and Phoenix. The pipeline normally brought 30% of Phoenix's fuel from a Texas refinery. During this period, Phoenix gas stations were able to buy gas from West Coast refineries at higher prices. By the end of the month, the rupture was repaired and prices returned to normal. During this three-week period of supply disruption, gasoline sales fell by 8%. What was the approximate price elasticity of demand for gasoline during this period? If the gas stations were unable to get additional gas from the West Coast and supplies fell by the full 30%, how high might have prices risen during that three-week period?

**Answer:** If gas prices in Phoenix rose by 40% and sales fell by 8%, then elasticity is  $0.2 = |-0.08/0.40|$ . Now, if supplies fell by 30% and elasticity is 0.2, then prices could have risen by roughly 150% ( $0.2 = |-30\%/150\%|$ ) to clear the market.

## Solving Problems

15. Rising world wholesale fair-trade coffee bean prices force the local Dunkin' Donuts franchise to raise its price of coffee from 89 cents to 99 cents a cup. As a result, management notices that donut sales fall from 950 to 850 a day. Shortly after the coffee price spike, the local Cinnabon franchise reduced its price on cinnamon rolls from \$1.89 to \$1.69. This resulted in a further decline in Dunkin' Donuts donut sales to 750 a day.

- What is the cross elasticity of demand for coffee and donuts? Are these two products complements or substitutes?
- What is the cross elasticity of demand for Dunkin' Donuts donuts and Cinnabon cinnamon rolls? Are these two products complements or substitutes?

**Answer:**

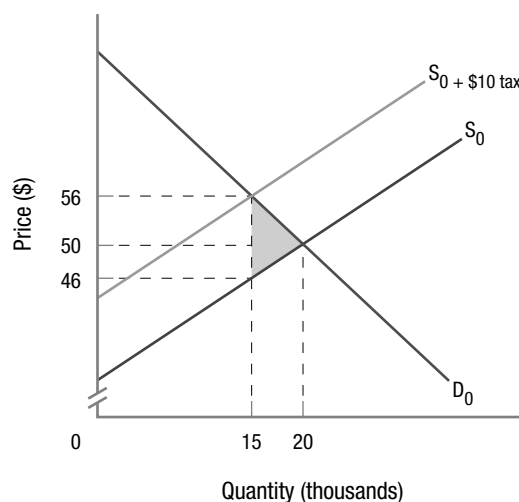
- When coffee prices rise and donut sales fall, cross elasticity will be negative and these are complements. The cross elasticity of demand (using the midpoint formula) is

$$(-100/900)/(.10/.94) = -.1111/.1064 = -1.044$$

- When the local Cinnabon franchise drops the price of cinnamon rolls and the sales of Dunkin' Donuts donuts falls, the cross elasticity of demand will be positive and these two goods are substitutes. The cross elasticity of demand (using the midpoint formula) is

$$(100/800)/(0.20/1.79) = .125/.1117 = 1.119$$

16. Suppose the demand and supply for imported Kobe beef is as shown in the figure below. Now assume that the U.S. government imposes a \$10 import tax per pound of Kobe beef.



- How does the market price change with the imposition of the \$10 per pound tax?
- Do buyers or sellers of Kobe beef bear the greater burden of the tax?
- How much tax revenue does the government collect from this market?
- Calculate the approximate value of deadweight loss created in this market from the tax.

**Answer:**

- a. The market price rises from \$50 to \$56 with the \$10 tax.
- b. Buyers bear the greater burden of the tax, because the price rises by \$6 while sellers earn \$4 less after the tax.
- c. The government collects \$10 per pound times 15,000 pounds = \$150,000.
- d. The deadweight loss is  $\frac{1}{2} \times (20,000 - 15,000) \times (\$56 - \$46) = \$25,000$ .

**Using the Numbers**

17. According to By the Numbers, how much greater is the elasticity of demand for food in Canada than in the United States? How about Mexico compared to the United States?

**Answer:** The elasticity of demand for food in Canada is around 0.21, while in the United States it is around 0.11. Canada's elasticity of demand is greater by 0.1. The elasticity of demand for food in Mexico is around 0.37, or 0.26 higher than in the United States.

18. According to By the Numbers, what type of alternative fuel car generated the highest sales in the year 2012? Which type of alternative-fuel car generated the second highest sales?

**Answer:** Flex fuel cars generated the highest sales (19% of total auto sales), and hybrids came in second (8% of total auto sales).

**Chapter 6****Check Your Understanding**

1. Using a budget line, why does a decrease in the price of a good allow one to potentially consume more of both goods?

**Answer:** A decrease in the price of a good allows one to consume the original combination of two goods at a lower overall cost, leaving some money left over which can be used to purchase more of both goods. In other words, the decrease in price acts as an increase in relative income, even though the actual budget did not change.

2. Why do price changes cause a budget line to pivot while income changes cause a budget line to shift in a parallel manner?

**Answer:** When the price of one good changes, the maximum quantity of that good which can be purchased changes. And because the maximum quantity of the other good remains the same (assuming its price does not change), the budget line will therefore pivot outward (if price falls) or inward (if price rises). When income rises or falls and prices stay the same, the ability to consume both goods changes proportionally, which means that the budget line will shift parallel outward (if income rises) or parallel inward (if income falls).

3. Describe the utility-maximizing condition in words. Explain why it makes sense.

**Answer:** Utility is maximized when the marginal utility per dollar of each product consumed is equal. If you received five utils per dollar for one product and only two for another, total utility would be increased by consuming more of the first product and less of the second. This weighing process would continue until you no longer could gain by choosing one product over another.

4. What conditions are necessary for total utility to be positive while marginal utility is negative?

**Answer:** You have consumed so much of a product that you are essentially satiated. You still received utility from your total consumption, but if you consumed one more unit, the marginal utility would be negative and total utility would fall, although it still would be positive. This is the typical outcome from an all-you-can-eat buffet. You enjoy the meal, but eat so much that the extra dessert makes you feel bad for hours.

5. Why should sunk costs not be taken into consideration when making decisions about the present or the future?

**Answer:** Sunk costs are costs that have been spent and cannot be recovered. Therefore, any future decision should compare the benefits of the action with the additional costs of that action (and not the costs that have already been incurred). For example, the preregistration fee for a 10K race is a sunk cost. Whether one actually runs the race or not, the fee cannot be recovered. Therefore, if one is injured, the lost registration fee should not be a factor in determining whether to run. The relevant cost to consider should be whether running the race would make one's injury worse.

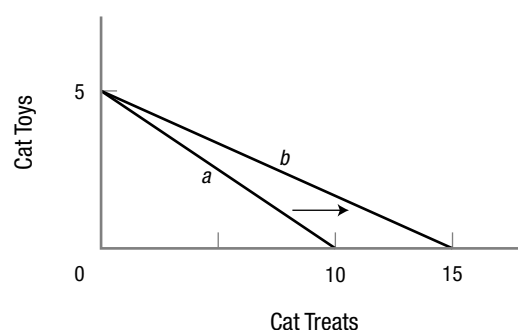
6. Why do the prices of many goods and services end in 99 cents? Why don't businesses just round to the nearest whole dollar?

**Answer:** Although rounding all prices to the nearest whole dollar would be simpler, and would save time with sales transactions and accounting, businesses are reluctant to do so because evidence on consumer behavior suggests that consumers are more likely to view a price such as \$5.99 to be more affordable than a price of \$6.00, even though the actual price difference is a small fraction of 1%. Therefore, consumers are more likely to purchase a good when priced at \$5.99 than at \$6.00. This is an example of a framing bias.

### Apply the Concepts

7. Scruffie the cat has \$15 to spend each month on cat toys, which cost \$3 each, and cat treats, which cost \$1.50 each. Draw a budget line to show the combinations of each good that Scruffie can afford if she spends her entire budget. Now suppose that cat treats go on sale for \$1 each. How does this change in price affect the budget line (show on a graph)?

**Answer:** Budget line *a* shows the combination of cat toys and cat treats that Scruffie can afford. She can afford up to 5 cat toys or 10 cat treats, or various combinations of the two goods on the budget line. If the price of cat treats falls to \$1, the maximum quantity of cat treats she can afford increases from 10 to 15 units, extending the budget line outward to budget line *b*.



8. Eric enjoys having sushi and sashimi for lunch every day. Suppose the marginal utility of the last roll of sushi Eric eats is 40 and the marginal utility of the last piece of sashimi Eric eats is 20. If the price of a roll of sushi is \$8 and the price per piece of sashimi is \$2, did Eric maximize his utility? Explain.

**Answer:** The last roll of sushi gave Eric 40 units of utility; at a price of \$8 per roll, the marginal utility per dollar for sushi is  $40/\$8 = 5$ . The last piece of sashimi Eric ate gave him 20 units of utility; at a price of \$2 per piece, the marginal utility per dollar for sashimi is  $20/\$2 = 10$ . Eric is not maximizing his utility, because the marginal utility per dollar for the last unit of sushi and sashimi consumed are not equal. Eric should be consuming more sashimi and less sushi until the marginal utility per dollar of the last unit consumed are equal.

9. One luxury goods manufacturer noted that, "Our customers do not want to pay less. If we halved the price of all our products, we would double our sales for six months, and then we would sell nothing." Is there something about luxury goods that suggests consumers are irrational? Do luxury goods not follow the law of demand?

**Answer:** Luxury-goods consumers are not irrational. Price may be an important characteristic of luxury goods. Luxury consumers may want to flaunt their wealth, as suggested by Thorstein Veblen in his book, *The Theory of the Leisure Class*. The marginal benefit from the product may drop off quickly when everyone can afford it if a large part of the benefit may come from conspicuous consumption.

10. Advertisements on television both inform consumers and persuade them to purchase products in differing proportions, depending on the ad. But today, digital video recorders can be found in virtually all households, much of what these households watch is recorded, and the vast bulk of the ads are skipped. If this trend continues, where will consumers find out about new products?

**Answer:** Ads don't go away—they just change forms. Ad agencies realize that this trend exists, and they are trying a host of new techniques such as product placements within the program itself, in which your favorite TV show has characters, say, driving Ford cars and drinking Starbucks coffee. Sometimes, ads build on this placement and look like a continuation of the show. Additionally, more ad money is moving to alternative media: the Internet, cable, and event sponsorship.

11. Critics of marginal utility analysis argue that it is unrealistic to assume that people make the mental calculus of marginal utility per dollar for large numbers of products. But when you are making a decision to either go to a first-run movie or buy a used DVD of last summer's blockbuster, does this analysis seem so complex? Is it a reasonable representation of your thought process?

**Answer:** When the product choices are narrowed to two, and the prices are similar, the marginal utility framework seems to provide a reasonable guide to consumer decision making.

12. A common practice at many supermarkets is to show the total "savings" customers received from their purchase at the bottom of the receipt. Such savings include the total discounts from goods purchased, along with savings from coupons used. How would listing the total savings on a receipt influence an individual's consumption habits? Of what type of behavioral factor does this strategy take advantage?

**Answer:** Showing the total savings on a supermarket receipt is a type of framing technique in which stores try to make consumers feel that they received a great deal. In this case, shoppers leave the supermarket feeling they saved money, even if in reality other supermarkets offer similar prices. This is an example of a framing bias.

## In the News

13. Richard Layard, in his book, *Happiness: Lessons from a New Science*, states that once a country's annual income exceeds \$20,000 per capita, there is little relationship between happiness and income. But if you are poor, more money does make you happier. Does this fact suggest that the marginal utility from more income above \$20,000 per capita is small?

**Answer:** Not necessarily. The empirical data presented by Professor Layard does suggest a high positive correlation of happiness with per capita income below \$20,000, suggesting that additional income when you are poor yields greater utility. One problem with this approach (relating happiness to income) ignores the income distribution question. Income per capita may be high, but if the vast bulk of income is in a few hands, the measures may mean less. Finally, because measuring utility is impossible, it is difficult to compare individuals; it is possible that Bill Gates gets just as much marginal utility out of his next \$100 as you or me.

14. In the summer of 2009, Chrysler announced that beginning with its 2010 models it was dropping the current lifetime powertrain (engine and transmission parts) warranty and replacing it with a five-year, 100,000-mile guarantee. The *Wall Street Journal* (August 20, 2009) reported that "Chrysler spokesman Rick Deneau said that the decision was driven by market research that showed customers prefer warranties with a fixed time period." The new five-year warranty was transferable if the vehicle was sold, while the prior lifetime warranty applied only to the original owner.

Given marginal utility analysis, does it seem reasonable that consumers really prefer a five-year, 100,000-mile warranty to a lifetime warranty? What customers actually benefit from this new warranty?

**Answer:** Only those customers who sell or trade in the vehicle within five years will benefit from the new transfer option. People who keep their cars for longer lose unless the price of the new car is lowered to account for the loss (not likely). Chrysler must have concluded that their lifetime warranty was not enough of a competitive edge over a five-year, 100,000-mile warranty, or it cost too much to justify its continuance. Behavioral economists might suggest that a five-year, 100,000-mile warranty sends enough of a signal to customers that this is a high-quality vehicle.



Solving Problems

15. Assume a consumer has \$20 to spend and for both products the marginal utilities are shown in the table below:

| Quantity | $MU_A$ | $MU_B$ |
|----------|--------|--------|
| 1        | 20     | 30     |
| 2        | 10     | 10     |
| 3        | 5      | 2      |

Assume that each product sells for \$5 a unit.

- a. How many units of each product will the consumer purchase?
- b. Assume the price of product B rises to \$10 a unit. How will this consumer allocate her budget now?
- c. If the prices of both products rise to \$10 a unit, what will the budget allocation be?

Answer:

- a. At \$5 a unit for both products, the consumer will buy 2 units of each product.
- b. When the price of product B rises to \$10, the combination will be 2 units of A and 1 unit of B. The first unit purchased will be a unit of A ( $20/\$5 = 4$  utils per dollar), the second unit purchased will be a unit of B ( $30/\$10 = 3$  utils per dollar), and finally the last \$5 will be spent on a second unit of A ( $10/\$5 = 2$  utils per dollar).
- c. If the price of both products rises to \$10, one unit each of A and B will be purchased.

16. Answer the questions following the table below.

| First-Run Movies |               |                  | Bottles of Wine |               |                  |
|------------------|---------------|------------------|-----------------|---------------|------------------|
| Quantity         | Total Utility | Marginal Utility | Quantity        | Total Utility | Marginal Utility |
| 0                | 0             | —                | 0               | 0             | —                |
| 1                | 140           | _____            | 1               | 180           | _____            |
| 2                | 260           | _____            | 2               | 340           | _____            |
| 3                | 360           | _____            | 3               | 460           | _____            |
| 4                | 440           | _____            | 4               | 510           | _____            |
| 5                | 500           | _____            | 5               | 540           | _____            |

- a. Complete the table.
- b. Assume that you have \$50 a month to devote to entertainment (column labeled First-Run Movies) and wine with dinner (column labeled Bottles of Wine). What will be your equilibrium allocation if the price to see a movie is \$10 and a bottle of wine cost \$10 as well?
- c. A grape glut in California results in Napa Valley wine dropping in price to \$5 a bottle, and you view this wine as a perfect substitute for what you were drinking earlier. Now what will be your equilibrium allocation between movies and wine?
- d. Given this data, calculate your elasticity of demand for wine over these two prices (see the mid-point method in Chapter 5).

Answer:

a.

| First-Run Movies |               |                  |  | Bottles of Wine |               |                  |  |
|------------------|---------------|------------------|--|-----------------|---------------|------------------|--|
| Quantity         | Total Utility | Marginal Utility | Marginal Utility per Dollar (P = \$10) | Quantity        | Total Utility | Marginal Utility | Marginal Utility per Dollar (P = \$10) |
| 0                | 0             | 0                | —                                      | 0               | 0             | 0                | —                                      |
| 1                | 140           | 140              | 14                                     | 1               | 180           | 180              | 18                                     |
| 2                | 260           | 120              | 12                                     | 2               | 340           | 160              | 16                                     |
| 3                | 360           | 100              | 10                                     | 3               | 460           | 120              | 12                                     |
| 4                | 440           | 80               | 8                                      | 4               | 510           | 50               | 5                                      |
| 5                | 500           | 60               | 6                                      | 5               | 540           | 30               | 3                                      |

- b. With the prices at \$10 each, you will go to 2 movies and drink 3 bottles of wine.
- c. When the price of wine falls to \$5 a bottle, you will go to 3 movies and drink 4 bottles of wine.
- d. Price of wine has fallen from \$10 to \$5, and quantity demanded has risen from 3 to 4 bottles. Using the formula from Chapter 5, elasticity of demand is equal to  $(1/3.5) \div (-5/7.5) = .286 / -.667 = |-.43| = .43$

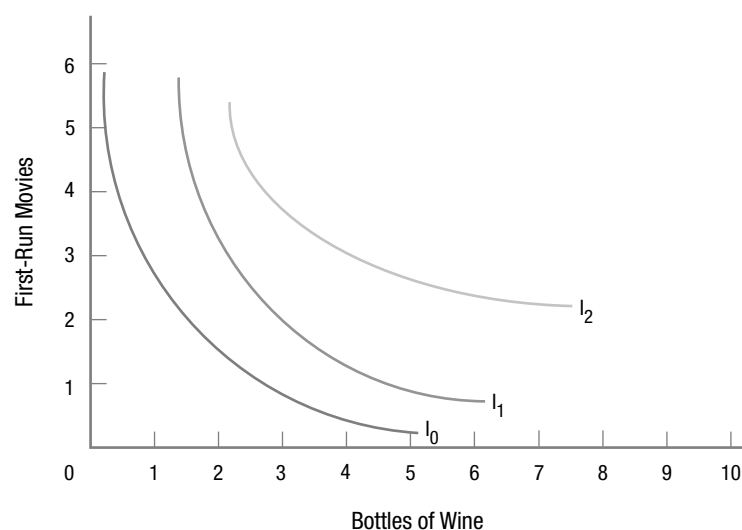
Using the Numbers

17. Using By the Numbers, list the top five categories that the average American household spent their incomes on in the year 2011 (start with the largest expenditure and proceed downward in terms of percentage of household budget).
- Answer:** The top five categories are: (1) housing (33.8%), (2) transportation (16.7%), (3) food (12.9%), (4) insurance and savings (10.9%), and (5) health care (6.7%). An alternative answer is the category “all other” (10.3%), which would replace health care as the fifth category.
18. According to By the Numbers, what category or categories of goods and services have increased in price (on average) every year from 2009 to 2011? What category or categories have fallen in price every year from 2009 to 2011?
- Answer:** Gasoline and oil, and health care, are two categories that have increased in price every year from 2009 to 2011. Mortgage interest has decreased in price every year from 2009 to 2011.

Chapter 6 Appendix

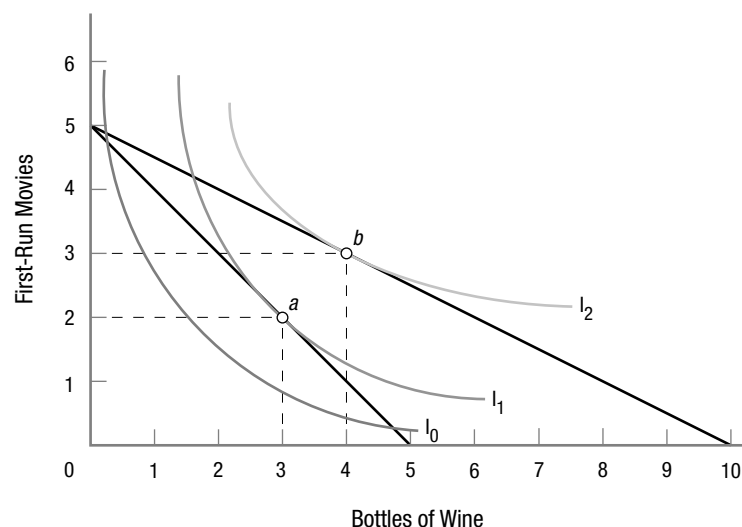
1. Indifference curves cannot intersect. Why not?
- Answer:** If you have indifference curves that intersect, then you have two different indifference curves passing through the same point. At that point, the two curves would be indifferent, but that cannot be, because each indifference curve represents a different level of satisfaction. Two indifference curves cannot have the same level of utility.
2. Explain why the following bundles of apples (A) and bananas (B) cannot be on the same indifference curve: (4A, 2B); (1A, 5B); (4A, 3B).
- Answer:** The first two bundles are fine, but the last bundle (4A, 3B) must necessarily be preferred to the first (4A, 2B), because it has the same four apples, but one more banana.

3. Answer the following questions using the figure below:



- Assume that you have \$50 a month to devote to entertainment (First-Run Movies) and wine with dinner (Bottles of Wine). What will be your equilibrium allocation if the price to see a movie or buy a bottle of wine is \$10? Graph the equilibrium on the figure and label it point *a*.
- A grape glut in California results in Napa Valley wine dropping in price to \$5 a bottle, and you view this wine as a perfect substitute for what you were drinking. Now what will be your equilibrium allocation between movies and wine? Graph that on the figure and label the new equilibrium as point *b*.

**Answer:** The equilibrium points are shown in the graph below.

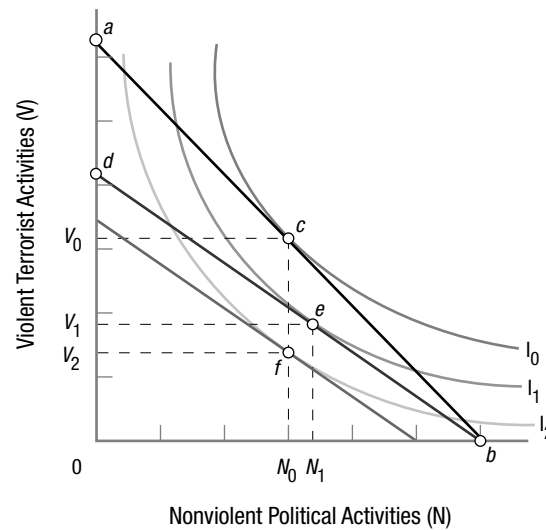


- Research by Walter Enders and Todd Sandler, *The Political Economy of Terrorism* (New York: Cambridge University Press), 2006, and David Wessel, "Princeton Economist Says Lack of Civil Liberties, Not Poverty, Breeds Terrorism," *Wall Street Journal*, July 5, 2007, p. A2, suggests that terrorists are not spurred by poverty, but rather often are educated individuals who live in countries with a lack of civil liberties. These researchers treat terrorists as rational actors who maximize a set of goals subject to constrained resources.

Assume that terrorists can choose between nonviolent acts and violent acts. Draw a budget line and indifference curves that show where a utility-maximizing combination of these activities would occur. Now suppose that the U.S. government can choose between two types of antiterrorism policies: (1) a defensive approach such as increased airport screenings, and (2) a proactive approach, which includes activities such as infiltrating terrorist cells and freezing bank assets. Analyze how these

policies affect the budget line of terrorists and how it affects the utility-maximizing combination of terrorist activities.

**Answer:** Suppose the initial budget line  $ab$  represents possible combinations of violent terrorist activities and nonviolent political activities, and point  $c$  is the optimal combination based on the indifference curve. A defensive approach such as increased airport screenings is likely to increase the cost of violent activities, but not change the cost of nonviolent activities. Therefore, the budget line will rotate inward to budget line  $db$ , with a new optimal combination at point  $e$ , where fewer violent activities take place but more nonviolent activities take place. Under a proactive approach, all terrorist acts (violent and nonviolent) would be costlier, and therefore the budget line would shift parallel inward. Compared to point  $e$ , the shift of the budget line leads to a new optimal combination at point  $f$ , where fewer of both activities take place.



## Chapter 7

### Check Your Understanding

1. What is the difference between explicit and implicit costs? What is the difference between economic and accounting profits? Are these four concepts related? How?

**Answer:** Explicit costs are those out-of-pocket expenses paid to others, while implicit costs are opportunity costs. Economic profits are profits after both explicit and implicit costs are deducted, while accounting profits typically do not have implicit costs deducted. The four concepts are related in how they are defined, with implicit costs playing an important role.

2. Why should sunk costs be ignored for decision making?

**Answer:** A sunk cost is a cost that has already been paid and cannot be recovered. Because no money can be returned, sunk costs should not influence future decisions.

3. How does the short run differ from the long run? Is the long run the same for all industries? Why or why not?

**Answer:** In the short run, one factor of production is fixed, but in the long run all factors can vary, and firms can enter or leave the industry. The long run differs for industries and firms because the time required to expand plant capacity differs among industries. Some industries (chemical and nuclear power plants) are heavily regulated, while others (restaurants and retail establishments) are not, and these regulations take more or less time to fulfill.

4. Why should a firm never hire a worker when negative marginal returns set in?

**Answer:** When marginal returns are negative, hiring an additional worker causes total production to fall. Therefore, a firm would be better off not hiring that worker.

5. Why is the average fixed cost curve not U-shaped? Why does it not turn up as the average variable cost and average total cost curves do?

**Answer:** Because fixed costs are fixed, total fixed costs do not vary, thus as more output is produced, average fixed costs continue to fall as the  $Q$  in  $FC/Q$  gets larger.

6. What is the difference between marginal cost and average total cost?

**Answer:** Marginal cost is the additional cost of producing one more unit, while average total cost is the average cost per unit of all units produced. Marginal cost is used by businesses to determine whether to expand or restrict production, while average total cost provides an overall indicator of performance that will determine if a business remains in the industry over the long run.

## Apply the Concepts

7. If you work hard building your business and end up earning zero economic profit for the year, would this be considered a failed business to an economist? Why or why not?

**Answer:** To an economist, earning zero economic profit is not a bad outcome at all. Zero economic profit means that a business is earning *normal profits*, a level of profits that would be earned under the next best alternative use of resources. In other words, economic profit takes into account all opportunity costs, including the value of the time and money given up to pursue the business.

8. In order to take this class, you had to pay tuition, buy the textbook, and buy a new laptop. Which of these items (if any) would be considered a sunk cost? Explain your reasoning.

**Answer:** The tuition you paid is most likely a sunk cost if the university does not provide any refunds if you drop the course. A textbook is not a sunk cost, because you may be able to sell the book to the bookstore at the end of the term for a small amount of money. A laptop is not a sunk cost, because a used laptop can be sold at any time.

9. Skype, the Internet phone company, uses peer-to-peer network principles to enable people to make free phone calls over the Internet to anywhere in the world. Skype forwards calls through users' computers without having any central infrastructure. Users agree to let their computer's excess capacity be used as transfer nodes. In this way, Skype does not have to invest in more infrastructure as it adds users, and the system is highly robust and scalable. What is the marginal cost to Skype to add another user to its system?

**Answer:** Zero or near zero. They simply need to maintain a database of users.

10. List some of the reasons why the long-run average total cost curve has sort of a flat bowl shape. It declines early on, then is rather flat over a portion, and finally slopes upward.

**Answer:** As a firm expands its output, economies of scale are encountered due to specialization of labor and management. Eventually, a flat region is reached, reflecting the fact that the firm can duplicate its operations at virtually the same cost. Finally, the firm gets so big that it begins to lose control, and costs begin to rise.

11. The Finger Lakes region in New York State produces wine. The climate favors white wines, but reds have been produced successfully in the past 15 years. Categorize the following costs incurred by one winery as either fixed or variable:

- the capital used to buy 60 acres of land on Lake Seneca
- the machine used to pick some varieties of grapes at the end of August and the beginning of September
- the salary of the chief vintner, who is employed year-round and receives bonuses based on the amount of wine produced
- the wages paid to workers who bind the grape plants, usually in April, and usually over a period of three to four days
- the wages paid to the same workers who pick the grapes at the end of August or early September
- the costs of the chemicals sprayed on the grapes in July
- the wages of the wine expert who blends the wine in August and September, after the grapes have been picked
- the cost of the building where wine tastings take place from April to October
- the cost of the wine used in the wine tasting

**Answer:** (a) fixed, (b), fixed, (c) variable, (d) variable, (e) variable, (f) variable, (g) variable, (h) fixed, (i) variable.

12. If marginal cost is less than average total cost, are average total costs rising or falling? Alternatively, if marginal cost is more than average total cost, are average total costs rising or falling? Explain how this example might apply to a basketball player attempting to achieve a high average *points per game*.

**Answer:** If marginal cost is less than average total cost, then average total cost is falling and vice versa. A baseball player hitting .333 (gets a hit one-third of the time on average) will see his average rise when he gets a hit and fall when he does not. If the average income of your class is \$15,000 (some people work), and Tom Cruise decides to take a refresher course in economics and joins your class, the average income rises, and vice versa if someone with no income joins the class. A basketball player's average *points per game* (ppg) is calculated based on all games played to date in a season. Suppose a player's average is 10 ppg. If the player scores 15 points in the next game, her marginal score (15) is greater than her average (10), which means that her average will rise. Alternatively, if she scores only 5 points in the next game, her marginal score (5) is less than her average (10), which means her average will fall.

### In the News

13. Twenty-five years ago, coffee was a commodity product. Coffee brands such as Maxwell House ("good to the last drop") and Folger's advertised on television, but the difference between the brands was minimal. Not very satisfying, but no great pressure for change, either. In the 1990s, after touring coffeehouses in Rome, Howard Schultz brought the concept of upscale coffee to the United States and Starbucks was born ("Starbucks to Open 1,500 More Cafes in the U.S.," *The Seattle Times*, December 5, 2012). In 2012, over 13,000 Starbucks existed in the United States alone. How could a company such as Starbucks make any money in a highly competitive market like coffee? What factors did Howard Schultz need to consider before venturing into this business?

**Answer:** For any company, profit is determined by the difference between revenues and costs. Howard Schultz thought people would appreciate a superior product that brought with it the coffeehouse experience. He perceived a market need, and then determined whether the revenues and costs associated with the business would result in a profit. The number of Starbucks establishments in major cities in the United States shows he made the right decision.

14. When J.P. Morgan Chase, one of the largest banks in the world, admitted to an embarrassing \$9 billion trading loss in 2012, policymakers rushed to propose new regulations to prevent banks from taking risky bets ("J.P. Morgan Loss Spurs Scrutiny of Fed Governance," *Wall Street Journal*, May 14, 2012). Clearly, memories of bank bailouts by taxpayers in 2008 made the sentiment stronger. How do new regulations affect the costs of doing business? Do regulations represent a fixed or variable cost?

**Answer:** Regulations add a layer of constraints on businesses. Businesses may have fewer options as to how they operate, or they may be forced to provide more financial data to auditors. Regulations generally represent a fixed cost, because they usually are unrelated to output. However, in some cases they can be a variable cost, if increased financial reporting forces the business to hire additional accountants, in which case the cost would vary by the level of output.

### Solving Problems

15. Suppose you pay \$10 to watch a movie at the local cineplex, and afterward you sneak into the next theater to watch a second movie without paying. What is your marginal cost of watching the second movie? What is the average cost of watching the two movies? After the movies, you go to the batting cages and stand in for two rounds of pitches, each round costing \$2. What is your marginal cost of batting the second round? What is the average cost of batting two rounds?

**Answer:** The marginal cost of watching the second movie is \$0. The average cost of watching the two movies is  $\$10/2 \text{ movies} = \$5$ . The marginal cost of batting the second round is \$2. The average cost of batting two rounds is \$2 (\$4 total/two rounds).

16. Using the table below, answer the following questions.

| Labor | Output | Marginal Product | Average Product |
|-------|--------|------------------|-----------------|
| 0     | 0      |                  | —               |
| 1     | 7      |                  |                 |
| 2     | 15     |                  |                 |
| 3     | 25     |                  |                 |
| 4     | 33     |                  |                 |
| 5     | 40     |                  |                 |
| 6     | 45     |                  |                 |

- a. Complete the table, filling in the answers for marginal and average products.
- b. Over how many workers is the firm enjoying increasing returns?
- c. At what number of workers do diminishing returns set in?
- d. Are negative returns shown in the table?

Answer:

a.

| Labor | Output | Marginal Product | Average Product |
|-------|--------|------------------|-----------------|
| 0     | 0      |                  | —               |
| 1     | 7      | 7                | 7.00            |
| 2     | 15     | 8                | 7.50            |
| 3     | 25     | 10               | 8.33            |
| 4     | 33     | 8                | 8.25            |
| 5     | 40     | 7                | 8.00            |
| 6     | 45     | 5                | 7.50            |

- b. Up to three workers.
- c. With the fourth worker.
- d. No.

Using the Numbers

17. According to By the Numbers, explain why a correlation exists between the costs of industrial robots and the productivity rate over the last 20 years.

Answer: A decrease in the price of robots makes them a less expensive input relative to other inputs such as other machinery or labor. This allows the same level of output to be produced at a lower cost, which increases productivity (output per input used).

18. According to By the Numbers, between which four years from 2000 to 2012 did Internet flight bookings increase the most (by percentage of overall sales)? Between which four years from 2000 to 2012 did Internet flight check-ins increase the most (by percentage of overall check-ins)?

Answer: Internet flight bookings as a percentage of total flight bookings increased the most between 2004 and 2008. Internet flight check-ins as a percentage of total check-ins increased the most between 2008 and 2012.

## Chapter 8

### Check Your Understanding

1. Why must price cover average variable costs if the firm is to continue operating?

**Answer:** If price is less than average variable costs, then losses will exceed the fixed costs incurred if the firm continues to operate, than if the firm closed its doors. If price cannot cover the costs of the variable factors of production, then the firm should close its doors.

2. Why do perfectly competitive firms sell their products only at the market price? Why not try to raise prices to make more profit or lower them to garner more sales?

**Answer:** Because a perfectly competitive firm produces a tiny share of overall market output and competes against many similar firms, each firm has no control over the market price. They are price-takers. Therefore, if one firm chooses to raise its price above the market price, it would likely lose all of its customers, because customers could easily purchase the same product at a lower price elsewhere.

3. Describe the role that easy entry and exit play in competitive markets over the long run.

**Answer:** Easy entry and exit are crucial in the long-run adjustment process in competitive markets. When existing firms are earning economic profits, entry is encouraged, bringing prices down and returning industry profitability to normal. Just the opposite occurs when existing firms are earning losses. Some of the existing firms leave the industry, reducing supply, resulting in higher prices and bringing profits up to normal levels.

4. Why are marginal revenue and price equal for the perfectly competitive firm?

**Answer:** Marginal revenue is equal to the change in total revenue from selling another unit of the product. For competitive firms this is just equal to market price. This is a simple concept for competitive firms, but it becomes more complex for the other market structures, as we will see in the next two chapters.

5. Why, if competitive firms are earning economic profits in the short run, are they unable to earn them in the long run?

**Answer:** In the same way that honey attracts bears, short-run economic profits attract new firms to the industry in the long run. These new entrants increase market supply, lowering prices and reducing profits to normal.

6. Describe the reasons why an industry's costs might increase in the long run. Why might they decrease over the long run?

**Answer:** Costs may increase in the long run if expanding the industry bids up resource or input costs. Costs might decline in the long run because of technological advances or if industry growth permits suppliers to gain economies of scale.

### Apply the Concepts

7. When a sports team consistently struggles, one strategy is to replace the coach. But when this happens, the new coach initially has the same players (its primary input). How can a new coach improve the team's record when the players are mostly the same?

**Answer:** A coach, like a manager of a firm, has physical inputs to work with. However, along with physical inputs are ideas, which also represent an important factor of production, because how one uses inputs is as important as the quality of inputs. Therefore, by hiring a new coach, a team can use existing players in a more productive manner, thus potentially improving the team's record.

8. How is the short-run supply curve for the competitive firm determined?

**Answer:** Profit maximization requires that firms produce output where  $MR = MC$ . For perfectly competitive firms this is where  $P = MC$ , since  $P = MR$ . The firm will produce nothing (shut down) if  $P < AVC$  and will produce output where  $P = MC$  if  $P \geq AVC$ . Therefore, the competitive firm's supply curve is the output associated with the MC curve for  $P \geq AVC$ .



9. Suppose you master the art of growing herbs in your garden and selling them for profit at the local farmer's market. Your neighbor sees your profitable business and decides to do the same, however with less experience faces a much higher marginal cost curve. How is it possible for both you and your neighbor to sell herbs at the same price?

**Answer:** Because the market price is given, each seller produces herbs until its marginal cost equals the market price (or marginal revenue). Because you have a lower marginal cost curve, you will be able to produce a higher quantity of output than your neighbor at the profit-maximizing equilibrium.

10. Assume a competitive industry is in long-run equilibrium and firms in the industry are earning normal profits. Now assume that production technology improves such that average total cost declines by \$5 per unit. Describe the process this industry will go through as it moves to a new long-run equilibrium.

**Answer:** If the ATC curve shifts downward by \$5, existing firms will now be making economic profits equal to roughly \$5 a unit in the short run. New firms will enter the industry, industry supply will rise, and the new equilibrium will be achieved at a price \$5 less than before the technological change.

11. When a competitive firm is earning economic profits, is it also maximizing profit per unit? Why or why not?

**Answer:** A competitive firm maximizes profit where  $P = MR = MC$ . If price is greater than ATC, then the firm is producing more output than that associated with the minimum point on the ATC curve. Maximum profit per unit is at that output where ATC is at a minimum (profit per unit =  $P - ATC$ ). Beyond that point, ATC is higher and rising, thus profit per unit will be less, but total profit will increase until it is maximized at the output where  $MR = MC$ .

12. In this chapter we suggested that whenever market price fell below average variable costs, the firm would shut down. At that point revenue is not covering its variable costs and the firm is losing more money than if it just shut down and lost fixed costs. Clearly, shutting the firm is more complicated than that. Under what circumstances might the firm continue to operate even though prices are below average variable costs?

**Answer:** Even though continuing to operate when prices are below average variable costs means that the owners of the firm are losing more money than if they shut down, closing a firm (restaurant, department store, beauty parlor, grocery store, and many other firms) often entails additional costs to close up operations. In addition, low prices can be temporary because markets fluctuate. Firms in markets with variable market prices want to remain in the industry over the long run, and this would be difficult if every time prices decline, you close your doors and then reopen when the market is better. People's shopping habits change when one firm closes. For smaller firms, the very act of shutting down in the short run entails psychological costs, because many of their employees are their friends. Shutting a firm is not just the simple act described in the competitive market.

## In the News

13. A January 25, 2012, article in *The New York Times* describes how more states are attempting to pass legislation to collect sales tax on Internet sales (sometimes dubbed the *Amazon Tax*) even when the seller does not have a physical presence in that state. Given the intense competition between online retailers and physical (brick-and-mortar) stores, how would such laws affect competition? Would brick-and-mortar stores be better off? How about customers? Why or why not?

**Answer:** Online retailers such as Amazon.com have held a competitive advantage over brick-and-mortar stores from their ability to offer lower prices due to lower fixed costs (i.e., no physical store) and also from their ability to escape charging sales tax. Because of this advantage, brick-and-mortar stores have to work even harder to reduce costs and provide better customer service to compete. By forcing online retailers to charge sales tax, this eases the competitive pressure faced by brick-and-mortar stores, which would clearly be better off with the legislation. Customers, however, would be worse off having to pay higher prices on online purchases.

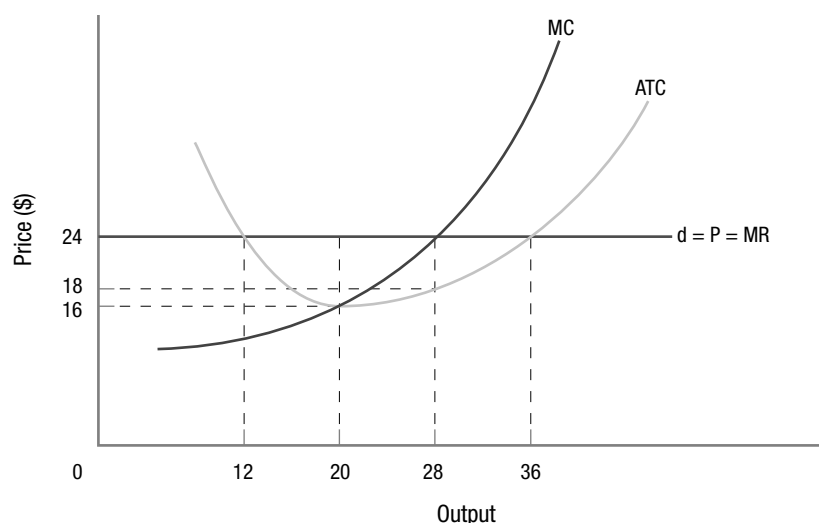
14. An April 19, 2012, article by Art Carden in *Forbes* entitled "Let's Be Blunt: It's Time to End the Drug War" argues that legalizing marijuana is a key solution to ending the drug war. He argues that turning

the industry into a competitive market would force cost-inefficient drug cartels to exit the market. Using what you know about competitive markets and firm entry and exit, explain the economics behind the author's theory.

**Answer:** An important reason why the drug war exists is because the industry is dominated by a few large organizations that control the bulk of the drug trade, allowing them to earn substantial economic profits. Legalizing certain drugs would lead to a significant increase in the number of domestic sellers (who previously would have faced prosecution), turning the drug trade into a competitive market. By doing so, prices will fall until normal profits are earned, forcing all sellers to be cost efficient. Those that aren't would be forced to exit the market.

## Solving Problems

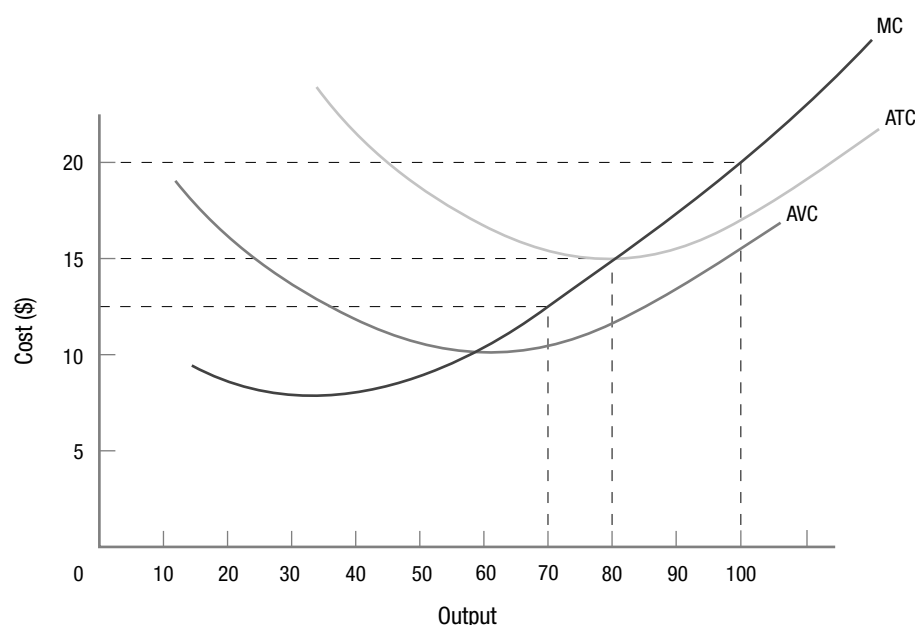
15. Use the following diagram for a firm in a perfectly competitive market.



- What is the output that maximizes the firm's profit?
- At the profit-maximizing output, calculate total revenue and total cost.
- If the firm maximizes profit, how much profit does it earn?
- What will likely happen to market demand or market supply in the long run?
- What will likely happen to the market price in the long run?

**Answer:**

- 28.
  - Total revenue equals  $28 \times \$24 = \$672$ ; total cost equals  $28 \times \$18 = \$504$ .
  - Profit equals total revenue (\$672) minus total cost (\$504) = \$168.
  - In the long run, market supply will shift to the right as more firms enter the industry because of the positive economic profits.
  - The increase in supply would push the price down in the long run until economic profits are zero.
16. Use the figure below to answer the following true/false questions:
- If market price is \$25, the firm earns economic profits.
  - If market price is \$20, the firm earns economic profit equal to roughly \$100.
  - If market price is \$9, the firm produces roughly 55 units.
  - If market price is \$12.50, the firm produces roughly 70 units and makes an economic loss equal to roughly \$210.
  - Total fixed costs for this firm are roughly \$100.
  - If market price is \$15, the firm sells 80 units and makes a normal profit.

**Answer:**

- a. T; at \$25 a unit the firm produces an output where  $P > ATC$ , thus the firm earns an economic profit.
- b. F; at \$20 per unit, the firm will sell 100 units, and at that output, ATC is roughly equal to \$16, the profit per unit is \$4, and thus economic profit would be about \$400.
- c. F; at \$9 a unit,  $P < AVC$ , therefore the firm will shut down.
- d. T; at \$12.50,  $P = MC$  at roughly 70 units, and loss per unit is roughly \$3, thus economic losses are  $\$3 \times 70 = \$210$ .
- e. F;  $FC = AFC \times Q$ , thus at output of 60, for instance, AFC is roughly \$6 (the vertical difference between ATC and AVC), therefore  $FC = \$6.00 \times 60$ , which equals roughly \$360.
- f. T; a price of \$15 is just tangent to the minimum point on the ATC curve, thus the firm earns a normal profit by producing 80 units.

**Using the Numbers**

17. According to By the Numbers, which two regions employ the highest number of people in the farm and farm-related industries? Approximately how many total persons are employed in the farm and farm-related industries in these two regions combined?

**Answer:** Northern Crescent (about 5.8 million) and Fruitful Rim (about 5.6 million). The two regions combined employ approximately 11.4 million people.

18. According to By the Numbers, in which year (since 1986) did the following crops reach their highest and lowest prices per bushel: corn, wheat, and soybeans?

**Answer:** Corn reached its highest price in 2012 and lowest price in 1986. Wheat reached its highest price in 2007 and lowest price in either 1990 or 1999 (both years reached about the same low price). Soybeans reached their highest price in 2012 and lowest price in 2001.

**Chapter 9****Check Your Understanding**

1. Are McDonald's and Starbucks monopolies? Why or why not?

**Answer:** Neither is a monopoly in the strictest sense, although each has market power. Both exploit location well. In their local realm they have considerable market power, but in both cases there are numerous competitors a short drive away.

2. Explain why  $MR < P$  for the monopolist, but  $MR = P$  for perfectly competitive firms.

**Answer:** Perfectly competitive firms are so small that they only have a negligible impact on the market, and they take their price from the market and adjust output to maximize profits. For each unit produced,  $MR = P$ . Monopolists, on the other hand, are the market. Their demand is industry demand. To sell more output, they must lower market price not only to new customers, but to all customers, thus their  $MR < P$ .

3. What do economists mean when they call monopolies inefficient? What is the deadweight loss of monopoly?

**Answer:** Monopolies are inefficient because monopoly output is lower, and prices are higher when compared to competitive markets. The deadweight loss from a monopoly is the consumer and producer surplus lost because prices are higher and output is less under monopolistic conditions (see Figure 6).

4. Why are monopoly firms able to earn long-run economic profits while perfectly competitive firms cannot?

**Answer:** A monopoly industry has significant barriers to entry. Therefore, unlike perfectly competitive industries, new firms cannot easily enter the industry when economic profits are positive.

5. Under what market conditions would a firm find it easier to engage in price discrimination?

**Answer:** To engage in price discrimination, a firm must have market power, the ability to separate consumers into groups based on their elasticities of demand, and the ability to prevent arbitrage.

6. What is a natural monopoly and why is such a monopoly often regulated by government?

**Answer:** A natural monopoly is an industry with significant economies of scale such that it is less costly for one firm to serve the entire market than two or more competing firms. Because a natural monopolist is often protected from competition by the government (such as a local water company), the firm is typically regulated to prevent it from charging monopoly prices.

## Apply the Concepts

7. How important is the existence of a significant barrier to entry to maintaining a monopoly? What would be the result if a monopoly market could easily be entered? Why might a monopoly in a high-tech field such as computers, the Internet, and consumer electronics be rather short-lived?

**Answer:** Significant or nearly impossible barriers to entry are vital to maintaining a monopoly. Without such barriers new firms could (and would) enter, driving prices lower and profits toward normal. Technology is changing so rapidly in these areas that what might be a monopoly today is rendered less so when the next new thing is introduced.

8. My dentist recently recommended that I have a tooth replaced with a titanium pin inserted in my jaw and capped with a crown. I went to an oral surgeon to have the tooth removed and the pin inserted. The bill for the procedure was \$300 to remove the tooth and \$1,500 to insert the titanium pin. Removing the tooth and inserting the pin each took roughly the same amount of time. Because the cost of the pin is negligible and both parts of the procedure took the same amount of time, why would the oral surgeon charge 5 times as much to set the pin as to pull the tooth? (Hint: Market power and level of competition underlies the answer.)

**Answer:** Oral surgeons, also known as oral and maxillofacial surgeons, are dental specialists who have completed not only four years of dental school, but have also completed at least four years of a surgical hospital residency. There are more dentists and fewer oral surgeons in any market. The oral surgeon therefore has some market power and can charge more to set the pin, but faces more competition in the pulling of teeth and thus charges the lower going rate to pull the tooth.

9. The taxi industry in many large cities spends millions of dollars lobbying local policymakers not to build rail links connecting airports to the city center, even if such mass transportation infrastructure would benefit many consumers traveling to and from the airport. Explain why such actions by the taxi industry are taken. Then, explain why taxis in cities without airport rail links are less likely to invest in fuel-efficient cars and in-taxi technologies such as televisions and Internet access.

**Answer:** The taxi industry engages in rent seeking in order to protect its market power in providing airport transportation. The cost of lobbying adds to the inefficiency of the taxi industry; however, the potential profits by preventing competition with the rail link more than offsets these rent seeking

costs. Without rail link competition, the taxi industry faces less pressure to upgrade its cars or invest in technologies beneficial to its customers.

10. If the Miami Heat can sell five courtside seats for \$2,000 each or six courtside seats if it reduces the price to \$1,600 each, what is the marginal revenue of the sixth seat? Should the owner make this sixth seat available? If all six seats can be sold for \$1,800 each, would this make the sixth seat worth selling? (Hint: What costs are involved with selling the sixth seat?)

**Answer:** The total revenue for five seats is  $5 \times \$2,000 = \$10,000$ ; the total revenue for six seats is  $6 \times \$1,600 = \$9,600$ . The marginal revenue of the sixth seat is  $-\$400$ . The owner should not make the sixth seat available because it would reduce total revenue. If all 6 seats can be sold for \$1,800, the total revenue is  $6 \times \$1,800 = \$10,800$ . The marginal revenue for the sixth seat would therefore be \$800. However, there is not enough information to know whether the sixth seat is worth selling, because we do not know whether the marginal cost is greater than or less than \$800. For example, if the space used for the extra seat could have instead been used for an advertising sign generating \$1,000 per game, the marginal cost would exceed the marginal revenue. Only if the marginal cost is less than \$800 would selling the sixth seat be optimal.

11. Sally owns the only cake shop in town (she is a monopolist). At a quantity of five, the marginal cost of producing one more cake is \$12, while the marginal revenue from selling one more cake is \$10. In order for Sally to maximize profits, should she increase or decrease output? Should she increase or decrease prices? Explain.

**Answer:** At a quantity of five, the marginal cost exceeds marginal revenue, which means Sally is producing more than the profit-maximizing level of output. To increase profits, she should reduce output until marginal cost equals marginal revenue. By reducing output, the profit-maximizing price would be at a higher point on the demand curve, which means Sally should increase prices.

12. Airlines that compete against one another have at times merged with each other to create a larger airline. What are some factors that would determine whether such a merger would constitute an uncompetitive environment according to antitrust law?

**Answer:** When airlines merge with one another, the government would need to determine the merger's effect on competition. For example, what market share would the new company garner? How does the merger affect the market concentration ratio or HHI? Also, the government would examine the finer details within the market. For example, did the premerger airlines compete for the same routes or did their routes complement one another? The latter scenario would have a smaller effect on airline competition and a merger would more likely be approved.

## In the News

13. In July 2012, a court found several electronics manufacturers guilty of price-fixing in the LCD television and computer panels in one of the largest price-fixing cases in history ("What the \$1.1 Billion LCD Price-Fixing Settlement Means for You," *CNN Money*, July 16, 2012). The alleged actions involved many major manufacturers, including Toshiba, Samsung, and Sharp. The total settlement that manufacturers paid to compensate victims of the scheme came to an astounding \$1.12 billion. What potential benefits do companies gain by working together to fix prices on a good? Why do companies choose to engage in such unlawful behavior despite the risk of being caught and paying significant fines?

**Answer:** The potential benefit to companies that collude with one another is significantly higher profits, typically by restricting the total output available on the market to force prices higher, benefiting all firms in the industry. Firms choose to engage in this behavior despite its risks because intense competitive pressures (both domestic and foreign) may force some companies out of the industry. Therefore, some companies see collusion as the only way to survive.

14. Being number one in any business attracts a lot of attention. As *The Economist* (December 17, 2005) noted, *As soon as a firm climbs above the sharp elbows of its rivals, it starts getting pelted with the eggs of anti-business activities. People who hate big business aim high. So while big, bad Wal-Mart is pilloried, Target has in the past couple of years blithely cut the benefits of its non-union workers. And when was the last time you saw an anti-globalization mob destroy a Burger King outlet?*

Describe some of the benefits of being number two in a large industry. In terms of total revenues (sales), name the number one and two firms in the following industries: major auto manufacturers, major drug manufacturers, and major integrated oil and gas.

**Answer:** As the quote suggests, number two firms fly under the radar. Another important benefit is that these firms are usually ignored when it comes to antitrust actions, and often they can merge with other firms with very little attention unless the difference in market shares between them and the top firm is trivial. For 2012, the number one and two firms in several industries (data for 2012 sales in billions of dollars are in parentheses) were

**Auto Manufacturers—Major**

Toyota (\$226.1B)

General Motors (\$152.3B)

**Drug Manufacturers—Major**

Johnson & Johnson (\$67.2B)

Pfizer (\$58.9B)

**Major Integrated Oil & Gas**

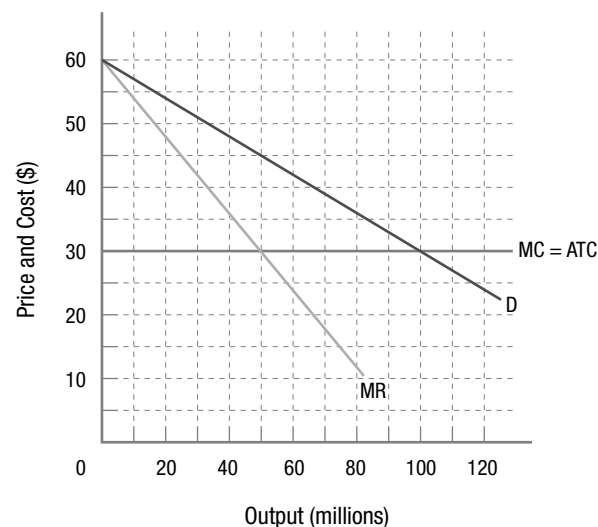
Royal Dutch Shell (\$467.2B)

Exxon Mobil (\$433.5.6B)

## Solving Problems

15. Using the figure below for a monopoly firm below, answer the following questions.

- a. What will be the monopoly price, output, and profit for this firm?



- b. If this monopolist could perfectly price discriminate, what would profit equal?  
 c. If this industry were competitive, what would be the price, output, and profit?  
 d. How large (in dollars) is the deadweight loss from this monopolist?

**Answer:**

- a.  $MR = MC$  where output is 50 million units. From the demand curve, price will be \$45, and total profits will equal \$750 million [ $TR - TC = (\$45 \times 50 \text{ million}) - (\$30 \times 50 \text{ million}) = \$750 \text{ million}$ ].  
 b. If the monopolist could perfectly price discriminate, total profit would equal the area under the demand curve above the MC curve. Thus profit is equal to  $[(\$60 - \$30) \times 100 \text{ million}] \div 2 = \$1,500 \text{ million}$ .  
 c. If this were a competitive industry,  $P = MR = MC$  would be the profit-maximizing output at 100 million units, price would equal \$30, and economic profit would be zero.  
 d. The deadweight loss is equal to the area under the demand curve above the MC curve between the competitive output and monopoly output. Thus, the deadweight loss would equal  $[(\$45 - \$30) \times (100 \text{ million} - 50 \text{ million})] \div 2 = \$375 \text{ million}$ .

16. Assume the following table represents the sales figures for the eight largest firms in the auto industry in the United States:

| Company        | Sales (billions of dollars) |
|----------------|-----------------------------|
| General Motors | 2.063                       |
| Toyota         | 1.77                        |
| Ford           | 1.616                       |
| Honda          | 1.151                       |
| Chrysler       | 0.931                       |
| Nissan         | 0.77                        |
| Hyundai        | 0.435                       |
| Mazda          | 0.208                       |
| <b>Total</b>   | <b>8.944</b>                |

- Compute the four-firm concentration ratio for the industry.
- Compute the HHI for the industry (assuming the industry contains just these eight firms).
- Assuming the industry is represented by these eight firms, if Toyota and Ford wanted to merge, and you were the head of the Department of Justice, would you permit the merger? Why or why not? (Hint: Calculate the new values from parts a and b assuming the merger takes place.) How about if Hyundai and Mazda wanted to merge?

**Answer:**

| Company        | Sales (billions of dollars) | Share of Market | Share Squared   |
|----------------|-----------------------------|-----------------|-----------------|
| General Motors | 2.063                       | 23.07           | 532.03          |
| Toyota         | 1.77                        | 19.79           | 391.64          |
| Ford           | 1.616                       | 18.07           | 326.45          |
| Honda          | 1.151                       | 12.87           | 165.61          |
| Chrysler       | 0.931                       | 10.41           | 108.35          |
| Nissan         | 0.77                        | 8.61            | 74.12           |
| Hyundai        | 0.435                       | 4.86            | 23.65           |
| Mazda          | 0.208                       | 2.33            | 5.41            |
| <b>Total</b>   | <b>8.944</b>                | <b>100.00</b>   | <b>1,627.26</b> |

- The four-firm concentration ratio is 73.8.
- The HHI for this industry is 1,627.26.
- You probably would not permit Ford and Toyota to merge, because that would change the upper mix so significantly. Hyundai and Mazda would not be a problem because combined they would only equal 7.19% of the market.

### Using the Numbers

17. According to By the Numbers, assuming that the number of viewers for each of the five games in the 2012 NBA Finals were the same, approximately how many more people watched the 2012 Super Bowl than the final game of the 2012 NBA Finals?

**Answer:** Nearly 100 million more people watched the 2012 Super Bowl than the final game of the 2012 NBA Finals.

18. According to By the Numbers, the annual growth in demand for electricity has fallen over the past half-century but remained positive nearly every year. In what years did actual electricity demand fall (negative growth in demand)?

**Answer:** Electricity demand fell in 2008 and 2009, and also in 2013.

## Chapter 10

### Check Your Understanding

1. How do monopolistically competitive markets differ from competitive markets? If monopolistically competitive firms are making economic profits in the short run, what happens in the long run?

**Answer:** Monopolistic competition involves differentiated products. Economic profits in the short run attract new firms, reducing individual firm demands until only normal profits are earned by all industry firms.

2. How do monopolistically competitive firms exhibit market power? In what ways can a firm increase market power?

**Answer:** Monopolistically competitive firms exhibit market power by differentiating their products. Firms can differentiate products by advertising, by their location, style or product characteristics, product quality, or level of service. By differentiating a product in a way that establishes brand loyalty by customers, the elasticity of the product falls, allowing a firm to increase its market power and raise prices.

3. Explain what strategic interdependence means and how it applies to oligopoly markets.

**Answer:** Strategic interdependence means that any action taken by one firm in an industry has a direct impact on another firm, and therefore firms will attempt to engage in strategies that are most beneficial given these conditions. Because oligopoly markets are made up of a few large firms selling similar products, a firm will make decisions knowing that each decision will impact its competitors and may elicit a competitive response.

4. Why is it difficult for cartels to maintain high prices effectively over the longer term?

**Answer:** Cartels typically set prices by joint profit maximizing and then allocate the permissible output to members. Because prices are set at roughly monopoly levels, this leaves a lot of potential sales (and profits) at prices above marginal costs if a cartel participant is willing to cheat. This profit incentive to cheat undermines cartel stability.

5. Why would the use of repeated games make overcoming the Prisoner's Dilemma easier compared to a game that is played only once?

**Answer:** A Prisoner's Dilemma is hard to overcome when there is no threat of retaliation for choosing the noncooperative strategy. Repeated games allow for retaliation in subsequent stages of the game. Therefore, firms are more likely to cooperate and avoid the Prisoner's Dilemma when games are repeated many times over a long time horizon.

6. What is the difference between a tit-for-tat trigger strategy and a grim trigger strategy?

**Answer:** Tit-for-tat and grim strategies are types of trigger strategies used in repeated games when firms are attempting to circumvent the Prisoner's Dilemma by cooperating. A tit-for-tat trigger strategy is used when one firm stops cooperating, causing the other firm to cease cooperating as well until the first firm chooses to return to cooperation. A grim trigger, however, occurs when one firm stops cooperating, causing the other firm to cease cooperating permanently even if the original firm chooses to return to cooperation. A tit-for-tat strategy is more forgiving than a grim strategy.

### Apply the Concepts

7. "Monopolistic competition has a little of monopoly and a little of competition, hence its name." Do you agree? Why or why not?

**Answer:** Clearly monopolistic competition has elements of both market structures, but monopolistic competition is much more like competition, and the monopolistic elements are relatively minor.



Many buyers and sellers, and no barriers to entry or exit, are conditions that are more important than the small levels of monopoly power resulting from product differentiation.

8. We saw in the last chapter that the HHI (Herfindahl-Hirschman index) is used by the Department of Justice to measure industry concentration. Because domestically we have very few monopolies, some would argue that the HHI is really used to measure the degree of oligopoly. However, the HHI represents domestic concentration, and many of the products we purchase are made globally and sold in the United States by foreign firms. Has global competition made these HHI estimates less meaningful? Are old-line American oligopolies (autos, steel, and airlines) more like monopolistic competitors today? Why or why not?

**Answer:** Yes, globalization makes domestic concentration estimates suspect and less meaningful and probably explains why there is significantly less government antitrust litigation today. While firms in oligopolistic industries are huge, because of globalization and foreign competition, a good argument can be made that these industries act more like monopolistic competitors today. Very few industries have the price and profit stability that the old-line oligopolies had in the past.

9. In both competitive and monopolistically competitive markets, firms earn normal profits in the long run. What enables oligopoly firms to have the opportunity to earn economic profits in the long run?

**Answer:** Oligopolistic industries tend to have significant barriers to entry and exit. For example, to enter the computer microchip-fabricating business (i.e., to compete with Intel and AMD) requires huge capital expenditures on plant, equipment, and expertise. A typical Intel fabrication plant alone can cost over a billion dollars to get up and running.

10. Poker players are known to *bluff* once in a while, meaning that they will make a large bet despite holding bad cards in an effort to pressure other players to fold their hands. Would bluffing be considered a dominant strategy to be used in poker?

**Answer:** No, bluffing is not considered a dominant strategy in poker, because if one chooses to bluff every time she or he holds bad cards, that strategy would eventually become obvious to the other players, who would then call the player's bluff by not folding. Poker is a game in which players must bluff occasionally to remain unpredictable.

11. Suppose you choose to pledge for your top choice of sorority or fraternity at your university. Despite the tiny odds of getting accepted into your top choice, that does not deter you from spending all of rush week focusing on your top choice. Would this strategy coincide with a best-response strategy in a Nash equilibrium?

**Answer:** No, choosing to focus all of your efforts on just your top choice when the odds are small is not a best-response strategy. A Nash equilibrium is an outcome that is achieved by maximizing one's expected payoffs, which means choosing strategies that will lead to a good chance of achieving a high payoff.

12. Suppose two competing stores each announce a "low price guarantee," meaning that each store would match the prices of the other store if they were lower. Does providing this guarantee make it easier or more difficult to overcome the Prisoner's Dilemma facing the two firms?

**Answer:** A low price guarantee makes it easier to overcome the Prisoner's Dilemma. A low price guarantee is a strategy used by firms to protect against competitors who choose to lower their prices in an attempt to gain market share. It acts as a threat to discourage stores from lowering prices too much, knowing that price reductions will automatically be matched by other stores using the low price guarantee. Therefore, by having the low price guarantee in place, there is less risk by choosing to keep prices high (cooperating) to avoid the Prisoner's Dilemma.

## In the News

13. The *Wall Street Journal* reported on April 25, 2012, that Pakistan launched a test missile in response to India launching a missile of its own the previous week. Both countries want to prove that they are the dominant military power in South Asia. Explain how this ongoing game between nuclear powers represents a game of chicken, and what might happen if neither side chooses to back down.

**Answer:** This situation represents a game of chicken because both Pakistan and India want to "win" by proving it is the dominant military power. However, in order to achieve this victory, both countries need

to engage in more and more military actions that threaten the entire region. If neither side chooses to back down, a full-blown war may eventually occur, leading to significant cost and loss of life, the worst-case scenario. Such games of brinkmanship are the most severe and potentially devastating versions of chicken games that have led to wars throughout history.

14. “Bank of America Faces Outrage over Debit Card Charge” was the headline in the *Washington Post* on September 30, 2011. Bank of America attempted to institute a new fee on debit card accounts by charging its debit card users \$5 per month, in hopes that other banks would follow its lead. However, no other major bank did, and Bank of America was pummeled in the media and by customers who closed their accounts until Bank of America relented and dropped the new fee. Explain how Bank of America was attempting to overcome the Prisoner’s Dilemma. Provide reasons why this attempt was unsuccessful.

**Answer:** Bank of America was attempting to set a new standard by encouraging all banks to raise their fees for debit card users. Because open collusion is illegal, Bank of America chose to raise its fees unilaterally, hoping that all other banks would quickly follow. If that happened, banks would earn more money, overcoming a Prisoner’s Dilemma situation. However, other banks saw the public backlash against Bank of America’s actions, and took advantage of the situation by choosing not to raise their fees, allowing Bank of America to suffer through the negative press and media. Eventually, Bank of America relented and dropped its fees. Not all attempts at overcoming the Prisoner’s Dilemma fail, however. The airline industry has been successful at raising revenues by implementing baggage fees, seat reservation fees, and other fees that started from one company initiating the action and other airlines following.

### Solving Problems

15. Suppose each member of a diamond cartel consisting of five producers agrees to sell 100 carats of diamonds a day. With 500 total carats being sold, the market price is \$1,000/carats, and each firm earns \$100,000. Now assume that one producer cheats by producing 110 carats, causing the market price for 510 total carats to drop to \$980/carats. How does this action affect the revenues of the cheating firm and the noncheating firms? Suppose the four noncheating firms change course and all produce 110 carats, and the market price for 550 total carats drops to \$850/carats. How much does each firm earn now? How important is loyalty to maintaining an effective cartel?

**Answer:** When one firm cheats and produces 110 carats, this firm’s total revenue rises to  $110 \times \$980 = \$107,800$ , an increase of \$7,800. However, the remaining four firms see their total revenue fall to  $100 \times \$980 = \$98,000$ , a decrease of \$2,000. Therefore, the cheating firm gains \$7,800, while each of the other four firms loses \$2,000. If the four firms respond by raising production to 110 carats, all five firms would then have total revenue of  $110 \times \$850 = \$93,500$ . A Prisoner’s Dilemma results because all firms are worse off than before. Loyalty is critical to a cartel’s success. When one firm cheats on a cartel agreement, it affects all other members. Further, cheating by one firm often leads to cheating by others, causing the cartel to break down.

16. The following shows a pricing game between JetBlue and Delta. Each airline has a choice between engaging in a fare sale or not. The resulting profits of each airline are provided, where the first number in each payoff box equals JetBlue’s profit and the second number is Delta’s profit.

|         |              | Delta     |              |
|---------|--------------|-----------|--------------|
|         |              | Fare sale | No fare sale |
| JetBlue | Fare sale    | 80   500  | 200   800    |
|         | No fare sale | 50   700  | 100   1200   |

What is the Nash equilibrium of this game? Does this game resemble a Prisoner’s Dilemma? Explain.

**Answer:** The Nash equilibrium is JetBlue offering a fare sale while Delta does not. JetBlue earns \$200 in profits and Delta earns \$800 in profits. This game does not resemble a Prisoner’s Dilemma, because JetBlue achieved its highest possible payoff. This is a leadership game, in which a smaller firm (JetBlue) competes against a larger firm (Delta); however, the larger firm chooses not to match the pricing strategies of the smaller firm because the loss of market share is not significant enough to warrant lowering the price for all of its output.

## Using the Numbers

17. According to By the Numbers, in terms of number of restaurants, what percentage of all restaurants among the top ten chains is a Subway, McDonald's, or a Starbucks? (Hint: First calculate the total number of Subways, McDonald's, and Starbucks combined and compare with the total restaurants among all top ten chains.)

**Answer:** The total number of Subways, McDonalds, and Starbucks stores is approximately  $23,000 + 14,000 + 11,000 = 48,000$ . The total number of all stores among the top ten chains is approximately  $23,000 + 14,000 + 11,000 + 7,500 + 7,000 + 6,500 + 6,000 + 5,500 + 5,500 + 5,000 = 91,000$ . Therefore, the share of Subways, McDonald's, and Starbucks is approximately  $48,000 / 91,000 = 53\%$ .

18. According to By the Numbers, if the third and fourth largest wireless providers merged into one new company, would the combined company surpass the market share of either of the largest two firms prior to the merge?

**Answer:** No. The third largest wireless provider is Sprint, with 17% market share, and the fourth largest wireless provider is T-Mobile, with 11% market share. The merged company would have 28% market share, which is still smaller than AT&T and Verizon, each of which has more than 28% market share.

## Chapter 11

### Check Your Understanding

1. Why are individual supply curves of labor potentially backward bending, but market and industry supply curves are always positively sloped?

**Answer:** Individuals make tradeoffs between labor and leisure. As wage rates rise, initially the substitution effect dominates, and workers substitute work for leisure. But as wages rise to high levels, additional income is less important because these high wages yield high incomes with less work; therefore the income effect dominates, resulting in workers substituting leisure for work. Thus, the supply curve bends backward. Market and industry labor supply curves do not bend backward because higher wages in one market (industry) elicit supplies from other industries.

2. What factors will increase the demand for labor?

**Answer:** Anything that increases the demand for the goods and services that labor is producing, anything that increases labor's productivity, and an increase in the cost of capital which causes labor to be substituted for capital.

3. When there is discrimination in the labor market, who loses? Why? Why is it harder to discriminate when both labor and product markets are competitive?

**Answer:** When a higher productivity individual is discriminated against because of race, color, gender, age, religion, or disability, that individual loses, the employer loses the added productivity, and consumers and society lose the added output. When both labor and product markets are competitive, the firm that discriminates and hires the lower productivity individual will have higher costs as a result, but competitors who do not discriminate will not. Discriminators will earn lower profit than their competitors.

4. What are the important laws in place in the United States to prevent discrimination in the workplace based on race or gender?

**Answer:** The Equal Pay Act of 1963 required that men and women receive equal pay for equal work. However, the law provided a limited timeframe to file a case, and many women feared losing their jobs as a result of filing a case. The 2009 Lily Ledbetter Fair Pay Act extended the time allotted to file a discrimination case, allowing more women to speak up against gender discrimination in the workplace.

5. How do unions exert their influence in the labor market?

**Answer:** Unions exert their influence in the labor market through collective bargaining. By becoming a union member, a worker becomes part of a larger and more powerful voice that can demand greater wages and benefits. Further, unions collect dues from their members, which are used for lobbying

efforts on behalf of their members as well as to compensate members during strikes and walkouts. Unions essentially restrict the labor supply, which forces wages higher for union members.

6. What are some changes in the types of jobs available in the United States over the past 50 years and what are some trends for future labor employment?

**Answer:** Over the past 50 years, a shift from manufacturing jobs to service sector jobs has taken place, as many manufacturing jobs were sent overseas or replaced by capital inputs. Technology and trade has had an important influence on the types of jobs available, and will continue to influence future labor employment. Jobs in technology, web and social media programming, and communications will continue to grow, along with jobs in health care as the population grows and life expectancy rises, increasing the need for doctors and nurses.

### Apply the Concepts

7. Some employees feel locked into their jobs because employer benefits, such as health insurance, are not transferrable to other companies. This “job lock” phenomenon is especially severe with health insurance coverage for employees if someone in their family has a severe pre-existing condition that prevents them from getting private health insurance at reasonable rates. What are the effects of this type of inflexibility on labor markets? What would be the impact if some form of health care reform eliminated the potential loss of health insurance for workers?

**Answer:** Essentially forcing some workers to remain in jobs they dislike just to maintain health coverage often leads to bitterness and lower productivity. These workers are stuck in a job at which they are less efficient, when by moving they could be happier, more productive, and improve efficiency in the overall economy. If some form of universal health coverage unrelated to employers came out of health care reform efforts, this would essentially eliminate the “job lock” problem.

8. Why do college professors who usually spend five to seven years in graduate school and play such an important role in shaping our society make so much less than a Hollywood producer such as Jerry Bruckheimer, who most people don’t even know (he has produced over 40 films and a dozen TV shows)?

**Answer:** Most college professors teach 200–300 students a year and have a positive impact, but the market judges their marginal revenue product as roughly equal to their salaries. Jerry Bruckheimer, however, produces movies and television programs (e.g., *Top Gun*, *Beverly Hills Cop*, *Black Hawk Down*, and *Pirates of the Caribbean*, and TV shows such as the various *CSI* series and *Cold Case*) watched by millions, and the market judges his marginal revenue product quite highly. Also, many people can teach college, but few can do what Bruckheimer can do: consistently produce successful films and TV shows.

9. Why do we permit price discrimination with different ticket prices at movies based on age, or ladies’ nights at bars (when women get in free or pay less for drinks), or insurance coverage, for which women sometimes pay more (health) or less (automobile), but we do not permit discrimination in wage rates?

**Answer:** There is an inherent unfairness in different wages for the same job based on race, gender, age, and the like. Plus, there is the relative importance of earning a living versus going to the movies, and so on. Insurance is priced on an experience-based analysis and reflects different risks with different groups. Because health insurance is important, our general policies on discrimination may not be entirely consistent.

10. Has globalization made it more difficult for unions to negotiate higher wages? Why or why not?

**Answer:** The rise of global production powerhouses such as China, Japan, South Korea, and Indonesia have made it extremely difficult for unions to pressure firms to raise wages. If too much pressure is brought to bear, the firm looks to outsource production overseas. Further, competition from global firms has reduced former oligopoly markets: Before, when increasing costs affected all firms, their costs could be passed on to consumers without real alternatives; but now, highly competitive markets have left firms from the old oligopolies at a disadvantage.

11. The airline pilots union has been very successful in negotiating six-figure salaries for pilots. The unions representing flight attendants have not been nearly as successful. What probably accounts for the difference?

**Answer:** Pilots are highly skilled, and the airlines spend huge sums on pilot training (and retraining) and annual evaluations. Further, their salaries are a small part of the overall costs of the airline, therefore high salaries have not been difficult to negotiate. Flight attendants require less training than pilots, and there is a greater supply of people qualified and willing to be attendants, making negotiations difficult for the flight attendants unions.

12. Fifty years ago, married women age 35 to 44 worked for pay only 10 hours per week on average; today they work over 26 hours on average. During the same period, the workweek for married men of the same age has been relatively constant, between 42 and 44 hours. Can you think of reasons why women's working hours have nearly tripled in the last half-century?

**Answer:** Time is a limited resource for all of us. Fortunately, the time required to do work at home such as preparing meals, doing laundry, and so on, has declined as home appliances have become more efficient. Meal preparation time has also been reduced by technology. The passage of fair wage and labor laws reducing wage discrimination has played a role because higher wages make work outside the home more attractive to women. The same is true for reducing marginal tax rates. This means women, who are often secondary workers, can take home more of a given salary. Finally, social norms have changed regarding mothers and working. This has been met by a jump in child care facilities.

## In the News

13. Tightened visa rules since September 11 have reduced the number of high-skill legal immigrants. Stiffer security rules and insufficient personnel have substantially increased the waiting time (and certainty) for visas. A *New York Times* article titled "Immigration and American Jobs" (October 19, 2012) reports a finding by economist Giovanni Peri that the wave of high-skilled legal immigrants from 1990 to 2007 increased the average wage of American workers by lifting the overall economy. Such findings have increased the pressure for immigration reform allowing more foreign graduates of American universities in the math, science, and technology fields to become permanent residents in the United States. Using the tools of labor demand and supply, evaluate the merits of the proposed immigration policy.

**Answer:** The United States has benefited handsomely from high-skilled immigrants over the years, including Albert Einstein and other familiar names. Security tradeoffs are the biggest obstacles; checking people's background requires a lot of employees. Letting in unlimited numbers of immigrants would be a political risk, because a large flow of high-skilled workers would lower wages for a large group of Americans. In addition, immigration reform affects other countries that could face a serious short-term brain drain if high-skilled workers leave.

14. The National Bureau of Economic Research in December 2010 reported a study by Elizabeth Wilde, Lily Batchelder, and David Ellwood that a highly skilled woman loses anywhere from \$230,000 to \$349,000 in lifetime earnings by having children. What are the reasons that having children reduces women's earnings so much?

**Answer:** The decision to have children typically means that the mother (as the primary caregiver) will leave the labor force, even if only temporarily, resulting in lost wages and a reduction in career activities. Working part time reduces the monetary loss. Being out of the labor force for an extended period means that an attractive career ladder has been interrupted and lifetime earnings are reduced.

## Solving Problems

15. Joe's Mechanic, which provides oil changes for \$40 per car, decides to increase the number of mechanics on staff from four to five. As a result, the number of oil changes completed in a day increases from fifteen to seventeen. What is the marginal revenue product of the fifth worker?

**Answer:** By increasing the number of mechanics from four to five, the number of oil changes completed in a day increases by two. At a price of \$40 per oil change, the marginal revenue product of the fifth worker is  $2 \times \$40 = \$80$ .

16. In the following table, suppose the price of output is \$10 per unit. What are the marginal physical product and the marginal revenue product of the sixth worker? If the wage of each worker is \$150, should the sixth worker be hired?

| Number of Workers | Units of Output |
|-------------------|-----------------|
| 1                 | 50              |
| 2                 | 110             |
| 3                 | 170             |
| 4                 | 220             |
| 5                 | 250             |
| 6                 | 270             |

**Answer:** The marginal physical product of the sixth worker is the increase in output from 250 to 270, or 20 units. At a price of \$10 per unit, the marginal revenue product of the sixth worker is  $20 \times \$10 = \$200$ . If a worker earns \$150 per day, the marginal revenue product of the sixth worker exceeds the wage of \$150, and therefore that worker should be hired.

Using the Numbers

17. According to By the Numbers, what is the average starting salary of workers with an undergraduate degree in economics? What is the average mid-career salary of workers with an undergraduate degree in economics?

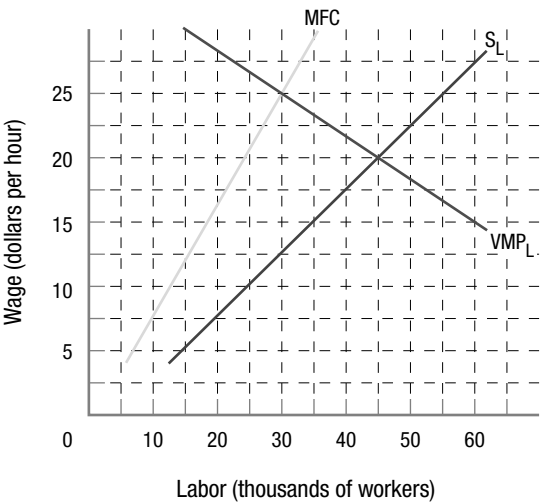
**Answer:** The average starting salary of workers with an undergraduate degree in economics is approximately \$50,000. The average mid-career salary is approximately \$95,000.

18. According to By the Numbers, during which seven-year period did the percentage of Americans with flexible work schedules increase the most?

**Answer:** The seven-year period in which the percentage of Americans with flexible works schedules increased the most was from 1991 to 1998.

Chapter 11 Appendix

1. The figure below shows the supply of labor, marginal factor costs, and the demand for labor for a firm that is large enough that it is essentially a monopsonist in the community in which it operates. Assume that all workers are paid the same wage and that they work 2,000 hours per year (40 hours a week for 50 weeks).



- a. What is the total wage bill (total wages paid by the firm) for this monopsonistic firm?
- b. If the firm was actually hiring from a competitive labor market, what would be the total wage bill for the firm?
- c. What is the total value of the monopsonistic exploitation of labor by this firm?
- d. Is the firm a competitor or a monopolist in the product market?

**Answer:**

- a.  $(\$12.50 \times 2,000) \times 30,000 = \$750,000,000$
  - b.  $(\$20.00 \times 2,000) \times 45,000 = \$1,800,000,000$
  - c.  $[(\$25.00 - \$12.50) \times 2,000] \times 30,000 = \$750,000,000$
  - d. The firm is a competitor in the product market since its demand for labor is the VMP of labor.
2. Would unions be more likely to organize successfully in highly competitive markets or in markets with monopsony power? Explain.

**Answer:** A firm with monopsony power hires fewer workers at lower wages than competitive firms. Workers are more likely to join, and the union has more potential to increase wages without causing unemployment among its members. The only way wages rise in competitive markets is if employment is reduced.

## Chapter 12

### Check Your Understanding

1. What does the term *land* refer to in economics and why is it very inelastic in supply?

**Answer:** Land refers to physical land as well as natural resources that come from the land. Because the quantity of land and natural resources are physically limited, the supply is very inelastic because it is difficult to find and supply more resources even when prices rise.

2. If the interest rate is 6% and you are offered a bond that will pay you \$2,000 in two years, but no interest between now and then, what would you be willing to pay for this bond today?

**Answer:** A bond that pays \$2,000 in two years is worth \$1,780 today if the interest rate is 6%. This is calculated as  $\$2,000 / (1.06)^2$ .

3. What are the different ways in which businesses can acquire financial capital?

**Answer:** Businesses can acquire financial capital by borrowing from a bank, issuing bonds or stocks, or acquiring venture capital.

4. Why are colleges filled with young people rather than middle-aged individuals? If interest rates rose to over 10%, would this have any impact on the number of people attending college or its composition?

**Answer:** Young people make up the bulk of college enrollment because their opportunity costs are lower (they don't command high wages), and once they graduate, they can look forward to a long earning horizon. Middle-aged people have high opportunity costs and a shorter future earning span. If interest rates rise dramatically, the costs of a college education go up if you must borrow, and the higher future wages are discounted more heavily. Fewer people would attend college (the rate of return has fallen), and those who do would be less likely to be poor or need to borrow.

5. What is the difference between physical capital and human capital?

**Answer:** Physical capital is machinery and other physical equipment used to produce goods and services. Human capital is labor that is enhanced by education and training. Both physical and human capital make labor more productive. In other words, a person's effort is more productive if she has access to better equipment or is more educated or trained to use resources more effectively.

6. What do intellectual property rights protect and why is it important to entrepreneurship?

**Answer:** Intellectual property rights include patents, copyrights, trademarks, and industrial designs. They protect inventions such as new products, creative works such as books and music, symbols

such as a brand's name or logo, and designs such as a new car style. Intellectual property rights are important to entrepreneurship because they give the owner the exclusive right to profit from their creativity for a period of time. Intellectual property rights provide an incentive for inventors and entrepreneurs to invest in new products and services and reduce the risk that they would be copied and exploited by competitors.

### Apply the Concepts

7. How do times of growth in the general economy encourage capital investments? How do recessions discourage capital investments? What happens to the cost of capital in boom times when the economy is growing? What happens in recessionary times?

**Answer:** When the economy is booming, consumers demand more products, which encourages businesses to expand by making capital investments. Recessions discourage investment because income is down (or growing slowly), and demand for products falls. When the demand for capital rises, interest rates will rise, and this will dampen investment. During recessions, interest rates fall, helping to stem the decline in investment.

8. Cities such as London and Johannesburg spent billions in capital expenditures building new stadiums, roads, and public transportation to host the 2012 Summer Olympics and the 2010 World Cup, respectively, in hopes of generating a spike in future tourism and business investment. Explain how these cities would use a rate of return approach to determine whether the effort to host the sporting event was a worthwhile endeavor.

**Answer:** Cities such as London and Johannesburg expect that their investment will pay off through many years of increased tourism and business revenues. Using a rate of return approach, these future revenues would be discounted by a rate of return allowing the overall investment to break even. As long as the calculated rate of return is greater than that required by investors, the investment would be worthwhile.

9. Suppose you wish to purchase a corporate bond that offers a coupon rate of 10% in the bond market. On a particular day, you notice the price of the bond listed as greater than "100." Given this price, would the yield on this bond be greater than or less than 10%? List some possible reasons that would cause the price of the bond to exceed "100."

**Answer:** If the price of the bond exceeds 100, this means that investors view the bond as less risky than when the bond was initially issued. Because the perceived risk is lower, investors are willing to pay more for the bond, which means that the yield would fall below the coupon rate of 10%, reflecting the safer investment. Possible reasons why the price of a bond would exceed 100 include an improved bond rating, reduced debt by the company, or an improved profit or revenue outlook.

10. When a company uses resources to train staff or subsidize tuition for employees, it is clearly investing in human capital. However, this investment is treated as current spending (cost of selling or producing goods) rather than investment. Should these activities be treated as investments and be reflected in the investment statistics of the economy?

**Answer:** Yes, they and other intangibles, like investment in research and development, patents, copyrights, and enhancing a brand name, should be treated as investments. The problem is that accounting for some of these investments can be difficult. How much of current advertising accounts for enhancing the brand, and how much is to increase sales today? Other expenditures such as R&D and tuition grants are easier to account for.

11. Does it seem reasonable that a certain portion of the benefits of a college education is essentially a way to show prospective employers that you are reasonably intelligent, trainable, and have a certain degree of discipline?

**Answer:** Yes it does. However, it also seems reasonable that a large part of a college education represents a broadening of your mind, the acquisition of a set of analytical and communication skills, along with the choice of an area of study in which you have an interest and show promise.

12. Some politicians during any election campaign offer proposals to make college more affordable by increasing subsidies through higher Pell grants and subsidizing reduced rate loans. If these policies come to pass, and college becomes less expensive, more people will attend college. What will this do to the rate of return on a college education?

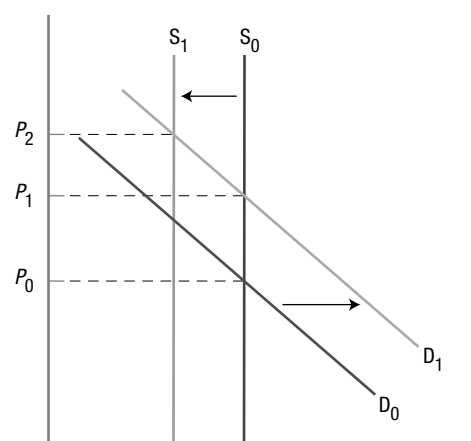


**Answer:** All things equal, if more people get college degrees, supply will eventually rise and wages will not rise as fast, leading to a reduction in the rate of return to your education.

## In the News

13. A December 13, 2012, article in *The Los Angeles Times*, “Colorado River Water Supply to Fall Short of Demand . . .” highlighted the concern regarding the ability of the Colorado River, the primary source of water for the greater Los Angeles area residents, to fulfill the needs as the river continues to decrease in water flow. Using a market diagram, show what happens to water prices if the supply of water, a natural resource, is fixed each year while demand continues to increase due to population growth. If the article’s predictions come true and the supply decreases, show what happens to the price of water.

**Answer:** The figure shows what happens when supply is fixed (vertical) and demand increases from  $D_0$  to  $D_1$ , causing prices to rise from  $P_0$  to  $P_1$ . If the supply of water decreases from  $S_0$  to  $S_1$ , this would push prices even higher, to  $P_2$ .



14. Steve Wynn is a billionaire Las Vegas casino tycoon who built famous hotels such as the Mirage, Bellagio, Wynn, and Encore resorts. In 2012, he announced a plan to invest \$4 billion to build his third hotel in Macao, a tiny former Portuguese colony near Hong Kong that has been returned to China (“Wynn Macao Plans to Invest \$4 Billion for New Resort,” Bloomberg.com, June 5, 2012). The size of the investment surprised analysts, because the gaming market in Macao, while still the world’s largest in total revenue, has begun to slow in recent years. What are some market factors influencing the present value of Wynn’s future earnings that might justify his decision to build such a lavish resort?

**Answer:** Steve Wynn is expecting continued growth in the demand for gaming in Asia to push revenues higher for his Macao casino. In addition to the expected increase in future revenues, the discount rate is expected to remain low as opportunities for high returns on investment slow. Both factors (a higher revenue stream and a lower discount rate) increase the present value of investments, making a larger investment now easier to justify.

## Solving Problems

15. Suppose you win the lottery and are given a choice to collect either the grand prize of \$6 million in twenty annual installments of \$300,000, or collect an immediate one-time payment of \$4 million today. If the interest rate is 5% and that is what you use to discount future earnings, which option should you select to maximize the present value of the winnings?

**Answer:** If you select the twenty annual installments of \$300,000, you would need to discount each payment by 5% for each year that you wait. The present value of this option is approximately \$4.6 million, which is greater than the \$4 million offered as a one-time payment today. Therefore, to maximize the present value of the winnings, you should select the twenty annual installments of \$300,000.

16. The mayor of your city is considering building a new toll road to reduce congestion. The cost of the toll road is \$10 million and is estimated to generate a profit (from tolls collected less expenses

collecting the tolls and maintaining the road) of \$1.5 million per year. If the discount rate is 10%, how many years would it take before the road is paid for? (Hint: Calculate the present value of the annual profit—for year 1, discount \$1.5 million by 10%).

**Answer:** It would take 12 years. The present value of \$1.5 million collected after year 1 at a 10% discount rate is \$1,363,636. The present value of \$1.5 million collected after year 2 is \$1,239,669. Continuing these calculations by dividing \$1.5 million by  $(1.1)^n$  for each year ( $n = 3, 4, 5, \dots$ ), the present value of total future revenues will exceed \$10 million after year 12.

## Using the Numbers

17. According to *By the Numbers*, in the year 2011 (the last year for which data are reported) approximately what percentage of high school graduates attended college? Approximately what percentage of college graduates attended a graduate program?

**Answer:** Approximately 72% of high school graduates attended college in 2011. Approximately 29% of college graduates attended a graduate program in 2011.

18. According to *By the Numbers*, by approximately what percentage did venture capital funding fall from its peak in 2007 to its lowest point in 2010?

**Answer:** Venture capital funding fell from its peak of approximately \$40 billion in 2007 to a low of approximately \$12 billion in 2010, a decrease of 70%.

## Chapter 13

### Check Your Understanding

1. When trying to estimate the external benefits of a college education, what kinds of specific benefits would you include?

**Answer:** Benefits such as a more informed electorate, the impact of reduced crime, increases in tax revenues collected over the working lives of college graduates, and the impact of higher productivity on economic growth.

2. How might the government use market forces to encourage recycling?

**Answer:** Manufacturers could be required—or given tax incentives along with subsidies—to make as much of their packaging recyclable as possible. It can require stores to collect refundable deposits on products and packages to be redeemed for cash later (much like bottles today in some states). Another approach would be to charge for each container of garbage picked up, but not for recycled containers.

3. What makes public goods so different from private goods?

**Answer:** Public goods are nonrival in consumption (you and I can consume the same good with no loss of satisfaction to each of us) and exhibit nonexcludability (once the good is provided, no person can be kept from consuming it). Private goods are both rival and exclusive (when I eat a candy bar, you can't eat that same bar).

4. Why wouldn't a rural highway in Montana, Freeway 405 in Los Angeles, and the New Jersey Turnpike (toll) all be classified as public goods? Which would be most like a public good and which would be least?

**Answer:** The Freeway 405 in Los Angeles is nonexcludable, but is subject to heavy traffic congestion due to its rival nature. Traffic on the New Jersey Turnpike moves at a relatively good speed; however, one must pay a toll to drive on it (it is excludable). A rural highway in Montana is most like a public good, because it is open to everyone (nonexcludable) and although it is technically rival in nature, heavy traffic is virtually nonexistent. The New Jersey Turnpike is least like a public good because of the clear exclusion (toll) that makes it closer to a private good.

5. Assume that you are convinced that if something isn't done now, global warming is going to create extensive problems and damage at the end of this century. If you were preparing a cost-benefit analysis of the impacts and had a 100-year horizon for your projections, would you use a 3% or an 8% discount rate?

**Answer:** The answer depends on how concerned you are about the people who will live 80–100 years from now. The lower the discount rate, the more likely the project would be financed today, because harm way into the future would compute as a higher value today, therefore reducing that harm today could stand up to higher current costs. Using an 8% discount rate would mean the harm 100 years out would have a small present value today.

6. What is the tragedy of the commons? How can it be solved?

**Answer:** When resources are held in common—owned by everyone and not a single individual (e.g., national parks, ocean fisheries, freeways, and African animals)—they are typically overused. Regulation has been the traditional solution, but recently there have been some experiments with the idea of selling these resources to private individuals to provide an incentive to protect and preserve the resource.

## Applying the Concepts

7. “Internalizing” the cost of negative externalities means that we try to set policies that require each product to include the full costs of its negative spillovers in its price. How do such policies affect product price and industry output and employment? Are these kinds of policies easy to implement in practice? How has globalization of production affected our ability to control pollution?

**Answer:** Theoretically, internalizing externalities is the way to approach pollution control. It results in higher prices and reduced output and employment. Implementing this concept is not easy in practice, and our huge environmental protection bureaucracy is testimony to that fact. Globalization of production makes it easier for companies to shop for environmentally favorable venues when cleanup costs are significant.

8. As a way to increase the funds for wildlife conservation, why don’t we just auction off (say, on eBay) the right to name a new species when it is discovered? Why not do the same for existing species?

**Answer:** The naming of a new species by auction was done in 2005 by the discoverers of a new monkey in Bolivia. Bought by a Canadian online casino, we now have the Golden Palace monkey. Many existing species have names based on wealthy financiers of expeditions years ago. It might not seem right to change a name at this point in time, but selling the right to name new species seems to be a good idea. Of course, we could wind up with the United Airlines bear and the Coca-Cola coyote.

9. We can estimate the emissions caused in one year from automobile use. What can you do to offset these emissions? Buy a *green tag*. These voluntary purchases are akin to carbon offsets traded in Europe. For a small fee, individuals can purchase carbon offsets for their cars or SUVs, or companies can use them as a way to purchase wind power for their stores. Organizations selling the green tag (both for-profit and not-for-profit) provide a decal; most of the fee collected is provided to alternative energy producers as a subsidy, which then can lower their prices to the market to encourage use. Is this a public good being sold privately? Why would individuals or businesses buy a tag when they can free-ride?

**Answer:** It is a public good, neither rival nor exclusive. People buy these tags for the same reason they support public radio and television. They support the cause and also “feel good” about their purchase. Firms can use these tags as a show of corporate support for green issues and get a head start on potential future environmental regulations.

10. Garbage dumps are a particular source of a potent global-warming gas, the methane that bubbles up as the garbage decomposes. Does it make sense for companies in the European Union to help Brazilian garbage dumps reduce their releases of methane as a way of meeting their Kyoto obligations?

**Answer:** Yes, climate change is a global phenomenon, and reductions in global warming gases anywhere in the world are beneficial. Further, it pays to reduce those emissions where the world gets the most “bang for the buck,” and methane is a particularly potent global warming gas, therefore eliminating much of it is an efficient approach. Because the members of the European Union and other developed countries have spent more on environmental controls than developing nations, reducing the pollution that aggravates global climate change is cheaper (at the margin) in developing nations.

11. The Presidio, previously a military base in San Francisco, is now a national park. It sits in the middle of San Francisco on some of the most valuable real estate in the United States. Congress, when it created the park, required that it rehabilitate the aging buildings and be self-sufficient within a decade or so, or the land would be sold off to developers. The park appears to be well on its way to self-sufficiency by leasing the land to private firms—Lucas Films has built a large digital animation studio, and other firms have undertaken similar projects. These projects all must maintain the general character of the park and generate rent that will cover the park's expenses in the future. Would this privatization approach work with most of America's other national parks? Why or why not?

**Answer:** The Presidio in San Francisco is probably unique in that the value of the land for development is so great that just a small part of the land can be leased to generate enough revenue to run the park. In most other parks, such a plan would not work, given the remoteness of the parks.

12. Nobel Prize-winner Simon Kuznets once suggested that poor nations tend to pollute more as they grow—until they reach a certain level of income per capita—after which they pollute less. Does this observation by Kuznets seem reasonable? Why or why not?

**Answer:** As very poor nations develop and incomes grow, the focus is on acquiring a basic standard of living we take for granted. Acquiring more goods and services ignores the environment because it can absorb considerable pollution at that point, and achieving a minimum standard of living is more important. Once economies reach a given level of consumption (per capita income), policy turns to improving the quality of life (e.g., surroundings, environmental purity, and improving health), and the community will not tolerate the same level of environmental degradation it accepted when providing minimum levels of food and shelter were the order of the day.

### In the News

13. In 2009, the Cash for Clunkers program was initiated to encourage consumers to trade in their old inefficient cars for a credit to buy new fuel-efficient cars. What are some of the external benefits from such a policy?

**Answer:** External benefits include less oil consumption, cleaner air, fewer breakdowns on roads causing traffic jams, and jobs in car manufacturing.

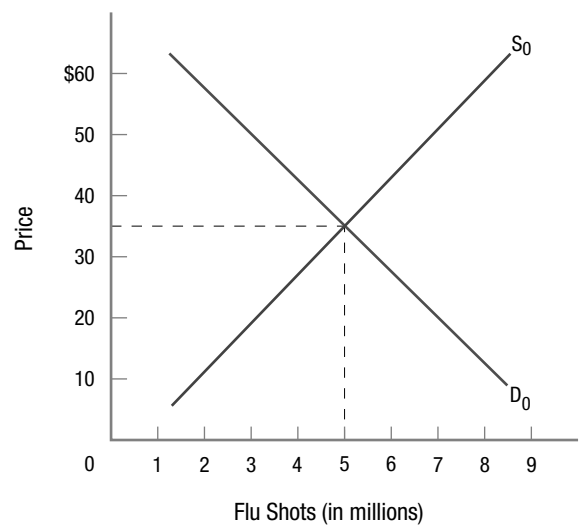
14. One's home (whether a house or an apartment) is typically thought of as one's castle. But not so in the condominiums with homeowners associations (HOAs) in Jefferson County, Colorado. In an older four-unit condo, the HOA voted 3–1 to adopt a no-smoking rule (inside the individual condos) after smokers bought one of the units and smoke permeated the walls of the structure. In 2006, a district judge ruled that the HOA's adoption of no-smoking rules was a reasonable restriction on ownership rights, stating that the rules were designed to prevent the odor of cigarettes from penetrating the walls of neighboring condos.

Considering that there are a small number of people involved (three nonsmoking units, one smoking), you would think that transaction costs would be minimal. Why do you think the homeowners could not work out an agreement (*à la* Coase) and ended up in court? According to the Coase theorem, would it have made any difference if the judge had ruled against the HOA?

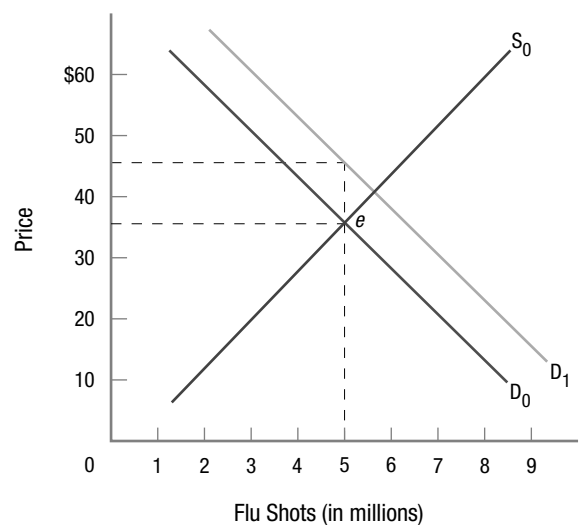
**Answer:** Working out an agreement was probably difficult for several reasons including the emotional bubble surrounding smoking (my right to smoke versus your right to breathe clean air; and my house is my house, and I'll do what I want). Because the four-condo complex was old, the costs to prevent smoke penetration were probably large. Either judgment would be efficient, but the distribution of benefits and costs would differ. Now, the smokers will have to quit smoking or sell their unit (presumably to nonsmokers, restricting the market somewhat). If the HOA had lost, the other owners could have paid the smoker to quit, bought and resold the property to nonsmokers, or rehabbed their condos enough to prevent smoking odor from penetrating the walls.

### Solving Problems

15. Suppose the market demand and supply for flu shots is shown in the figure below. Not taking into account the external benefits from flu shots, what is the equilibrium price and quantity of flu shots? Now suppose that every flu shot generates \$10 in external benefits (from others being less likely to get sick). Show how this positive externality affects the graph (draw in a new curve). Taking into account external benefits, what would be the new equilibrium price and quantity of flu shots?



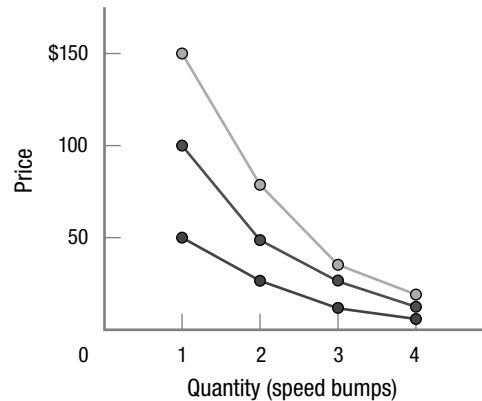
**Answer:** The market equilibrium is \$35 and 5 million flu shots. If an external benefit of \$10 is added, the social demand curve would be \$10 higher at every quantity. The new equilibrium (point  $e$ ) would be roughly \$40 and 5.7 million flu shots.



16. Suppose that the individual demand schedules for Al and Jane, the only two residents on a quiet city street, are shown in the table for speed bumps aimed at slowing cars passing through. In a single diagram, plot Al and Jane's individual demand curve, and then plot the total demand curve for each unit of the public good.

| Al       |                  | Jane     |                  |
|----------|------------------|----------|------------------|
| Quantity | Marginal Benefit | Quantity | Marginal Benefit |
| 1        | \$50             | 1        | \$100            |
| 2        | \$25             | 2        | \$50             |
| 3        | \$10             | 3        | \$25             |
| 4        | \$5              | 4        | \$10             |

**Answer:** The figure plots Al (blue dots) and Jane's (red dots) individual demand curves and the total demand curve (pink) through vertical summation.



### Using the Numbers

17. According to By the Numbers, between which two years did total sales of hybrid cars increase the most? What factors might have led to this rise in hybrid sales?

**Answer:** Hybrid cars sales increased the most from 2004 to 2005. Factors leading to the rise in hybrid sales include a spike in gas prices, an increase in hybrid production, tax incentives from the government, and other incentives such as states allowing hybrid cars with only one occupant to use high-occupancy (carpool) lanes on freeways.

18. According to By the Numbers, which two waste products are most recovered (recycled) by percentage, and which two waste products are least recovered?

**Answer:** The most recovered waste products are plastics and textiles (though rubber and leather is a very close third). The least recovered waste products are paper and paperboard, and yard trimmings.

## Chapter 14

### Check Your Understanding

1. What is a network externality and how does it differ from a typical externality?

**Answer:** A network externality is the increase in a product or service's value as more people buy or subscribe to it. A network externality benefits every user, including existing users and potential buyers, while a regular positive externality is a benefit conferred to a third party as a result of an action.

2. Explain why a network demand curve slopes upward for small quantities.

**Answer:** A network demand curve consists of all intersections between vertical short-run supply curves and their corresponding demand curves. Because network effects increase the demand as supply increases, the positive effect on price more than offsets the downward pressure on prices from the increase in supply (the price effect). This causes the price to rise when quantity is increased, creating an upward-sloping network demand curve. As the product matures, network effects become smaller due to diminishing returns.

3. List three strategies a firm can use to segment its market for a network good.

**Answer:** A firm can segment its market for a network good by versioning the good into multiple products, each targeting a different subset of customers with varying elasticities of demand. These versioning techniques include intertemporal pricing, peak-load pricing, and bundling.

4. True or False: Once a firm's network good becomes the market leader, it is extremely unlikely for the firm to lose that position within a five-year period. Explain.

**Answer:** False. A network good can enter into a vicious cycle and lose its leading market share in a very short period of time if a competing product enters into a virtuous cycle.

5. Why does the 3DTV industry exhibit large economies of scale? Would there also be network externalities in the consumption of 3DTVs? Explain.

**Answer:** The 3DTV industry invested billions of dollars to develop the TV, representing a huge fixed cost. The production of each subsequent TV, in comparison, is relatively small. When a good has a high fixed cost and low marginal cost, there exist significant economies of scale as the average cost of production falls as quantity produced rises. There also would be network effects in the consumption of 3DTVs. As more people buy 3DTVs, producers are likely to introduce more programming in that format, increasing the value to all 3DTV users.

6. If Matt wants to use his AT&T iPhone to call his girlfriend Sue, who uses a MyTouch from T-Mobile, why is interconnection necessary for the call to be completed?

**Answer:** Matt's iPhone and Sue's MyTouch are essential facilities to each person's respective wireless provider. In order for Matt to call Sue, T-Mobile must allow AT&T to complete a call on T-Mobile's network and ultimately Sue's MyTouch. An agreement to allow networks to access each other's equipment is called interconnection.

## Apply the Concepts

7. Suppose that two community organizations each plan their own public beach volleyball tournament on the same day at the same beach. Each organization wishes to have as many participants as possible. Further, a larger tournament is more fun for the participants. Suppose that a team consists of four players and at least four teams are required to hold a tournament. Explain what the tipping point would be and why a vicious cycle can develop if that number fails to be achieved.

**Answer:** In order to hold a tournament, there must be at least sixteen volleyball players participating. This represents the tipping point, because once one organization reaches this number, it can begin the tournament, which may attract more players who see the tournament in action. Meanwhile, if the other organization fails to reach sixteen players, its tournament cannot begin, and players who wait around may likely leave to participate in the other tournament. This will create a chain reaction where more and more players leave to attend the tournament that already met its minimum number of players. Note that it is possible to have both tournaments reach sixteen players; in this case, network effects can still occur if one tournament is better organized than the other. In this case, the less popular tournament may experience a vicious cycle as people switch to the other tournament.

8. If a person decides to unsubscribe from a popular social network, it decreases the value of the network to everyone else. Why wouldn't this action be considered a negative externality?

**Answer:** A person who decides to unsubscribe from a social network decreases the value of the network to everyone else. However, this decrease in value is the removal of the external benefit that the person created when he or she joined the network. By leaving, he or she is simply reversing the process. A negative externality occurs when a person imposes an actual cost onto another person. This is not occurring here; instead, a person is removing a benefit created earlier.

9. Suppose that an expansion of the productive capacity of a firm producing a network good reduces the average cost due to economies of scale, but generates a very large increase in demand due to the network effect. Is this good likely to be on the upward-sloping or downward-sloping portion of the network demand curve? Explain.

**Answer:** The expansion of capacity shifts supply to the right, which reduces prices, all else equal. However, if it also generated a large increase in demand due to network effects, this will increase prices. If the latter effect is stronger, the overall effect on price will increase when quantity increases, which means the good is on the upward-sloping portion of the network demand curve.

10. Suppose that a new Harry Potter book called *The Untold Stories of Harry Potter* is released for sale, and fans line up for days to be the first to buy it. Are these fans core users or casual users in their demand for the new book? How could the book publisher maximize its profit using intertemporal pricing?

**Answer:** Fans who are willing to wait in long lines to buy the new Harry Potter book are likely to be core users who have inelastic demand curves, which means they are less price sensitive. A book publisher can maximize its profit using intertemporal pricing by introducing a more expensive hardback

book targeting the core fans, then releasing a less expensive paperback book a couple months later for readers with more elastic demand curves who are willing to wait to save money.

11. Suppose that your bank opens up a dozen more automatic teller machines (ATMs) throughout the city, making it much easier to find one. What happens to the demand and supply curves for this network as it expands?

**Answer:** As the bank establishes more ATMs, the supply curve shifts to the right because a larger network is able to serve more customers. In addition, a network effect is created: As more ATMs are set up, customers find the bank more convenient and this leads to more customers, shifting demand to the right. An increase in customers provides an incentive for banks to establish even more ATMs, and so on. Unlike traditional goods, for which greater production shifts only the supply curve, a network good is one for which an increase in production (more ATMs) increases the overall value of the network, which increases demand as well.

12. Whenever a new car with satellite radio capability is purchased, the buyer is typically offered a free 90-day subscription to a satellite radio service such as SiriusXM. Explain why this offer would be considered a teaser strategy. Why wouldn't SiriusXM just charge a monthly subscription fee from the start?

**Answer:** Teaser strategies are offers used to attract new customers to a good or service. In this case, the free 90-day subscription entices customers to sign up for SiriusXM when they purchase a new car. Without the offer, consumers would be more likely to consider alternative options for music, such as connecting one's MP3 device to the car's speakers or listening to regular radio. By enticing customers to sign up and become hooked to the service, most will choose to renew their subscriptions after the free trial, resulting in greater profits for the firm in the long run.

### In the News

13. The 2006 introduction of Google Docs, an online alternative but compatible software to Microsoft Office, forced Microsoft to develop new ideas to maintain its dominant market share. BBC News (May 12, 2010) reported that "Microsoft Takes Aim at Google Docs" by introducing a new online component with its Office 2010 product that offers the same features as Google Docs but with the familiarity of the Office software format. Why would the ability of Google Docs to read and edit a file created using Microsoft Office potentially cause the price of Microsoft Office software to fall?

**Answer:** If Microsoft Office were incompatible with other software but was able to maintain a dominant market share, it would be able to charge a high price for its software. The existence of network compatibility, which allows competing firms such as Google Docs to sell products that are compatible with Microsoft, will create competition in the software market. Such competition will likely reduce prices for all word processing software.

14. Internet interconnection has become an important issue as countries improve their network infrastructure. According to the International Charging Arrangements for Internet Services (ICAIS) agreement, countries wishing to access U.S. Web sites or use U.S. backbones (Internet networks) must pay the full cost of interconnection (as opposed to, say, telephone interconnection, where each side shares the cost). Why would a country agree to this type of arrangement in the first place (in the 1990s), and what developments have taken place since then that would cause them to now oppose this arrangement?

**Answer:** The Internet was mostly developed in the United States. Therefore, in order for persons in other countries to gain access to U.S. networks (where most Web sites were based) or to even send email, users needed to rely on U.S. Internet backbones (networks). Thus, countries agreed to pay the full cost of interconnection to have access at all. Today, however, many countries have developed their own networks and host their own Web sites that benefit U.S. users; however, according to the ICAIS agreement, non-U.S. countries continue to pay all of the costs when interconnecting with U.S. networks.

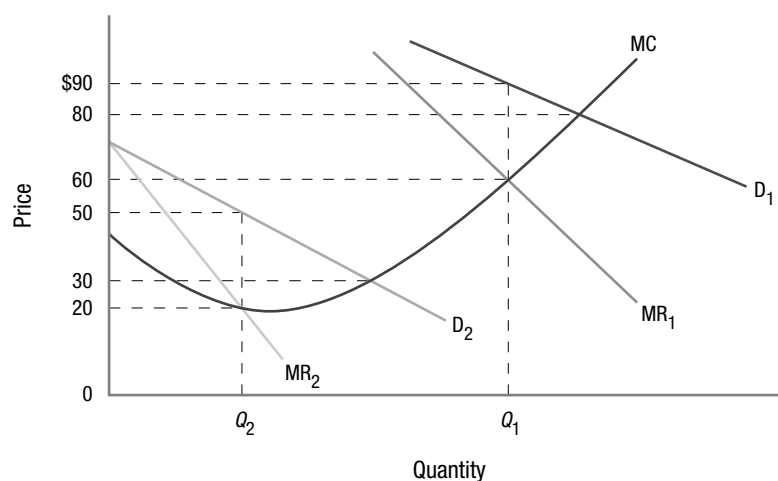


## Solving Problems

15. Suppose Ben values video game X at \$100 and video game Y at \$20, whereas Paul values video game X at \$30 and video game Y at \$80. The marginal cost to produce each game is \$0. If a firm that produces both games decides to bundle X and Y, what price should it charge, and why is this bundling strategy more profitable than selling each game separately at a single price (assuming price discrimination is not possible)?

**Answer:** If the firm wishes to sell each product separately, it will earn at most \$100 for the sale of game X (by pricing X at \$100 and selling only to Ben), while earning at most \$80 for game Y (by pricing Y at \$80 and selling only to Paul). The total profit for the firm would be \$180. However, if it bundles the two games, it can sell the bundle for \$110 (the highest combined price at which both Ben and Paul would buy the bundle). In this case, the firm would earn \$220, \$40 more than selling each good individually.

16. The accompanying figure shows two demand curves for ski lift tickets, one representing demand during February (peak season) and the other for April (low season). If the ski resort wishes to maximize its profit using peak-load pricing, what price should the ski resort set for lift tickets in February and what price should it set in April?



**Answer:** Demand curve  $D_1$  represents the demand in February, while demand curve  $D_2$  represents the demand in April. To maximize profit, the ski resort should set  $MR = MC$  in each period and set the price according to the demand curve at that quantity. Therefore, the ski resort should sell  $Q_1$  tickets in February at \$90 each, and sell  $Q_2$  tickets in April at \$50 each.

## Using the Numbers

17. According to By the Numbers, by what age category does the typical individual perceive television to be harder to live without than a mobile phone? By what age category does television become harder to live without than a computer?

**Answer:** Age category 29 to 42 and older tend to value television more than a mobile phone, and age category 43 to 52 and older tend to value television more than both a computer and mobile phone.

18. According to By the Numbers, in what year did Microsoft Word surpass WordPerfect in terms of market share? In what year did Google Docs surpass WordPerfect? What are the current trends (up or down) for each software program in the last year reported?

**Answer:** Microsoft Word surpassed WordPerfect in market share around 1994, and Google Docs surpassed WordPerfect around 2009. Microsoft Word and WordPerfect have been declining in market share, while Google Docs has been rising in market share.

## Chapter 15

### Check Your Understanding

1. If you look at income distribution over the life cycle of a family, would it be more equally distributed than for one specific year?

**Answer:** Yes. Over the life cycle of families, young people gain skills and see their incomes rise, moving them out of the lower brackets into middle or upper quintiles. Eventually earnings peak and family members retire, and they may slip down a quintile or two. All families have different life cycles, but the distribution over time will be more equal than at a specific point in time.

2. List some of the reasons why household incomes differ.

**Answer:** Family incomes differ because of inherited wealth, investment in human capital, physical and mental capabilities, discrimination, culture, attitudes, and luck. The reasons are complex, and this is why public policy in this area is so complex and clouded with emotion and politics.

3. How does the Gini coefficient differ from the Lorenz curve?

**Answer:** The Lorenz curve is a graphical device to depict the income or wealth distributions plotting the cumulative sum of quintile shares of income or wealth on the vertical axis and the cumulative sum of quintiles on the horizontal axis. The Gini coefficient is the ratio of the area between the Lorenz curve and the equal distribution line divided by the total area below the equal distribution line. Both use the same data, but the Lorenz curve is graphical, whereas the Gini coefficient provides a specific number representing inequality.

4. Currently the poverty threshold for a family of four is just over \$23,000 a year. What does this amount take into account and not take into account?

**Answer:** The poverty threshold takes into account the government's measurement of the cost of essential living expenses such as food, housing, clothing, and health care. The threshold is adjusted for inflation each year. The poverty threshold does not take into account geographical differences in the cost of living, nor differences in tax rates between states or between cities. It also does not take into account changes in the level of government benefits such as Medicaid and the Supplemental Nutrition Assistance Program (SNAP).

5. Are the poor in year 2014 just as poor as the poor in 1954? What has changed in 60 years to make poverty different today?

**Answer:** More of the poor today own their homes, own cars, have air conditioning, watch cable or satellite TV, use cell phones, and have better health care. Technology and lower prices resulting from international trade have increased the purchasing power of the poor, and many new safety net programs have been introduced over this half-century.

6. What are the primary factors that lead to poverty?

**Answer:** The primary factors that lead to poverty include low human capital (education), physical and mental disabilities, single parenthood, health care issues, a lack of work ethic, and an unwillingness to relocate.

### Apply the Concepts

7. Is there an efficiency-equity tradeoff when income is redistributed from the rich to the poor? Explain.

**Answer:** The efficiency-equity tradeoff exists in this instance because you are taking money from people who are working and earning to give to individuals who are not. The efficiency issue is one of work effort on both ends. Taxing money from those earning it reduces their incentive to work, while giving money to those not working gives them an incentive not to work as well. The equity side is that people not working or not earning enough money need that help to survive.

8. What do you think has been the impact on the distribution of income in the United States from the combined impact of the large number of unskilled illegal immigrants and the growing number of dual-earner households?

**Answer:** Both of these impacts probably account for a significant portion of the growing inequality of income in the United States. The more than 10 million unskilled illegal immigrants reduce earnings in the lower quintiles, while the dual-earner households increase the earnings in the upper quintiles.

9. It is probably fair to say that when we classify people as rich or poor at any given moment in time, we are simply describing similar people at different stages in life. Does this life cycle of income and wealth make the income distribution concerns a little less relevant? Why or why not?

**Answer:** Probably. It may not be the absolute distribution that is important, but how it is changing. A big change in the direction of inequality might be a reflection of a growing problem, but clearly life cycle effects do reduce the importance of one period views of the income distribution.

10. What would be the change in the distribution of income (Gini coefficient) if the United States decided to permit 10 million new immigrants into the United States who were highly skilled doctors, engineers, executives of large foreign firms, and wealthy foreigners who just want to migrate to the United States? How would the Gini coefficient change if, instead, the United States decided to permit 10 million unskilled foreign workers to enter?

**Answer:** With 10 million more high-income immigrants, the Gini coefficient would fall as more of the population's income would show up in the middle- and higher income groups. This would reduce the impact of the top group, making the distribution look more equal. Just the opposite would happen if more low-skilled, low-income individuals enter the United States. They would exaggerate the impact of upper-income groups and the Gini coefficient would rise.

11. Roughly half of all marriages in the United States end in divorce. What is the impact of this divorce rate on the distribution of income and poverty?

**Answer:** Immediately the household income is split between two families, which may take one middle-income family and create two lower-income families. Note also that the poverty thresholds include some assumption of household efficiencies because the thresholds grow slower as family size grows. Rising divorce rates would undoubtedly change both the distribution of income and levels of reported poverty.

12. Poverty rates have declined for blacks and have been relatively stable for everyone else over the last 40 years. But the poverty rate still hovers around 15%. What makes it so difficult to reduce poverty below 10% to 15% of the population?

**Answer:** There always seem to be people who are in poverty for a short period (the poor are not all the same people year after year) as they acquire the skills needed to earn wages above poverty levels. This particularly applies to immigrants and young people. These life-cycle aspects make it more difficult to get the poverty level below 10% to 15%. Lifestyle choices, disabilities, and discrimination are other reasons a certain level of poverty remains. Designing equitable and efficient policies to reduce poverty below this apparent floor is difficult, but clearly a worthwhile goal.

## In the News

13. In 2006 the Nobel Peace Prize went to economist Muhammad Yunus and the Grameen Bank "for their efforts to create economic and social development from below." Yunus led the development of micro loans to poor people without financial security: loans of under \$200 to people so poor they could not provide collateral, to use for purchasing basic tools or other basic implements of work. This helped to pull millions of people out of poverty. Discuss how economic prosperity and security for everyone can result in a more peaceful planet.

**Answer:** Economic development by individuals in the developing countries means that their children are more likely to be educated, to prosper, and be less likely to wage war with their neighbors. Micro credit (small loans to poverty-stricken people for self-development and small businesses) provides people with a stake in their communities, reducing poverty and promoting entrepreneurship, leading to a reduction in individual susceptibility to extremes in political and violent behavior. As the Nobel committee noted, "Lasting peace cannot be achieved unless large population groups find ways in which to break out of poverty."

14. According to the U.S. Department of the Treasury, people in the top income quintile (20%) pay roughly 70% of all federal income taxes, with the remaining 80% paying less than 30%. Further, the

bottom half of the population pays less than 10% of all taxes. Many politicians often assert that they want to bring tax relief (presumably with the idea of redistributing income) to “middle- and lower income” families. Given this distribution of income tax payments, what would middle- and lower income tax relief look like?

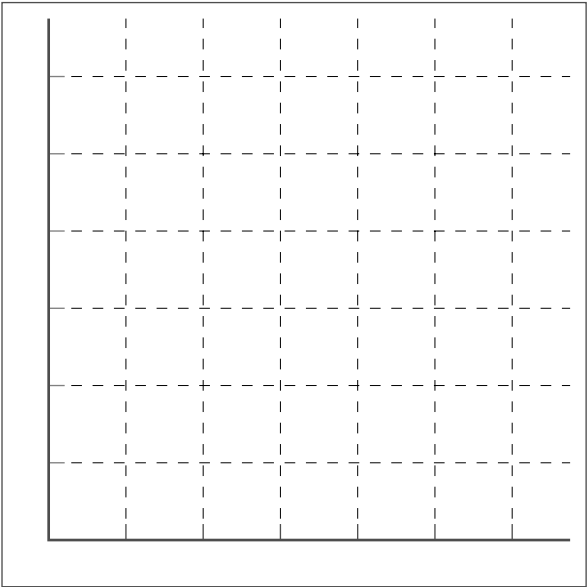
**Answer:** With such a small fraction of personal income tax payments coming from the bottom half of the income distribution, tax relief is an oxymoron. If the goal is to help low-income working Americans, that help might be better addressed with the earned income tax credit (EITC), whereby low-income families are given a credit that adds to their tax refunds, even if they owe no taxes. This credit, in effect, directly increases their income.

Solving Problems

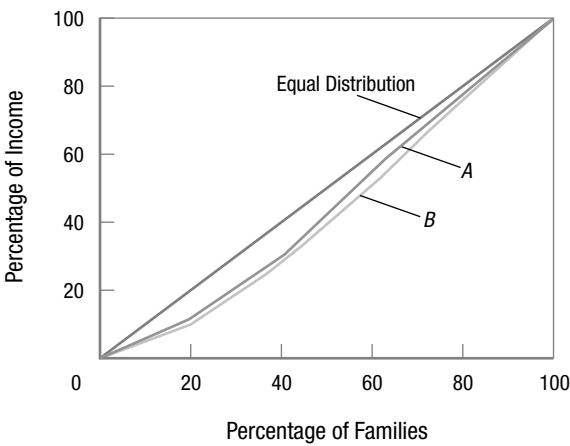
15. Use the two different distributions of income in the table below to answer the questions that follow.

| Quintile | <i>A</i> | <i>B</i> |
|----------|----------|----------|
| Poorest  | 11.2     | 10.5     |
| Second   | 12.0     | 11.6     |
| Middle   | 21.2     | 20.3     |
| Fourth   | 26.0     | 25.7     |
| Richest  | 29.6     | 31.9     |

- a. Use the grid below and graph the two Lorenz curves.
- b. Which curve has a more equal distribution?
- c. Are these distributions more or less equal than that for the United States today?



Answer:



- a. See graph above.
- b. Distribution A.
- c. Both of these are more equal than the distribution in the United States.

16. The following households each have four persons. Their annual incomes are as follows:

|                |          |
|----------------|----------|
| The Aikens     | \$25,600 |
| The Browns     | \$21,800 |
| The Carlyles   | \$18,500 |
| The Donaldsons | \$11,300 |

Assume that the poverty threshold for a household of four is \$23,000. Calculate the income deficit and the income-to-poverty ratio for each family. Classify each family as either not poor, near poor, poor, or severely poor.

**Answer:** The Aikens do not have an income deficit and their income-to-poverty ratio is 1.11. The Aikens are near poor. The Browns' income deficit is \$1,200 and their income-to-poverty ratio is 0.95. The Browns are poor. The Carlyles' income deficit is \$4,500 and their income-to-poverty ratio is 0.80. The Carlyles are poor. The Donaldsons' income deficit is \$11,700 and their income-to-poverty ratio is 0.49. The Donaldsons are severely poor.

Using the Numbers

17. According to By the Numbers, over what period of time did the gap between the full-time minimum wage earnings and the poverty threshold expand the most?

**Answer:** From 1997 to 2006 (when the federal minimum wage was \$5.15 per hour), the gap between full-time minimum wage earnings and the poverty threshold expanded the most.

18. According to By the Numbers, about how many Americans used food stamps (now known as SNAP benefits) in the year 2000? How about in the year 2012? (Hint: Use the approximate U.S. population of 300 million to calculate the answers for both years.)

**Answer:** In the year 2000, approximately 18 million Americans ( $6\% \times 300$  million) used food stamps. In the year 2012, the figure was approximately 45 million ( $15\% \times 300$  million).

Chapter 16

Check Your Understanding

1. How are business cycles defined? Describe the four phases of business cycles.

**Answer:** Business cycles are alternating increases and decreases in economic activity. Business cycles include a peak at the top of the cycle, then a downturn (or recession) as the economy cools off.

Eventually the economy reaches the bottom of the cycle, or the trough, followed by a recovery as business picks up and the economy heads toward another peak.

2. What is a key problem with the way the NBER dates recessions and recoveries?

**Answer:** A key problem is that the dating of recessions and recoveries is done *after* the events have already started. Therefore, it describes what has already happened and does not help to predict when future recessions will occur or when they will end.

3. Describe the circular flow diagram. Why must all income equal spending in the economy?

**Answer:** The circular flow diagram shows how the product and factor markets interact to produce goods and services and pay the factors of production. Ignoring some of the statistical measurement difficulties, when goods or services are produced and sold, that spending must somehow be split among the factors of production (and payments to): labor (wages), land (rent), capital (interest), and entrepreneurial activity (profits).

4. Why does GDP accounting include only the final value of goods and services produced? What would be the problem if intermediate products were included?

**Answer:** GDP accounting adds up only the final value of goods and services to avoid “double counting.” When a car is sold, the final price on the lot includes the sum of the costs of the individual parts, and to count them again would be to count them twice. For example, a \$28,000 Toyota Prius has tires that Toyota paid \$240 for, plus other parts that add up to, say, \$15,000. We would not want to increase GDP by \$43,240 (\$28,000 + \$15,000 + \$240) when the car is sold; that \$15,240 in parts is already included in the \$28,000 retail price.

5. Describe why GDP can be computed using either expenditures or income.

**Answer:** All spending in the economy necessarily equals payments to all of the factors of production. A dollar spent adds up to a dollar in wages, interest, rents, or profits.

6. What does GDP per capita measure? Why is it not a precise measure of a typical person’s standard of living in a country?

**Answer:** GDP per capita measures the total output of an economy divided by its population. Although GDP per capita provides a general indication of the standard of living of a country, it is not a precise measure because it does not take into account differences in income distribution. Therefore, a rich country in terms of GDP per capita can have many poor citizens.

## Apply the Concepts

7. Explain how it is possible for an economy in the recovery phase of the business cycle to have a lower GDP and a higher unemployment rate than when it was in the recession phase of the business cycle.

**Answer:** An economy in a recovery phase is one that has reached its low point (trough) when GDP has decreased and unemployment has increased. Therefore, in the early part of the recovery phase, an economy might not have had enough time to increase its GDP or reduce its unemployment. In this case, GDP and unemployment may appear worse during the recovery than during the recession.

8. Assume the federal government runs huge budget deficits today to finance, say, Social Security, Medicare, and other programs for the elderly, and finances these deficits by selling bonds, which raises interest rates. Because businesses often borrow money to invest, and interest is the cost of borrowing, these higher interest rates will reduce investment. Describe why this scenario is likely to be bad for the macroeconomy.

**Answer:** Spending on the elderly today does little to improve the economy of the future. Reduced investment today means lower GDP in the future because investment in new capital, employee training, and research and development mean higher output, higher salaries, and more new products and services in the future. Further, sometime in the future, taxes must be raised to pay off the bonds or continue paying interest.

9. Critics argue that the NIPA are outdated and fail to account for “intangibles” in our new knowledge economy. For example, many firms create copyrighted materials (movies, books, etc.) that when completed are much more valuable than just the value of the marketplace inputs that went into their production. What might be some of the problems associated with trying to include these intangibles in the NIPA?

**Answer:** The principal problem is estimating the value of these intangibles. How much is an unlicensed patent worth? If something takes several years to develop, how could we account for a project's "value" before it is completed, not knowing if it will be completed or if it will be accepted by the market? For many intangibles, reasonable estimates could be made and included in GDP, making it a more accurate statistic of our national output.

10. Gross domestic product and its related statistics are published quarterly and are often revised in the following quarter. Do you think quarterly publication and revision in the next quarter would present problems for policymakers trying to control the business cycle? Why or why not?

**Answer:** Only getting GDP and related data quarterly makes policymaking more difficult. We could conceivably be six months into a recession before policymakers are sure of the data. Consequently, they must rely on other economic data to confirm that the economy is turning downward, and because of these information lags, whatever action they take may be too late or too little, or actions are taken at the same time the economy is turning in the other direction, causing policies to heighten the business cycle.

11. Gross private domestic investment (GPDI) includes new residential construction as investment. Why is new housing included? Isn't this just another consumer purchase of housing services? How would the sale of an existing house be treated in the GDP accounts?

**Answer:** New residential construction is included in investment because of the long life of housing; you don't consume the entire housing services of a new house in the year of purchase. Sales of existing houses are not included in GDP, because GDP measures new production in that year.

12. Assume that we are able to account for environmental degradation in the NIPA accurately. Rank the following countries by the percent reduction to their GDP (from least to most percentage reduction): the United States, China, and Norway.

**Answer:** Norway, United States, China. (China is just now beginning to develop environmental policies to deal with air pollution from burning coal and other problems associated with its rapid growth and industrialization.)

## In the News

13. A headline in the January 27, 2012, *USA Today* read "Economists See Growth Slowing, Recession Risk Falling," highlighting government statistics that showed economic growth slowing to a 2.2% rate for the year, below previous estimates. If economic growth is slowing, wouldn't this suggest that another recession is likely to occur soon? Explain why the headline would suggest the opposite.

**Answer:** Just because economic growth is slowing does not mean that another recession will occur quickly. Although economic growth slowed in 2012, it was still positive and comfortably so. Economists believed that the economy was still on a path of recovery, and any short-term dips were not likely to cause growth to become negative for two quarters, the measurement needed in order for another recession to occur.

14. According to the *Happy Planet Index*, an annual survey conducted by the New Economics Foundation, Costa Rica ranks as the happiest country on Earth ("Take a Trip to the Happiest Country on Earth," *Forbes*, October 1, 2012). The index takes into account a number of factors including the quality of life and life expectancy, but most important the index values the sustainability of the environment, which it argues "establishes an undeniable link between happiness and the environment or nature." The World Bank estimates that Costa Rica's GDP per capita in 2012 was approximately \$8,800, about one-fifth that of the United States. Explain why GDP per capita does not always correlate well with a country's standard of living.

**Answer:** A country's GDP per capita provides a rough impression of a country's average standard of living. Clearly, a country with a very high GDP per capita (such as Luxembourg) would offer its citizens a better life than a country with a very low GDP per capita (such as Ethiopia). However, GDP per capita does not take into account all factors affecting standard of living. First, it does not account for income inequality. Second, it does not consider nonmonetary aspects, such as the climate, the environment, and natural beauty. Third, it does not measure how countries prioritize their spending. For example, Costa Rica chose not to have an army, allowing the government to increase spending on education, health care, and environmental conservation, programs that lead to a better standard of living.

## Solving Problems

15. The table below lists gross domestic product (GDP), consumption (C), gross private domestic investment (I), government spending (G), and net exports ( $X - M$ ). Compute each as a percent of GDP for the five years presented.

| Year | GDP     | C      | I      | G      | $X - M$ | C (%) | I (%) | G (%) | $X - M$ (%) |
|------|---------|--------|--------|--------|---------|-------|-------|-------|-------------|
| 1965 | 719.1   | 443.8  | 118.2  | 151.5  | 5.6     |       |       |       |             |
| 1975 | 1638.3  | 1034.4 | 230.2  | 357.7  | 16      |       |       |       |             |
| 1985 | 4220.3  | 2720.3 | 736.2  | 879    | -115.2  |       |       |       |             |
| 1995 | 7397.7  | 4975.8 | 1144   | 1369.2 | -91.4   |       |       |       |             |
| 2005 | 12455.8 | 8742.4 | 2057.4 | 2372.8 | -716.7  |       |       |       |             |

- a. Which component of GDP is the most stable? Look for the smallest change from the year with the smallest contribution to GDP to the year with the largest contribution.
- b. Which is the most volatile as a percent of GDP?
- c. Ignoring net exports, which component has grown the fastest as a percent of GDP since 1965?

**Answer:**

| Year | GDP     | C      | I      | G      | $X - M$ | C (%) | I (%) | G (%) | $X - M$ (%) |
|------|---------|--------|--------|--------|---------|-------|-------|-------|-------------|
| 1965 | 719.1   | 443.8  | 118.2  | 151.5  | 5.6     | 61.72 | 16.44 | 21.07 | 0.78        |
| 1975 | 1638.3  | 1034.4 | 230.2  | 357.7  | 16      | 63.14 | 14.05 | 21.83 | 0.98        |
| 1985 | 4220.3  | 2720.3 | 736.2  | 879    | -115.2  | 64.46 | 17.44 | 20.83 | -2.73       |
| 1995 | 7397.7  | 4975.8 | 1144   | 1369.2 | -91.4   | 67.26 | 15.46 | 18.51 | -1.24       |
| 2005 | 12455.8 | 8742.4 | 2057.4 | 2372.8 | -716.7  | 70.19 | 16.52 | 19.05 | -5.75       |

- a. Consumption ( $70.19 \div 61.72 = 1.14$ ).
- b. Net exports, followed by investment.
- c. Consumption went from 61.72 to 70.19.
16. Using the data below (given in millions of \$U.S.), compute GDP, national income, and net domestic product.

|   |       |
|---|-------|
| Corporate profits                             | 1,200 |
| Gross private domestic investment             | 2,000 |
| Consumption of nondurable goods               | 3,000 |
| Exports                                       | 1,200 |
| Proprietors' income                           | 900   |
| Taxes, imports, and miscellaneous adjustments | 800   |
| Consumption of services                       | 4,000 |
| Net interest                                  | 550   |
| Compensation of employees                     | 7,000 |
| Change in inventories                         | 80    |
| Imports                                       | 1,800 |
| Rental income                                 | 150   |
| Government spending                           | 2,000 |
| Consumption of durable goods                  | 1,000 |
| Capital consumption allowance                 | 1,500 |

**Answer:**  $GDP = C + I + G + (X - M) = (3,000 + 1,000 + 4,000) + 2,000 + 2,000 + (1,200 - 1,800) = 12,000 - 600 = 11,400$

$NI = 7,000 + 900 + 150 + 1,200 + 550 + 800 = 10,600$

Net Domestic Product =  $11,400 - 1,500 = 9,900$



## Using the Numbers

17. According to By the Numbers, in what year since 2005 was the difference between the unemployment rate and the real GDP growth rate the largest? What phase of the business cycle would this year best represent?

**Answer:** The difference between the unemployment rate and real GDP growth was largest in 2009, which represented the trough of the business cycle when the economy was at its lowest point.

18. According to By the Numbers, has the personal savings rate trended upward or downward during the last five economic recessions? Why does this trend occur?

**Answer:** In each of the last five recessions, the personal savings rate has trended upward. During economic downturns, consumers tend to save more to prepare for possible layoffs or reductions in wages.

## Chapter 17

### Check Your Understanding

1. Describe the three measures of inflation in use today and the focus of each measure.

**Answer:** The three measures are the consumer price index (CPI), producer price index (PPI), and the GDP deflator. The CPI focuses on retail prices to consumers. The PPI reflects prices received by domestic producers at the wholesale level. The GDP deflator is the broadest measure of inflation; it includes all goods and services covered by the national income and product accounts.

2. Who loses from unanticipated inflation? Who benefits?

**Answer:** Workers lose temporarily (until adjustments are made over a longer time period), because the goods and services they buy have gone up in price. Creditors lose because inflation has reduced the value of the payments they receive. However, persons with fixed interest rate loans benefit from unanticipated inflation, because the real value of the loan payments are lower.

3. Describe the possible losses to our society and the economy when people are unemployed.

**Answer:** The economy loses the output and income from those unemployed. Although the unemployed lose income directly, we (the economy) lose jobs as well because the unemployed would have spent most of their earnings, resulting in greater employment and income. For those who want to work, not being able to find a job is a serious psychological loss.

4. Why do teenagers and young people have high unemployment rates?

**Answer:** Teenagers and young people in general have not had enough time to acquire the kinds of skills that are associated with lower unemployment rates (college education, professional training, or trade skills beyond the apprenticeship period).

5. Describe the three types of unemployment. What types of government programs would be most effective in combating each type of unemployment?

**Answer:** Frictional, structural, and cyclical. A job-matching employment service would reduce search time for the frictionally unemployed. Extensive job training and retraining programs would be most useful for structurally unemployed people. Cyclical unemployment is minimized with good monetary and fiscal policies to reduce the swings in the business cycle.

6. What is required for a person to be considered unemployed? How is the unemployment rate computed?

**Answer:** To be unemployed, you must not have a job, but must be available for work and have been actively seeking work in the previous four weeks. The unemployment rate is the number of unemployed divided by the labor force (the sum of the numbers of employed and unemployed).

### Apply the Concepts

7. You have several student loans that have interest rates that change every year. After graduation, you can consolidate these loans into a fixed rate single loan. You can consolidate now or one year from now. How do your expectations of the inflation rate during the next year affect your decision when to consolidate?

**Answer:** If the inflation rate is expected to rise, interest rates will likely rise as well; therefore, you should consolidate your student loans now in order to lock in a lower interest rate. However, if inflation is expected to fall, interest rates may fall, making it wiser to wait until next year before consolidating the loans.

8. Suppose you work hard at a job after graduation and after your first year, your effort is rewarded with a 3% raise when the average wage increase in your company is 2%. Then, the government releases its inflation report and says that inflation is running at 5%. Given this information, did your standard of living improve? Why or why not?

**Answer:** No, your real income actually fell, because your 3% raise is smaller than the 5% average rise in prices. Therefore, the purchasing power of your income (even with the 3% raise) is less than it was last year when the price level was lower.

9. Since 1980, the U.S. population has grown 38%, while employment has increased by 45%. Further, the number of people unemployed has risen only 15%. Are all of these indicators a sign of a strong or weak labor market?

**Answer:** More people in the population have entered the labor force and are employed. Although the economy has suffered through two serious recession (1981–1982 and 2007–2009) and two mild recessions, the fact that employment has increased by more than 45% while unemployment has grown in absolute numbers by 15% suggests that this has been a period representing a remarkably strong economy. No economy has a perfect record over time, but the United States has had a great run over the last 35 years.

10. Assume you just lost your job and have decided to take a monthlong break to travel to Europe before looking for a new position. Just as you return home from your trip, you are interviewed by the Department of Labor about your employment status. How would you be classified (employed, unemployed, or not in the labor force)?

**Answer:** Not in the labor force. You were not actively seeking work over the past four weeks.

11. The Bureau of Labor Statistics categorizes unemployed people into several groups, including job leavers, job losers, and discouraged workers. During a mild recession, which group would tend to increase the most? During a deep recession? During a boom?

**Answer:** During a mild recession, the number of job losers would probably increase the most, but when the recession is deep, the number of discouraged workers would grow quite fast. In a boom, the number of job leavers would grow as people change jobs with ease.

12. In the beginning of a recovery after a recession, employment begins to rise and the news media report these data on job growth. Would such a report have an impact on the labor force? Would it affect the unemployment rate?

**Answer:** When news of job growth is reported, workers who had given up looking for work during the recession are likely to reenter the work force, which increases the size of the labor force. If the number of new jobs does not keep up with the growth of the labor force, the unemployment rate can actually rise despite the job growth.

## In the News

13. In early 2013, when the United States came close to experiencing a “fiscal cliff,” one politician proposed introducing a trillion dollar coin to be minted by the government and sent to the U.S. Treasury to pay down the federal deficit (“Economics Is Platinum: What the Trillion-Dollar Coin Teaches Us,” Bloomberg.com, January 14, 2013). If such a coin were to be minted, what would be the likely effects on inflation? Is this a risk-free way of paying off a fiscal deficit? Why or why not?

**Answer:** Minting a trillion dollar coin is nothing more than printing money to pay off debts, a process called monetizing debt. If the coin is not circulated, the immediate effects on inflation would not be significant. However, all money is neutral. This means that by increasing the money in the economy (even if it is not actually circulated), pressures on prices will rise in the long run, leading to higher inflation. Therefore, the deficit is paid for through an inflation tax, which means consumers pay more for the goods and services they buy as a result of the higher price level.

14. Federal unemployment benefits were extended in 2013, allowing unemployed workers to receive up to 73 weeks of benefits depending on the unemployment rate of each state. This is an extension of a program that at its peak during the last recession offered up to a maximum of 99 weeks of unemployment benefits. How does extending the federal unemployment benefit program influence the unemployment rate?

**Answer:** In order to qualify for unemployment benefits, an unemployed worker must be actively seeking employment, which means he or she is counted as part of the unemployment statistics. Therefore, offering a longer period of benefits provides an incentive for unemployed workers to be more selective when looking for work, which may increase the unemployment rate. If unemployment benefits are reduced, the opposite might occur if workers feel pressured to take the first job available to them, even at a lower wage than their previous job. This would reduce the unemployment rate. Also, if benefits are reduced and this forces workers out of the labor market (for example, if they choose to retire early or decide to return to school full-time to pursue another degree), the unemployment rate might fall further. In general, more generous unemployment benefits tend to increase the unemployment rate. Evidence from Europe (which has some of the world's most generous unemployment benefits but also relatively high unemployment) confirms this trend.

### Solving Problems

15. In January 1980, the CPI stood at 77.8, and by January 2006, it was 198.3. By what percent have consumer prices increased over this period? Assume college graduates entering the job market were being paid on average \$1,200 a month in 1980, and in January 2006 the average was \$3,000. Were these newer graduates paid more or less after adjusting for inflation?

**Answer:** By 154.9%. For our hypothetical example, adjusted for inflation, college graduates in 1980 were paid \$1,542 a month ( $\$1,200 \div .778$ ), and by January 2006, they received \$1,512 ( $\$3,000 \div 1.983$ ). Adjusted for inflation, college graduates were paid less in 2006 than in 1980.

16. Given the data for the United States between 1960 and 2010, complete the table below and answer the questions that follow.

| Year | GDP<br>(billions of<br>dollars) | GDP Deflator<br>(2000 = 100) | Real GDP<br>(billions of<br>2000 dollars) | Population<br>(millions) | Real GDP per<br>Capita<br>(billions of<br>2000 dollars) |
|------|---------------------------------|------------------------------|---|--------------------------|---|
| 1960 | 526.4                           | 20.04                        | _____                                     | 180.7                    | 14,537  |
| 1970 | 1,038.5                         | _____                        | 3,772.3                                   | 205.1                    | _____   |
| 1980 | _____                           | 54.06                        | 5,109.0                                   | _____                    | 22,437  |
| 1990 | _____                           | 81.61                        | _____                                     | 250.1                    | 28,432  |
| 2000 | 9,817.0                         | _____                        | 9,817.0                                   | 282.4                    | _____   |
| 2010 | 14,498.9                        | 125.14                       | _____                                     | 308.7                    | _____   |

- a. Between 1960 and 2010:
  - i. GDP was how many times larger in 2010 than in 1960?
  - ii. The price level was how many times larger in 2010 than in 1960?
  - iii. Real GDP was how many times larger in 2010 than in 1960?
  - iv. What is the relationship between these values?
- b. What was the percentage change in real GDP per capita between 1960 and 2010? Were people in the United States better off in 2010 than in 1960?
- c. What are some of the problems associated with using real GDP per capita as a measure of our well-being?

Answer:

| Year | GDP<br>(billions of<br>dollars) | GDP Deflator<br>(2000 = 100) | Real GDP<br>(billions of<br>2000 dollars) | Population<br>(millions) | Real GDP per<br>Capita<br>(billions of<br>2000 dollars) |
|------|---------------------------------|------------------------------|---|--------------------------|---|
| 1960 | 526.4                           | 20.04                        | 2,626.8                                   | 180.7                    | 14,537  |
| 1970 | 1,038.5                         | 27.53                        | 3,772.3                                   | 205.1                    | 18,393  |
| 1980 | 2,789.5                         | 54.06                        | 5,109.0                                   | 227.7                    | 22,437  |
| 1990 | 5,803.1                         | 81.61                        | 7,110.8                                   | 250.1                    | 28,432  |
| 2000 | 9,817.0                         | 100.00                       | 9,817.0                                   | 282.4                    | 34,763  |
| 2010 | 14,498.9                        | 125.14                       | 11,586.1                                  | 308.7                    | 37,532  |

- a. i.  $14,498.9/526.4 = 27.54$   
 ii.  $125.14/20.04 = 6.24$   
 iii.  $11,586.1/2,626.8 = 4.41$   
 iii. The general relationship among GDP, the price level, and real GDP is  $\text{GDP} = \text{real GDP} \times \text{price level}$ . Therefore, the changes in the three variables from 1960 to 2010 should be the same. To verify,  $27.54 = 6.24 \times 4.41$ .
- b.  $[(37,532 - 14,537)/14,537] \times 100 = (22,995/14,537) \times 100 = 158.2\%$ . Yes, average real incomes were much higher in 2010 than in 1960.
- c. This is an average number for the economy and doesn't reflect any changes in the distribution of income and wealth. GDP per capita reflects output and ignores the economy's impact on the environment. These and other issues were discussed in the previous chapter.

## Using the Numbers

17. According to By the Numbers, which of the previous four presidents (R. Reagan, G. H. W. Bush, B. Clinton, G. W. Bush) saw a fall in the Misery Index from the year he entered office to the year he left? Which presidents saw a rise in the Misery Index?

**Answer:** The Misery Index fell during Reagan's and Clinton's terms in office. During G. H. W. Bush and G. W. Bush's terms, the index was relatively flat but ended slightly higher.

18. Using the By the Numbers, compare the increase in the average prices of tuition at public and private colleges and universities with the increase in overall prices according to the consumer price index from 2001 to 2012.

**Answer:** According to the consumer price index, the average level of prices rose about 30% from 2001 to 2012. The average tuition at private colleges and universities, however, rose about 56% over this same period, and the average tuition at public colleges and universities rose about 87% over this period. Clearly, the cost of a college education rose much faster than the overall rate of inflation.

## Chapter 18

### Check Your Understanding

1. Although abundant natural resources can be a blessing to a country, are they necessary to ensure economic growth and a prosperous economy?

**Answer:** Natural resources are helpful, but not necessary to have a vibrant and prosperous economy. Japan and Singapore are clear examples of countries without any significant resources that have high standards of living. These countries do have large numbers of well-educated productive people who have contributed to growth.

2. Why does a small difference in the economic growth rate lead to big differences over time?

**Answer:** The power of compounding makes small differences larger over time, because growth builds upon previous growth.

3. What are some ways countries can improve labor productivity?

**Answer:** Through training, education, greater capital, and technology.

4. In what ways do governments help to build technology and ideas?

**Answer:** By supporting colleges and universities, and students directly with loans and grants, research centers, grants to individuals and companies, and by protecting and enforcing property rights (including intellectual property such as inventions and ideas).

5. Why is investment in human capital good for both individuals and fostering economic growth for the economy as a whole?

**Answer:** Investment in human capital such as education increases the standard of living for individuals as they become more productive and earn more throughout their working lives. For the economy as a whole there are positive spillovers from more productive workers. Also, higher levels of education mean more workers are more able to use and create improving technologies.

6. Why is a stable financial system important to economic growth?

**Answer:** When a country's financial sector is subject to frequent crises or the currency is subject to wide fluctuations in value, businesses and consumers find their normal activities interrupted. This leads to economic uncertainty and reduces investment in productive activities. Lower investment, and other poor economic decisions because of financial uncertainties, reduce a country's overall growth rate.

## Apply the Concepts

7. The standard of living we enjoy today is largely due to the investments of earlier generations of Americans. Do you agree? Why or why not?

**Answer:** Without the investments of past generations in infrastructure (roads, dams, etc.), and investments in education and schools, for example, the U.S. economy would be considerably smaller today and our standard of living would be lower.

8. What role might foreign investment play in helping developing nations improve their growth rate and increase income levels?

**Answer:** Foreign investment can help to jumpstart an economy. Areas where the population is poor can benefit from the jobs and income that foreign investment provides. As income grows, other firms develop to provide services and goods to the employees of these foreign firms—now with higher incomes. But for many countries, this is a balancing act to assure that foreign companies add to economic growth and development without exploiting natural resources or creating environmental problems. The goal is to see that these firms leave a permanent increase in economic growth and prosperity.

9. Higher levels of savings and investment lead to greater rates of economic growth. What can government do to encourage more savings and investment?

**Answer:** Saving can be encouraged by making more savings not subject to taxation. The 401(k) accounts used for private pensions in the United States are an example. Focusing taxation more on consumption (sales taxes) rather than income will encourage saving. Investment can be encouraged by tax policy as well. Using investment tax credits that are an offset to tax liabilities reduces the cost of investing, resulting in more. Also, investment by government in basic research can often result in more research by private companies to turn these basic discoveries into potential products. For example, the Human Genome Project started by the U.S. government has led to significant research and development by the drug industry into new treatments and drugs.

10. Per capita income (or output) is the general measure used to compare the standards of living between countries. If a country's population growth is higher than its economic growth, what happens to per capita income? What are some of the limitations to using per capita income as a measure to compare the well-being of different countries?

**Answer:** If population growth exceeds economic growth, per capita income will decline—more people to spread the slower growing pie. Per capita income is a reasonable measure to compare countries, but not perfect. Economic freedoms also add to the quality of life, and governments provide different levels of services (holding per capita income the same), and these add to standards of living. Peter T. Bauer suggested that the birth of a cow adds to per capita GDP, but the birth of a child subtracts from it; something here is not quite right.

11. In 1988, Nobel Prize–winner Robert Lucas suggested that differences in growth rates between Egypt and India raise the most fundamental economic question of what causes economic growth. What makes this issue of growth so important? Is a long-term growth rate of 1.4% so different from 3.4%?

**Answer:** Growth influences the standard of living of citizens in a country. The effects of small differences in economic growth are magnified over a greater period of time. Twenty-five years ago, Egypt was much wealthier than India in terms of GDP per capita. However, higher growth rates in India over this period allowed the country to catch up. Today, the standards of living in the two countries are similar, but India maintains a higher growth rate. Just a 2% difference in economic growth can lead to one country being “rich” and another being “poor” in 50 years.

12. One of the potential negative consequences of both economic and population growth is that we will eventually exhaust the Earth’s natural resources, leading to our demise. What kind of activities might prevent this from happening?

**Answer:** As economies grow and per capita income rises, population growth rates typically fall, further adding to income, further slowing population growth. This may keep population from covering all of the Earth. As economies grow and prosper, the usage of resources becomes more efficient. Energy is an example—poor societies rely on wood, and as income grows, coal and oil take over, and then power plants dispense power more efficiently as income grows even further. Today, with higher energy prices, alternatives such as the sun and the wind may eventually provide considerable power. On the usage side, more energy-efficient lightbulbs, for example, are making energy use more efficient. Technology can reduce the quantity of natural resources needed for modern products and reduce our overall usage.

## In the News

13. Severe budget cuts at the federal and state level caused Education Secretary Arne Duncan to warn Congress about the long-term effects of education cuts on global competitiveness and economic growth (“Duncan Warns Congress on Impact of ‘Sequestration’ on Education Programs,” *Washington Post*, February 14, 2013). In 2013, nearly two-thirds of states still spent less money on education per student than in 2008; meanwhile, other countries in Europe and Asia have increased spending on education despite the economic downturn. If the reduction in education spending in the United States does in fact slow economic growth, explain why the effects of the slower growth will be felt much more by your grandchildren than by you today.

**Answer:** If a reduction in education spending reduces the growth rate of our economy, it would have little impact on our standard of living today, because the effects of economic growth extend over time. Therefore, that lower growth rate compounded over the next 50 years would mean a significantly lower standard of living for the next generation and beyond.

14. Energy independence has been a goal for each of the presidential administrations since Richard Nixon in the 1970s (“U.S. Inches Toward Goal of Energy Independence,” *The New York Times*, March 22, 2012). But the increased focus on alternative energy sources, such as natural gas, wind, water, and solar, along with greater emphasis on fuel-saving technology (hybrid and plug-in cars) has only taken on greater significance in the last decade. How does achieving energy independence contribute to labor productivity and economic growth?

**Answer:** Achieving energy independence, either by the development of alternative fuels or by increasing the efficiency of energy consumption, leads to job growth and reduced costs of production. Reduced reliance on foreign energy sources shifts the jobs to domestic industries, while increased energy efficiency improves the productivity of labor in nearly all industries. Therefore, the combination of increased job growth and greater labor productivity is likely to contribute to stronger economic growth.

## Solving Problems

15. Suppose you receive a stock tip that allows you to earn a 14% annual return. At this constant rate, about how long will it take to double your money using the Rule of 70?

**Answer:** Using the Rule of 70, a 14% annual return will allow an investment to double every  $70/14 = 5$  years.

16. Suppose a new colony is created on the moon with the following production function:  $\text{output} = A \times (L + K + H + N)$ . If  $L$ ,  $K$ ,  $H$ , and  $N$  each equal 5, and technology ( $A$ ) equals 3, how much output would this new colony produce?

**Answer:** Plugging the numbers into the production function,  $\text{output} = 3 \times (5 + 5 + 5 + 5) = 3 \times 20 = 60$ .

## Using the Numbers

17. According to By the Numbers, approximately how many years did it take for real GDP per capita in the United States to double from \$5,000 to \$10,000? How about from \$25,000 to \$50,000? During which period was economic growth stronger in terms of annual growth?

**Answer:** It took about 60 years (from 1870 to 1930) for real GDP per capita to double from \$5,000 to \$10,000, but only about 40 years (from 1970 to 2010) to double from \$25,000 to \$50,000. In terms of annual growth, the latter period was stronger because it took fewer years to double income.

18. According to By the Numbers, what is the range of life expectancies for the countries whose GDP per capita was less than \$5,000 in 2012? Compare these life expectancies with those with GDP per capita greater than \$35,000. Is there a strong correlation between GDP per capita and life expectancy?

**Answer:** Countries with GDP per capita less than \$5,000 had life expectancies ranging from 46 to 65 years. Countries with GDP per capita greater than \$35,000 all had life expectancies greater than 75 years. Yes, a positive correlation exists between GDP per capita and life expectancy.

# Chapter 19

## Check Your Understanding

1. Describe the important difference between the average propensity to consume (APC) and the marginal propensity to consume (MPC).

**Answer:** The APC is how much an individual consumes out of total income ( $C/Y$ ), whereas the MPC is the change in consumption associated with a change in income ( $\Delta C/\Delta Y$ ).

2. List the factors that influence an individual's marginal propensity to consume.

**Answer:** Income, wealth, expectations about future prices and income, household debt, and taxes.

3. Explain why we wouldn't expect investment to grow sufficiently to pull the economy out of a depression.

**Answer:** When the economy falls into a depression, consumption falls so significantly that business can't sell all it can produce and inventories grow more than expected. With such excess capacity, few businesses are willing to invest in new capacity to produce more that can't be sold.

4. Define the simple Keynesian multiplier. Describe why a multiplier exists.

**Answer:** The multiplier is equal to  $1/(1 - MPC) = 1/MPS$ . The multiplier exists because an initial expenditure becomes someone's income and a portion of this new income is spent and some is saved. This new spending ( $MPC \times \text{new income}$ ) now becomes someone else's income to be spent, and so on.

5. Explain why a \$100 reduction in taxes does not have the same impact on output and employment as a \$100 increase in government spending.

**Answer:** When taxes are reduced by \$100, this is essentially the same as income rising by \$100. Some of this increase in income is spent (consumed), and some is saved. Thus, the initial impact of the tax reduction is muted by the portion that is saved, reducing the ultimate impact on the economy.

6. How do injections and withdrawals into an economy affect its income and output?

**Answer:** Injections include investments, government spending, and exports, which boost aggregate expenditures by the initial injection magnified by the multiplier, leading to higher income and output. Withdrawals include savings, taxes, and imports (purchases of foreign goods instead of domestic goods), which reduce aggregate expenditures, leading to lower income and output.

### Apply the Concepts

7. Assume a simple Keynesian depression economy with a multiplier of 4 and an initial equilibrium income of \$3,000. Saving and investment equal \$400, and assume full employment income is \$4,000.
  - a. What is the MPC equal to? The MPS?
  - b. How much would government spending have to rise to move the economy to full employment?
  - c. Assume that the government plans to finance any spending by raising taxes to cover the increase in spending (it intends to run a balanced budget). How much will government spending and taxes have to rise to move the economy to full employment?
  - d. From the initial equilibrium, if investment grows by \$100, what will be the new equilibrium level of income and savings?

**Answer:**

- a. With a multiplier of 4,  $MPC = 0.75$ , and  $MPS = 0.25$ .
  - b. The income gap is \$1,000, therefore with a multiplier of 4, government spending would have to rise by \$250.
  - c. The balanced-budget multiplier is equal to 1, therefore government spending and taxes would each have to rise by \$1,000.
  - d. The multiplier is 4, therefore income rises by \$400 to \$3,400, and saving and investment will be equal to \$500.
8. Other than reductions in interest rates that increase the level of investment by businesses, what factors would result in higher investment at existing interest rates?

**Answer:** Factors that lead to greater investment include an improvement in business expectations regarding the economy and improvements in technology that stimulate innovations in new products.

9. The simple aggregate expenditures model discussed in this chapter concluded that one form of spending was just as good as any other; increases in all types of spending lead to equal increases in income. Is there any reason to suspect that private investment might be better for the economy than government spending?

**Answer:** Private investment typically leads to future increases in productive capacity and often to increases in productivity. Both of these may improve our standards of living in the future. Government spending on education, infrastructure, and research and development has the capacity to do the same. But some government spending is more like consumption and has little impact on the future. As we will see in later chapters, if government spending is too high, it can “crowd out” private investment, potentially reducing our rate of economic growth.

10. Assume that the economy is in equilibrium at \$5,700, and full employment is \$4,800. If the MPC is 0.67, how big is the inflationary gap?

**Answer:** The GDP gap is \$900 ( $\$5,700 - \$4,800$ ), and with an MPC of 0.67, the multiplier is 3 [ $1/(1 - .67) = 1/0.33$ ]. Therefore, the inflationary gap is the reduction in aggregate expenditures needed to bring the economy down to \$4,800 and is equal to \$300 ( $\$900/3$ ).

11. How does the economy today differ from that of the Great Depression, the economy Keynes used as the basis for the macroeconomic model discussed in this chapter?

**Answer:** Unemployment during the Depression peaked at 25%, whereas in 2013 unemployment was around 7%. Today we have many programs that help poor and unemployed people, such as welfare, unemployment compensation, and Medicaid; these were virtually nonexistent in the 1930s. Thanks to Keynes, our understanding of macroeconomics is better today. Also, during the 1930s we did not have a systematic process of data collection on the economy, therefore policymakers often made decisions based on anecdotes.



12. In modern politics, the word Keynesian often is synonymous with “big government” spending. Does this characterization accurately reflect the role of government in spurring economic activity? How would a tax cut be characterized today versus in Keynes’s time?

**Answer:** Keynes saw a role for an active government in smoothing out fluctuations in the economy by enacting policies to promote consumption and investment during economic downturns. This role of government is not limited to government spending. Tax cuts also promote spending by giving more money to consumers to spend and to firms to invest. However, in today’s highly politicized society, the word Keynesian is more often associated with government spending than with tax cuts.

**In the News**

13. In recent years banks have encouraged their customers to save by giving incentives to join programs that automatically transfer money from checking accounts to savings accounts. For example, a bank might offer to round debit transactions to the nearest dollar, transferring the change to one’s savings account, and then boost this amount with a match up to a certain amount (“Just Save Already: Bank Gimmicks for Saving Only Sound Good,” *Daily Finance*, September 11, 2009). Although these programs were intended to encourage customers to save, some economists are not very enthusiastic about these programs. What reasons, both practical and theoretical, might cause some to be concerned?

**Answer:** Many savings programs implemented by banks use automatic transfers of small amounts from one’s checking account to one’s savings account to encourage saving, often tied to a customer’s use of a debit card. Although the programs have been popular and help to improve the low savings rate by Americans, some economists worry that automatic transfers may lead to more overdraft (insufficient funds) fees when customers lose track of the additional money being withdrawn from their accounts. Also, many programs were implemented during the 2007–2009 recession as a way to encourage saving during times of economic uncertainty. However, savings represent a withdrawal of spending from the economy; therefore, increased savings may actually slow the economy’s recovery.

14. The \$787 billion stimulus package passed in 2009 was designed to jumpstart the economy reeling from the worst economic recession since the Great Depression by injecting the economy with large amounts of government spending (“Much Ado About Multipliers,” *The Economist*, September 24, 2009). Explain how this spending, as designed, was meant to create a much greater economic effect than the \$787 billion spent. What factors might explain why the full economic effect of the stimulus may have fallen short of expectations?

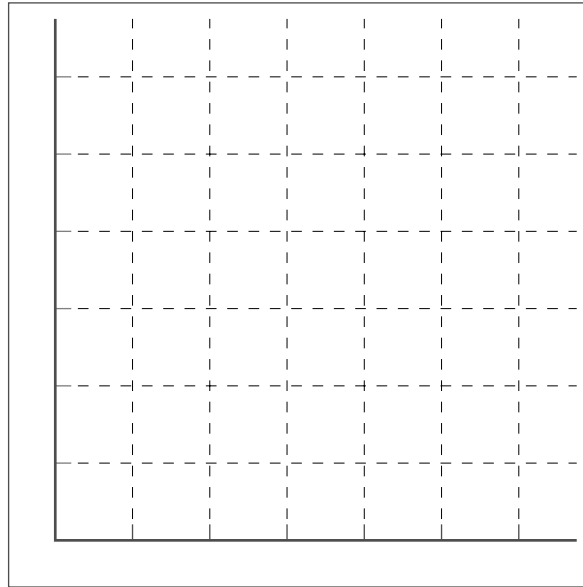
**Answer:** The stimulus package was designed to create an economic effect many times over through the spending multiplier, where spending by government supports businesses and creates jobs, which in turn generates more spending and jobs. However, the general tepidness of consumers and investors may have weakened the multiplier, as individuals and firms chose not to spend and invest, and instead paid off debts or increased their savings. The huge growth in savings provides evidence of this effect, which offsets the effects of the stimulus.

**Solving Problems**

15. Using the aggregate expenditures table below, answer the questions that follow.

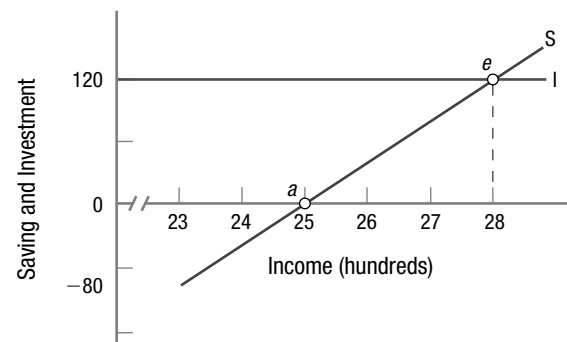
| Income (Y), in \$ | Consumption (C), in \$ | Saving (S), in \$ |
|-------------------|------------------------|-------------------|
| 2,200             | 2,320                  | −120              |
| 2,300             | 2,380                  | −80               |
| 2,400             | 2,440                  | −40               |
| 2,500             | 2,500                  | 0                 |
| 2,600             | 2,560                  | 40                |
| 2,700             | 2,620                  | 80                |
| 2,800             | 2,680                  | 120               |
| 2,900             | 2,740                  | 160               |
| 3,000             | 2,800                  | 200               |

- Compute the APC when income equals \$2,300 and the APS when income equals \$2,800.
- Compute the MPC and MPS.
- What does the simple Keynesian multiplier equal?
- If investment spending is equal to \$120, what will be equilibrium income?
- Using the graph below, show saving, investment, and equilibrium income.

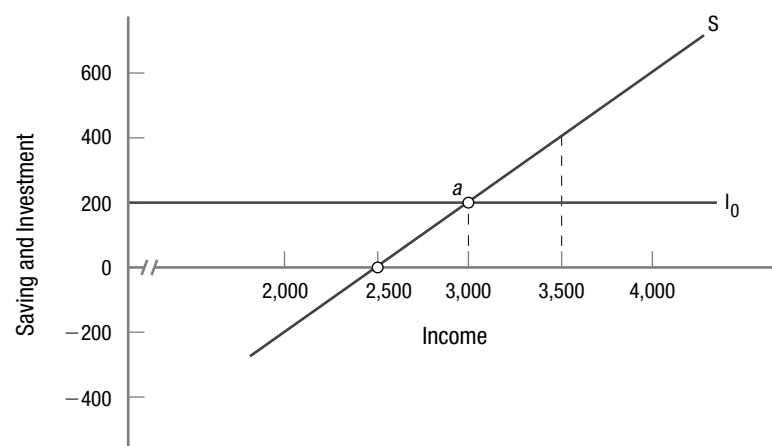


**Answer:**

- When  $Y = 2,300$ ,  $APC = 1.035$ . When  $Y = 2,800$ ,  $APS = 0.043$ .
- $MPC = 0.6$ ;  $MPS = 0.4$ .
- $k = 1/(1 - MPC) = 1/MPS = 1/0.4 = 2.5$ .
- $Y = 2,800$ .
- See figure below.



16. Use the figure below to answer the following questions.



- What are the MPC, the MPS, and the multiplier?
- If the economy is currently in equilibrium at point *a*, and full employment income is \$4,000, how much in *additional* expenditures is needed to move this economy to full employment? What is this level of spending called?
- Assume the economy is currently in equilibrium at point *a* and full employment income is \$4,000. How much of a tax decrease would be required to move the economy to full employment?

**Answer:**

- The MPC is 0.6 ( $300/500$ ), the MPS is 0.4 ( $200/500$ ), and the multiplier is 2.5 ( $1/0.4$ ).
- The multiplier is equal to 2.5 and income must grow by \$1,000, therefore an aggregate expenditure increase of \$400 is required ( $\$400 \times 2.5 = \$1,000$ ). This is the recessionary gap.
- To close the GDP gap of \$1,000, an increase in aggregate spending of \$400 is needed because the multiplier is 2.5. Because only 0.6 (the MPC) of the tax reduction will be multiplied, we will need to reduce taxes by more than \$400. Therefore the question boils down to what tax reduction times 0.6 equals \$400. The algebra is

$$\begin{aligned} 400 &= x (0.6) \\ 400/0.6 &= x \\ x &= \$667 \end{aligned}$$

Therefore, a \$667 tax reduction will close the GDP gap of \$1,000.

## Using the Numbers

17. According to By the Numbers, in what year (since 1973) did the U.S. government spend the most as a percentage of GDP? In what year did it spend the least? How do your answers correspond to the business cycle?

**Answer:** The U.S. government spent the most as a percentage of GDP in 2009, and spent the least in the year 2000. Government spending was highest at the trough at the end of the 2007–2009 recession, the most severe economic downturn over the period shown. Government spending was lowest at the peak of the 1991–2000 expansion, the greatest expansion over the period.

18. According to By the Numbers, the U.S. government spends less per person than any other developed country on the list. Does this mean the overall size of the U.S. government is smaller than that of the other developed countries? Why or why not?

**Answer:** No. Although U.S. government spending per person is less than the other developed countries on the list, the population of the United States is much greater than any of the countries listed. Therefore, the U.S. government is still the largest in terms of total spending, allowing it to spend large sums of money on national defense, health care, and other programs.

## Chapter 20

### Check Your Understanding

1. Describe the impact of rising interest rates on consumer spending.

**Answer:** Higher interest rates mean that the cost of borrowing rises. Some consumers will decide not to purchase items normally purchased on credit, therefore consumer spending falls.

2. When the economy is operating at full employment, why is an increase in aggregate demand not helpful to the economy?

**Answer:** When the economy is operating at full employment, an increase in AD just translates into higher prices (inflation). Temporarily, the economy might expand beyond full-employment output, but it quickly moves back to the LRAS curve and back to full employment, but now the price level is even higher.

3. When the economy is hit with a supply shock, such as oil prices rising from \$25 a barrel to \$75 a barrel, why is this doubly disruptive and harmful to the economy?

**Answer:** A leftward shift in the SRAS curve causes two problems for policymakers: increased unemployment (lower output) and a higher price level (inflation). To reduce unemployment by increasing AD will cause more inflation. To bring the price level back to its original state would require AD to be reduced, increasing unemployment even more.

4. Explain why the aggregate supply curve is positively sloped during the short run and vertical in the long run.

**Answer:** During a depression, the unemployment rate is high and the economy has significant slack, therefore output can be increased with no effect on prices. In normal short-run circumstances, employment is below full employment, and increasing output may require overtime (hiring and training of people takes time and adds to costs), causing prices to rise somewhat, resulting in an increase in the price level along with rising output. But in the long run, the economy is at full employment, therefore an increase in aggregate demand results only in a rising price level.

5. List some examples of factors that will shift the aggregate demand curve.

**Answer:** Any factor that changes consumption, investment, government spending, exports or imports will shift the aggregate demand curve. For example, a change in personal taxes, wealth, or consumer confidence will change consumption. Changes in interest rates or business forecasts for the economy will change investment. Changes in income or exchange rates (the value of one currency for another) can change imports or exports. We will learn more about this in later chapters. Unexpected events such as Hurricane Sandy or a war can alter government spending.

6. List some examples of factors that will shift the long-run aggregate supply curve.

**Answer:** A shift in the long-run aggregate supply curve will occur when the productive capacity of an economy changes. Factors include changes in the amount of available capital, changes in the skill level of workers, and changes in technology.

### Apply the Concepts

7. There is little doubt that computers and the Internet have changed our economy. Information technology (IT) can boost efficiency in nearly everything: Markets are more efficient, IT is global, and IT improves the design, manufacture, and supply chain of products we produce. Use the aggregate demand and supply framework discussed in this chapter to show the impact of IT on the U.S. economy.

**Answer:** Because most of the benefits from IT are efficiency of production and distribution, you should show a shifting of the LRAS curve to the right, resulting in a higher equilibrium output at lower prices.

8. Unemployment can be caused by a reduction in aggregate demand or short-run aggregate supply. Both changes are represented by a leftward shift in the curves. Does it matter whether the shift occurs in aggregate demand or short-run aggregate supply? Use the AD/AS framework to show why or why not.

**Answer:** If aggregate demand declines, the price level falls (or inflation pressures are reduced). If short run aggregate supply declines, the price level rises. Less inflation is better than more.

9. Why is cost-push inflation a more difficult problem for policymakers than demand-pull?

**Answer:** To solve demand-pull inflation, policymakers can just reduce aggregate demand and the economy will return to full employment at the old price level. With cost-push inflation, output falls and the price level and unemployment rise, therefore increasing aggregate demand to bring the economy back to full employment results in an even higher price level. Reducing aggregate demand makes unemployment worse.

10. Why is consumer confidence so important in determining the equilibrium level of output and employment?

**Answer:** Because consumer spending is roughly 70% of total spending, a small drop in consumer spending results in a large change in equilibrium output and income. Consumer confidence is one important factor driving consumer spending.

11. As the Japanese yen appreciated in value during the 1980s and 1990s, more Japanese auto companies built manufacturing plants in other parts of Asia and in the United States. What impact did this have on net exports for the United States? Why did Japanese automakers build plants in the United States? Were the reasons similar to the reasons that American firms build plants (or establish offshore production) in China and other parts of Asia?

**Answer:** Japanese investment in the United States increased investment spending and reduced imports of Japanese cars, increasing net exports. The rising value of the yen made production in Japan relatively expensive; producing in the United States made them more competitive. Also, shipping cars within the United States is much less expensive than shipping cars from Japan, further increasing competitiveness. Yes, both situations represent firms seeking production costs that keep them competitive.

12. Some advocates have suggested that the United States should move to a universal health care plan paid for at the federal level, like Medicare, which would be funded out of general tax revenues. Such a plan, it is argued, would guarantee quality health care to all. Ignoring all the controversy surrounding such a plan, would the introduction of universal health care paid for from general revenues have an impact on short-run aggregate supply? On long-run aggregate supply? Why or why not?

**Answer:** It could affect aggregate supply on at least two possible levels. First, with all workers covered, workers might become healthier and more productive, increasing aggregate supply. Many companies today have “wellness” programs that provide incentives (money and other rewards) to employees to eat right, exercise, and generally take better care of their health. These programs reduce sick days, health costs, and lead to more productive employees. Second, removing the responsibility of health care costs from private firms would reduce costs to businesses and increase aggregate supply (this is the equivalent of lower resource costs).

## In the News

13. Oil production in the United States has increased significantly over the past decade as a result of improved oil extraction technologies, with some analysts predicting that the United States will surpass Saudi Arabia in overall energy production by the end of the decade (“U.S. Oil Output to Overtake Saudi Arabia’s by 2020,” Bloomberg.com, November 12, 2012). How do the increase in U.S. energy production and the subsequent reduction in the reliance on imported oil affect the aggregate demand and/or aggregate supply curves?

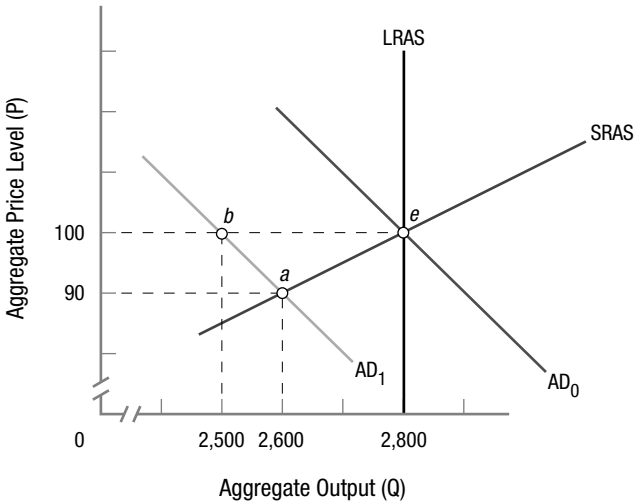
**Answer:** An increase in domestic energy production and a reduction of imported oil increase U.S. aggregate demand through an increase in consumption and an increase in net exports (because imports fall). In addition, if domestic energy production allows energy costs to fall, aggregate supply will rise. In both cases, aggregate output increases, which contributes to the growth of the U.S. economy.

14. In early 2013, significant political gridlock in Congress involved automatic spending cuts by the government termed the *Sequester*. Many economists warned that allowing the drastic cuts to persist increased the risk of another recession (“The Sequester and Fiscal Policy,” *The New York Times*, March 8, 2013). Using the AD/AS model and what you know about the multiplier, explain why economists would come to this conclusion.

**Answer:** Government spending represents a large portion of aggregate demand. During the last recession and subsequent recovery, government spending increased dramatically, which helped to offset reductions in consumer and investment spending as confidence in the economy fell. Although consumer and investment spending have mostly recovered since the depths of the last recession, many economists worried that a significant decrease in government spending would cause the aggregate demand curve to shift to the left, causing output to fall by the reduction in spending enlarged by the multiplier. If consumer and investment spending did not increase enough to compensate for the drop in government spending, overall output in the economy will fall, increasing the risk of another recession.

Solving Problems

15. In the figure below, the economy is initially in equilibrium at full employment at point *e*. Assume aggregate demand declines by 100 (shifts from  $AD_0$  to  $AD_1$ ).



- a. What is the new short-run equilibrium?
- b. How large is the simple Keynesian multiplier in this case?

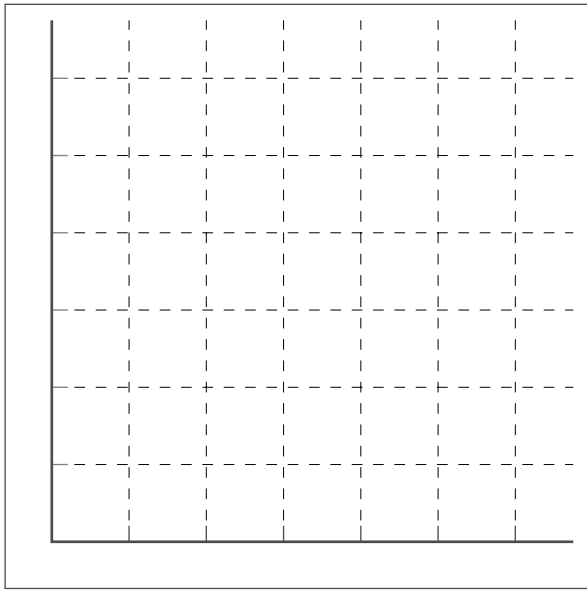
**Answer:**

- a. The short-run equilibrium will be at point *a* where  $Q = \$2,600$ .
- b. Aggregate demand fell by 100, and the gap in GDP is 300, therefore the simple multiplier is equal to 3. Remember, when AD declines by  $x$ , and the economy has a lot of slack, the change in equilibrium income,  $e - b$ , divided by the change in aggregate demand is the multiplier.

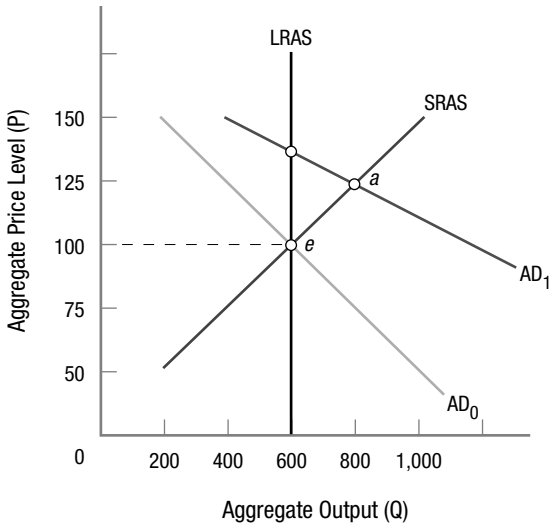
16. Use the table and grid below to answer the following questions:

- a. In the grid, graph the aggregate demand and short-run aggregate supply curves (label them  $AD_0$  and  $SRAS_0$ ). What are equilibrium output and the price level?
- b. Assume aggregate demand grows by 100% (output doubles at each price level). Graph the new aggregate demand curve and label it  $AD_1$ . What is the new equilibrium output and price level?
- c. If full employment output is 600, what will be the long-run output and price level given the new aggregate demand curve?

| Price Level | Output (short-run aggregate supply) | Output (aggregate demand) |
|-------------|-------------------------------------|---------------------------|
| 150         | 1,000                               | 200                       |
| 125         | 800                                 | 400                       |
| 100         | 600                                 | 600                       |
| 75          | 400                                 | 800                       |
| 50          | 200                                 | 1,000                     |



- Answer:**
- a.  $Q = 600, P = 100$ .
  - b.  $Q = 800, P = 125$ .
  - c. Long-run output will be at 600, and the new price will be between 125 and 150.



**Using the Numbers**

17. According to By the Numbers, if the average price of a barrel of oil is \$100, and total aggregate demand in 2012 was \$15 trillion in the United States and \$9 trillion in China, what percentage of aggregate demand did oil consumption represent in each country?
- Answer:** The United States spent  $\$100 \times 6.8 \text{ billion} = \$680 \text{ billion}$  on oil in 2012. This represented  $\$680 \text{ billion} / \$15 \text{ trillion} = 4.5\%$  of aggregate demand. China spent  $\$100 \times 3.6 \text{ billion} = \$360 \text{ billion}$  on oil in 2012. This represented  $\$360 \text{ billion} / \$9 \text{ trillion} = 4.0\%$  of aggregate demand.
18. According to By the Numbers, which state has the highest rate of home ownership? Which state has the lowest rate of home ownership? What are some reasons why these states represent the highest and lowest rate of home ownership?
- Answer:** West Virginia has the highest rate of home ownership at 73.4%, while New York has the lowest rate of home ownership at 53.3%. Reasons for these statistics vary, but average home prices

(which are much lower in West Virginia than in New York) play an important role. Also, a majority of New York residents live near New York City, where most residents live in rented apartments, whereas most West Virginia residents live in rural areas where land is plentiful and homes are more common than apartments.

## Chapter 21

### Check Your Understanding

1. Explain why government spending theoretically gives a bigger boost to the economy than tax cuts.

**Answer:** All government spending affects the economy. In contrast, some of the tax cuts are saved, therefore only a part of the tax cut is spent, cutting its impact on the economy.

2. Explain why increasing government purchases of goods and services is expansionary fiscal policy. Would increasing taxes or reducing transfer payments be contractionary or expansionary? Why?

**Answer:** Increasing government purchases of goods and services is expansionary fiscal policy. Buying goods from businesses increases aggregate demand, leading to greater sales by firms, which will use these funds to purchase other goods, pay factors, or invest in new production capacity. Combined with a multiplier effect, income and employment will expand. Raising taxes or reducing transfer payments is contractionary because the government is reducing private income, which will lead to reduced consumption.

3. Changes in tax rates affect both aggregate demand and aggregate supply. Explain why this is true.

**Answer:** On the demand side, tax rate changes affect consumer income, which affects consumer spending and, thus, aggregate demand. Tax rate changes also affect the supply side by altering incentives of labor to work; higher tax rates discourage work effort, while lower tax rates encourage work effort because take-home pay is higher. Further, tax rates affect investment levels and the incentive to invest.

4. What is one benefit to businesses when the government budget is in surplus?

**Answer:** One big benefit to businesses is that the government may be retiring (buying) debt, therefore the government's efforts to increase bond prices drives interest rates down, making investment prospects more attractive to businesses. Notice that this is essentially the opposite of crowding out.

5. How might interest paid on the national debt lead to greater income inequality?

**Answer:** The argument is that it is mostly high-income (or wealthy) individuals who own Treasury bonds and they receive the interest, further skewing the income distribution in favor of high-income people, adding to income inequality. In addition, if the debt were lower, more money currently paying interest on the debt could be used to support low-income families, reducing income inequality.

6. Is the absolute size of the national debt or the national debt as a percent of GDP the best measure of its importance to our economy? Explain.

**Answer:** The debt-to-GDP ratio is the measure that best illustrates the debt's impact. Gross domestic product represents the economy's earning (producing) potential and puts the debt relative to GDP in perspective. A small national debt alongside a smaller GDP could be much worse than a large debt associated with a huge economy.

### Apply the Concepts

7. One argument often heard against using fiscal policy to tame the business cycle is that the lags associated with getting a fiscal policy implemented are so long that when the program is finally passed and implemented, the business cycle has moved on to the next phase and the new program may not be necessary and may even be potentially destabilizing at that point. Does this argument seem reasonable? What counterarguments can you make in support of using fiscal policy?

**Answer:** Yes, it is a reasonable argument. Increasing government spending with a new program on line is a time-consuming process. Further, reducing spending (or eliminating programs) is often



extremely difficult given the vested interests in each government program. However, fiscal policy can be implemented much faster for existing programs, and changes to income tax rates once they become law are implemented quite quickly through withholding tables.

8. As mandatory federal spending becomes increasingly a larger share of the budget, should we worry that the economic stabilization aspects of fiscal policy are becoming so limited as to be ineffective?

**Answer:** The mandatory part of the federal budget is approaching two-thirds. As the baby boom generation retires and goes on Social Security and Medicare, this proportion will likely rise. However, even one-third of federal spending amounts to over \$1 trillion, and this is still enough discretionary spending to keep discretionary fiscal policy potent.

9. Our current personal income tax system is progressive: Income tax rates rise with rising incomes and are lower for low-income individuals. Some policymakers have favored a “flat tax” as a replacement for our modestly progressive income tax system. Most exemptions and deductions would be eliminated, and a single low tax rate would be applied to personal income. Would such a change in the tax laws alter the automatic stabilization characteristics of the personal income tax?

**Answer:** Yes, it would reduce the robustness of the personal income tax as an automatic stabilizer. Under a progressive tax system, a decline in income leads to a greater-than-proportionate decline in tax liability, putting more income in the hands of households. A flat tax is a proportionate tax, therefore the decline in tax payments and the increase in disposable income would be less. Taxes would still be an automatic stabilizer, but their impact would be less.

10. In 1962 in a speech before the Economic Club of New York, President Kennedy argued that “. . . it is a paradoxical truth that taxes are too high today and tax revenues are too low—and the soundest way to raise revenues in the long run is to cut rates now.” Is President Kennedy’s argument consistent with supply-side economics? Why or why not?

**Answer:** In general, President Kennedy’s statement is consistent with the arguments of supply-siders who feel that a reduction in tax rates will yield higher revenues, depending on where tax rates are on the Laffer curve. When President Kennedy made his address, marginal tax rates were as high as 70%. As of 2013, the top marginal rate was 39.6%; it is less clear that rate reductions will lead to higher long-run revenues.

11. A balanced budget amendment to the Constitution requiring Congress to balance the budget every year is introduced in Congress every so often. What sort of problems would the passage of such an amendment introduce for policymakers and the economy? What would be the benefit of the passage of such an amendment?

**Answer:** An annually balanced budget would eliminate the automatic stabilization aspect of the federal budget. When the economy enters a recession, the budget normally moves toward a deficit as transfer payments increase and tax collections decline. With a balanced budget amendment, spending would have to be cut back or taxes raised, causing the recession to be deeper. However, the benefit of such an amendment is that it forces fiscal discipline, preventing politicians from using excessive government spending that can lead to an unsustainable debt.

12. If the economy (gross domestic product) is growing faster than the growth of the national debt held by the public (both domestic and foreign), how does that affect the ability of the government to manage the national debt? What arguments can you make to rebut the common assertion that the national debt is bankrupting the country?

**Answer:** If GDP grows faster than the growth of the national debt, the burden of that debt on the annual budget becomes smaller as long as interest rates are low. However, when interest rates climb, the real cost of paying added interest each year is that it subtracts from money that could have been spent on other programs or projects. Arguments against the assertion that the national debt is bankrupting the country include: (1) Not all debt is held by the public—a sizeable portion of the debt is held by other government agencies; (2) of the debt held by the public, about half of that is held domestically; therefore, the tax payments to pay the interest on that debt goes to other Americans; (3) if the economy is growing faster than the debt is growing, then the debt as a percent of GDP is declining. To the extent that GDP reflects the ability of the country to pay its debt, our position is becoming better, even if the absolute size of the debt is large.

### In the News

13. The last two elections have seen more states and municipalities passing ballot measures legalizing some forms of soft drugs such as marijuana for medicinal or recreational purposes (“Marijuana Legalization Wins Majority Support in Poll,” *The Los Angeles Times*, April 4, 2013). Previously, sales of such drugs took place in the informal or underground economy, where taxes are avoided and crime runs high. What would be some fiscal policy justifications for legalizing soft drugs?

**Answer:** The legalization of soft drugs takes economic activity that was previously underground into the formal economy. When the sale of these goods are regulated and taxed, government revenues increase. Also, the potential reduction in the cost of drug enforcement would allow more money to be spent on other useful programs.

14. In June of 2009, *The Economist* discussed the ability to manage a country’s debt: “Arithmetically, a government’s debt burden is sustainable if it can pay the interest without borrowing more. Otherwise the government will eventually fall into a debt trap, borrowing ever more just to service earlier debt.” What kind of problems might cause a country to fall into a debt trap as described above? What policies enacted today could reduce the probability of falling into a debt trap?

**Answer:** High unemployment, slow economic growth, and corruption reduce government revenues and increase spending, while high inflation and interest rates make existing debt hard to manage. Solving this problem will require increases in taxes, cuts in entitlement benefits, or cuts in other areas of the budget in order to reduce the probability of falling into a debt trap.

### Solving Problems

15. Suppose a small economy has two income tax rates: 15% for all income up to \$50,000 and 30% for any income earned above \$50,000. Suppose that prior to the recession, the economy had five workers earning the following salaries:

|         |           |
|---------|-----------|
| Amy     | \$20,000  |
| Betty   | \$40,000  |
| Charlie | \$60,000  |
| Dimitry | \$80,000  |
| Evelyn  | \$100,000 |

- Calculate the total tax revenues paid by the five workers. What percent of total income does this represent?
- Now assume that a recession causes each of the five salaries to fall by 25%. Given the lower salaries, what would be the total tax revenues paid by the five workers? What percent of total income does this represent?
- Explain how this progressive tax structure acts as an automatic stabilizer.

**Answer:**

- Before the recession, Amy’s tax bill would be \$3,000, Betty’s \$6,000, Charlie’s \$10,500 (\$7,500 + \$3,000), Dimitry’s \$16,500 (\$7,500 + \$9,000), and Evelyn’s \$22,500 (\$7,500 + \$15,000), for a total of \$58,500 in taxes. This equals  $\$58,500 \div \$300,000 = 19.5\%$  in taxes.
  - After the recession, Amy’s tax bill falls to \$2,250, Betty’s \$4,500, Charlie’s \$6,750, Dimitry’s \$10,500 (\$7,500 + \$3,000), and Evelyn’s \$15,000 (\$7,500 + \$7,500), for a total of \$39,000 in taxes. This equals  $\$39,000 \div \$225,000 = 17.3\%$  in taxes.
  - A progressive tax structure reduces the percentage of income collected in taxes when incomes fall, reducing the burden caused by the reduction in income.
16. Suppose an economy has a national debt of \$10 billion, and the average interest rate on this debt is currently 3%. Its GDP is \$20 billion. Suppose that next year one of two events occurs: (1) GDP and interest rates stay the same, but the economy adds \$2 billion to its national debt, (2) GDP and the national debt stays the same, but interest rates increase to 4%. Which of these two events would increase the interest rate burden of the national debt more? Show your calculations.

**Answer:** The economy is currently spending \$300 million ( $3\% \times \$10$  billion) in interest payments, which is equal to 1.5% of its GDP ( $\$300$  million  $\div$  \$20 billion). Event (1) would cause interest

payments to increase to \$360 million ( $3\% \times \$12$  billion), which is equal to 1.8% of its GDP ( $\$360$  million  $\div$   $\$20$  billion). Event (2) would cause interest payments to increase to \$400 million ( $4\% \times \$10$  billion), which is equal to 2.0% of its GDP ( $\$400$  million  $\div$   $\$20$  billion). An increase in the interest rate from 3% to 4% causes a greater interest rate burden from the debt than an increase in the actual debt by \$2 billion.

## Using the Numbers

17. According to By the Numbers, what percent of total national debt and foreign held debt is held by China? How about OPEC nations? What does this suggest about the relative importance of U.S. relations with China and OPEC nations?

**Answer:** China holds about 8% of the total U.S. national debt and about 25% of the total U.S. foreign-held debt. OPEC nations hold about 1.5% and 5% of the debts, respectively. The dramatic growth in U.S. debt held by China indicates an increasingly important economic relationship between the countries.

18. According to By the Numbers, in which year between 1990 and 2012 did the United States have the biggest budget surplus and what was that value? In which year did it have the biggest budget deficit and what was that value?

**Answer:** The United States had its biggest budget surplus in the year 2000, with a surplus of almost \$250 billion. It had its biggest budget deficit in the year 2009, with a deficit of over \$1.4 trillion.

## Chapter 22

### Check Your Understanding

1. Describe the three functions of money.

**Answer:** Money serves as a medium of exchange, a unit of account, and a store of value.

2. What is a barter economy? Describe why such an approach is a difficult way for a modern economy to exist.

**Answer:** A barter economy is one in which participants directly trade goods and services with one another. Barter requires a double coincidence of wants: You have to find someone who produces what you want and wants what you have to trade. Barter networks could exist, but the number of prices soon becomes unmanageable. Modern economies are too complex with too many goods—barter would prevent the attainment of a modern economy.

3. Explain the important difference between M1 and M2.

**Answer:** M1 consists of currency, traveler's checks, demand deposits, and other checkable deposits. M2 has a broader definition, which includes M1 plus other near moneys such as saving accounts and money market accounts.

4. What gives our money its value if there is no gold or silver backing the currency?

**Answer:** Our money is fiat money—nothing but what it will buy is backing the currency. We all have faith that the government will not debase the currency by printing too much. Recall what the impact of hyperinflation is and how it devastates existing financial assets.

5. What happens to savings if the real interest rate goes up? What happens to the demand for borrowing?

**Answer:** When real interest rates rise, we would expect to see people save more because the reward for saving has risen. Borrowing now costs more, thus we would expect to see that decline.

6. Explain why bond prices and interest rates are inversely related.

**Answer:** Bonds have a fixed coupon rate of interest that results in a fixed dollar amount paid out each year as an interest (coupon) payment. For example, a coupon rate of 5% on a \$1,000 par value bond would result in \$50 paid to holders of the bond each year. If market interest rates are 5%, then the market price of the bond will be \$1,000. But, if market interest rates should rise to 10%, the price of the bond would fall to \$500 because  $\$50/\$500 = 10\%$ . Thus, as interest rates rise, bond prices fall, and vice versa.

## Apply the Concepts

7. List the following assets from most liquid to least liquid: a house (real estate); cash; a one-carat diamond; a savings account; 100 shares of Google stock; a Harley-Davidson motorcycle; a checking account; your old leather jacket.

**Answer:** Remember that liquidity is determined by how quickly, easily, and reliably assets can be converted into cash. The degree of liquidity of the last three items on the list will depend on supply and demand, but real estate transactions nearly always involve a lot of time and transactions costs (real estate agent fees).

- cash
- checking account
- savings account
- 100 shares of Google
- one-carat diamond
- Harley-Davidson motorcycle
- your old leather jacket
- house (real estate)

8. At many game centers (such as Chuck E. Cheese's), it is common for kids to play carnival-type games to win prize tickets, which are then redeemed for a variety of prizes based on the number of tickets earned. In what ways do these prize tickets illustrate the three functions of money?

**Answer:** In many ways, prize tickets illustrate the three functions of money, albeit in a very limited setting (that of the game center which accepts them). It serves as a medium of exchange within the store, allowing kids to exchange tickets for prizes. It serves as a unit of account, because each prize requires a specific number of tickets. And it serves as a store of value in that kids can save up tickets over multiple visits to redeem for larger prizes.

9. How do recessions affect the market for loanable funds? What happens to the supply of savings? What happens to the demand for borrowing? What is the effect on real interest rates?

**Answer:** In a recession, savings tend to increase and borrowing tends to fall. Supply shifts to the right and demand shifts to the left. Thus, real interest rates fall.

10. Most individuals with average wealth choose to save their money using a financial intermediary such as a bank or a mutual fund. However, individuals with greater wealth are more likely to invest in individual stocks or directly in new or existing businesses. Explain why persons of different wealth are likely to show differences in how they save, and how financial intermediaries play a role.

**Answer:** The role of financial intermediaries is to reduce information and transaction costs between savers and borrowers, and to diversify assets to reduce risk. For individuals with small- or medium-sized savings, a badly selected investment can wipe out one's entire savings. Therefore, these individuals are more likely to choose less risky assets such as a mutual fund. Wealthier individuals, however, tend to have more resources to research other investment opportunities that may be riskier but offer a greater potential return on investment. And if one investment fails, it's likely to be just one of many investments made; in other words, persons with more savings are better able to diversify their assets, including some in riskier investments.

11. Why would it be better to put \$1,000 each year into a retirement account than to wait ten years and put in \$10,000 all at once? How much of a difference would it make in the long run?

**Answer:** Putting \$1,000 into a retirement account each year allows money to grow immediately. And with the power of compounding, money deposited in early years will grow significantly over the period. Suppose that the average annual return is 10%. If one puts \$10,000 all at once at the end of the ten-year period, the retirement account would be worth \$10,000 (the deposit did not have any time to grow). If instead, \$1,000 is deposited each year for ten years, the total value at the end of ten years would be \$15,937 (many retirement calculators are available online that allow for easy calculation).

12. Why have pensions become a less common form of retirement benefit offered by companies?

**Answer:** Pensions are a more unpredictable expense for employers because they pay a benefit for the life of the recipient. And as the number of retirees and life expectancies rise, the cost of funding pensions has risen substantially for employers. Therefore, in the past few decades most employers have switched to a fixed-contribution plan, such as a 401(k), in which employer contributions are made up front, and employees are given the ability to manage the funds based on the level of risk they wish to tolerate.

## In the News

13. A proposal in the government budget set forth in 2013 placed a limit on the total amount of savings that can be accumulated in tax-preferred retirement accounts to about \$3 million (*U.S. News and World Report*, April 10, 2013). The White House has argued that wealthy individuals have accumulated “substantially more than is needed to fund reasonable levels of retirement saving,” and that the tax deductions from these excess savings cost the government billions each year. How do these sorts of proposals affect the market for loanable funds?

**Answer:** The answer depends on how affected savers choose to use their money that can no longer be saved in tax-preferred retirement accounts. If these funds are instead saved in other non-tax-preferred accounts, then there would be little or no effect on the market for loanable funds. However, although it is likely that some of the money would be saved elsewhere, the policy creates an incentive to save less overall, which means that the supply of loanable funds will shift to the left, reducing the amount of loanable funds and raising interest rates.

14. At the trough of the last recession in 2009, major stock market indexes had dropped in half from their peak in 2007. This led many stock analysts to argue that bonds had outperformed stocks and also were safer investments. However, a report published by Morningstar Investment Management titled “Are Bonds Going to Outperform Stocks Over the Long Run? Not Likely” contradicted these analysts by comparing returns on stocks and bonds over periods of more than 40 years, and showing that stock returns easily beat those of bonds. Why would the argument that bonds perform better than stocks lead to a self-fulfilling prophecy if investors sell stocks and buy bonds? Which argument better reflects the theory of the tradeoff between risk and return?

**Answer:** As stocks underperform relative to safer bond assets, investors sell stock, reducing their value, and buy bonds, increasing their values but reducing the interest rate. Therefore, evidence that has shown bonds to perform better than stocks can lead to a self-fulfilling prophecy if investors avoid stock investments. However, over the longer term, the evidence suggests that stocks still provide a higher return than bonds, which better reflects the theory that riskier assets (stocks in general) provide a greater return than safer assets (bonds in general).

## Solving Problems

15. Suppose a small country has the following monies in circulation:

Cash/currency: \$1 million  
 Demand deposits: \$2 million  
 Other checkable deposits: \$2 million  
 Small-denomination time deposits: \$4 million  
 Savings deposits: \$5 million  
 Money market deposit accounts: \$5 million

Calculate the value of M1 and M2 for this country.

**Answer:** M1 includes cash and currency (\$1 million), demand deposits (\$2 million), and other checkable deposits (\$2 million), for a total of \$5 million. M2 includes M1 (\$5 million) and savings deposits (\$5 million), money market deposit accounts (\$5 million), and small-denomination time deposits (\$4 million), for a total of \$19 million.

16. Suppose you paid \$1,000 for a perpetuity bond that pays \$40 a year forever to the bondholder. Now suppose that due to aggressive policy by the Fed, general interest rates fall from 4% to 1%. How much would the price of the bond be worth if it continues to pay \$40 per year?

**Answer:** If a bond that pays \$40 per year represents a 1% return, then the value of the bond must be \$4,000 ( $\$40 \div 0.01 = \$4,000$ ).

## Using the Numbers

17. According to By the Numbers, which bank had the largest amount of assets in 2012, and what was this value? How much in assets did a bank need to reach the top ten largest banks in the world in 2012?

**Answer:** Deutsche Bank of Germany was the largest bank in the world in 2012 with approximately \$2.8 trillion in total assets. In order to reach the top ten of largest banks, a bank needed at least \$2.2 trillion in assets (the amount held by the Royal Bank of Scotland of the United Kingdom, the tenth largest bank in the world in 2012).

18. According to By the Numbers, how much in U.S. dollars is currently in circulation in the world? How much in U.S. dollars is held in reserves in the world? Describe how these numbers compare to the euro and the Japanese yen.

**Answer:** About \$800 billion in U.S. dollars is currently in circulation, and about \$3.7 trillion in U.S. dollars is held in reserves. Compared to the euro and Japanese yen, the U.S. dollar is by far the most held reserve currency in the world. However, there are more euros in circulation than U.S. dollars, and the Japanese yen is not far behind the U.S. dollar in terms of circulation. One reason the euro is widely circulated is the large number of countries (with a total population of 335 million) that use the currency. For the Japanese yen, Japanese consumers tend to use cash for everyday transactions more than European and American consumers, resulting in a large amount of yen in circulation.

## Chapter 23

### Check Your Understanding

1. Describe the role required reserves play in determining how much money the banking system creates.

**Answer:** Because required reserves make the banking system a “fractional reserve” system, banks can lend only excess reserves (those in excess of required). When these loans are deposited back into the banking system, they create further excess reserves and loans, and so on. Theoretically banks can create up to a multiple of  $1 \div \text{reserve requirement}$  (the money multiplier) of new money based on the initial deposit.

2. Why are checking accounts (demand deposits) considered a liability to the bank?

**Answer:** Checking accounts or demand deposits are liabilities to banks because depositors have loaned this money to the bank until they write checks and “demand” this money be paid to someone else.

3. Why do leakages reduce the money multiplier from its potential?

**Answer:** Leakages occur when banks hold excess reserves or when individuals or businesses hold cash, both of which reduce the amount of loans that can be made to borrowers. When fewer loans are made, less money is being created in the banking system, and therefore the money multiplier is lower.

4. What is the most common tool used by the Federal Reserve to conduct monetary policy and how does it affect interest rates?

**Answer:** The most common tool used by the Fed is open market operations, which are the buying and selling of government securities to influence interest rates (specifically, the federal funds rate). When the Fed buys securities, bond prices increase and interest rates fall, and vice versa.

5. For what type of borrowing do the federal funds rate and the discount rate apply? Which rate is used in more transactions in the United States?

**Answer:** The federal funds rate is used when banks borrow reserves overnight from another bank to meet the minimum reserve requirement. The discount rate is used when banks borrow reserves directly from the Fed. The federal funds rate is used much more than the discount rate, because banks are often reluctant to borrow from the Fed because of the stigma that comes with doing so.

6. Why are monetary policy lags generally shorter than fiscal policy lags?

**Answer:** Monetary policy is conducted by the Fed, an independent body that is not influenced by political pressures. Therefore, monetary policy decisions made by the Fed are often quicker than fiscal policy decisions, which require the cooperation between Congress and the president.

## Apply the Concepts

7. The U.S. government produces billions of dollars in banknotes and coins for use in everyday transactions. Explain why currency alone does not represent money creation.

**Answer:** Currency represents just one part of the money supply. Most money transactions in the economy are conducted electronically, and therefore the money supply increases when other components, such as checking accounts and demand deposits, are increased through the lending and borrowing of money.

8. During an economic boom, banks tend to increase their willingness to lend. How does this trend influence the actual money multiplier?

**Answer:** When banks are more willing to lend, the amount held in reserves falls. Therefore, the reserve ratio is smaller, resulting in a larger money multiplier. As a result, each dollar injected into the banking system has a much more powerful effect on the economy.

9. The Federal Deposit Insurance Corporation (FDIC) insures individual bank accounts up to \$250,000 per account. Does the existence of this insurance eliminate the need for reserve requirements? Does it essentially prevent “runs” on banks?

**Answer:** No. Reserves are required to prevent banks from becoming too extended financially and maintain that cushion to prevent the bank from not meeting its obligations. More or less, the FDIC has provided sufficient security that runs on the bank by depositors have been prevented.

10. Many central banks in the world are independent in the sense that they are partially isolated from short-run political considerations and pressures. How is this independence attained? How important is this independence to policymaking at the Federal Reserve?

**Answer:** Although Congress has supervisory authority over the Fed and consent over appointments to the Board of Governors, the seven governors are appointed for 14 years with one term expiring every 2 years. This longevity of governors gives the Federal Reserve its independence in policymaking, in much the same way that tenure in universities fosters academic freedom. Most economists think that Fed independence permits the Fed to set the tradeoffs among the three goals of price stability, full employment, and robust economic growth. The argument is that independence helps the Fed focus in a professional way on keeping long-run inflation in check without the short-run distraction and political pressure to expand the money supply to increase output and income beyond what is prudent.

11. Alan Greenspan, a former chairman of the Fed, noted that “the Federal Reserve has to be independent in its actions and as an institution, because if Federal Reserve independence is in any way compromised, it undercuts our capability of protecting the value of the currency in society.” What is so important about protecting the value of the currency? How does Fed independence help?

**Answer:** Inflation depreciates the currency’s value, and extreme inflation (hyperinflation) renders the currency worthless, creating a whole host of problems for society including stifling growth and forcing people to turn to barter. By keeping political pressure to continually expand the money supply away from the Federal Reserve, its decisions will reflect a more balanced approach to the economy.

12. The reserve requirement sets the required percentage of vault cash plus deposits with the regional Federal Reserve Banks that banks must keep for their deposits. Many banks have widespread branches and ATMs. Would the existence of branches and ATMs affect the level of excess reserves (above those required) that banks hold? Why or why not? What would be the effect on the actual money multiplier?

**Answer:** ATMs and branches require a lot of vault cash to maintain and might be expected to result in banks holding greater excess reserves. Thus, the actual money multiplier would be lower.

## In The News

13. Eric Keetch offered an interesting anecdote in the *Financial Times* (August 12, 2009):

*In a sleepy European holiday resort town in a depressed economy and therefore no visitors, there is great excitement when a wealthy Russian guest appears in the local hotel reception, announces that he intends to stay for an extended period and places a €100 note on the counter as surety while he demands to be shown the available rooms.*

*While he is being shown the room, the hotelier takes the €100 note round to his butcher, who is pressing for payment.*

*The butcher in turn pays his wholesaler who, in turn, pays his farmer supplier.*

*The farmer takes the note round to his favorite “good time girl” to whom he owes €100 for services rendered. She, in turn, rushes round to the hotel to settle her bill for rooms provided on credit.*

*In the meantime, the Russian returns to the lobby, announces that no rooms are satisfactory, takes back his €100 note and leaves, never to be seen again.*

*No new money has been introduced into the local economy, but everyone’s debts have been settled.*

What’s going on here? In the end, no new money was introduced into the town, but all debts were paid. Is the money multiplier infinite? How do you explain what has happened? Did local GDP increase as a result of all debts being paid?

**Answer:** This is an interesting puzzle that can be answered by considering what would have happened if each party—the hotelier, butcher, wholesaler, farmer, and “good time girl”—went to his or her creditor and said, “Assume I just paid you,” and all accepted the statement as payment. The outcome would have been the same. In effect, it is as if each used credit to barter for each other’s good or service in the circle. Had it not been the equivalent of a barter circle, the hotelier would have had to come up with €100 of his own at the end. No new local GDP was created in this process; it rose when the original goods and services were performed on credit.

14. In the December 12, 2012, FOMC meeting, Chairman Ben Bernanke announced the start of QE4, a new round of quantitative easing in which the Fed committed to purchasing \$85 billion in assets per month in order to keep the federal funds rate near 0% until the unemployment rate fell below 6.5%. The effect of this announcement resulted in the expectation that interest rates will remain extremely low until at least mid-2015. How might this announcement affect the lives of ordinary individuals, and what impact might this have on the economy?

**Answer:** Since late 2008, the federal funds rate has been near 0%; however, at any point in time, the Fed could raise the target federal funds rate. By announcing QE4, another aggressive round of purchases of government securities and mortgage-backed securities by the Fed, it was signaling to the market that low interest rates will stay low for several more years. By doing so, it was hoping that individuals and businesses, which benefit from low interest rates when financing major purchases and investments, continue to consume and invest to promote stronger economic growth.

## Solving Problems

15. Assume that First Purity Bank begins with the balance sheet below and is fully loaned-up. Answer the questions that follow.

| First Purity Bank   |                       |
|---------------------|-----------------------|
| Assets              | Liabilities           |
| Reserves +\$700,000 | Deposits +\$2,000,000 |
| Loans +\$1,300,000  |                       |

- What is the reserve requirement equal to?
- If the bank receives a new deposit of \$1 million and the bank wants to remain fully loaned-up, how much of this new deposit will the bank loan out?
- When the new deposit to First Purity Bank works itself through the entire banking system (assume all banks keep fully loaned-up), by how much will total deposits, total loans, and total reserves increase?
- What is the potential money multiplier equal to in this case?

**Answer:**

- The reserve requirement is equal to 35% ( $\$700,000/\$2,000,000$ ).
- The bank must keep 35% (\$350,000) in reserves, therefore the bank will loan out \$650,000.
- Total deposits will increase by \$2,860,000, total loans will increase by \$1,860,000, and total reserves will increase by \$1,000,000.
- The potential money multiplier is  $1 \div \text{Reserve Requirement} = 1/0.35 = 2.86$ .



16. Suppose that the leakage-adjusted money multiplier can be calculated using a simple modification of our money multiplier formula:

$$1/(\text{Reserve Requirement} + \text{Excess Reserves} + \text{Cash Holding}),$$

where each component in the denominator is expressed as a percentage.

Suppose that the reserve requirement is 25%, but banks on average hold an additional 10% of their deposits as excess reserves. Further, assume that individuals and businesses choose to hold 15% of their borrowed funds in cash. Compare the potential money multiplier with the leakage-adjusted money multiplier. Does the existence of leakages make a significant impact on the ability to conduct monetary policy? Explain why or why not.

**Answer:** Without the leakages, the potential money multiplier would be  $1/\text{Reserve Requirement}$ , or  $1/0.25 = 4$ . However, with the leakages, the leakage-adjusted money multiplier would be  $1/(0.25 + 0.10 + 0.15) = 1/0.5 = 2$ . Therefore, the existence of leakages reduces the multiplier from 4 to 2, which significantly reduces the effectiveness of monetary policy.

## Using the Numbers

17. According to By the Numbers, by what percentage did the U.S. monetary base increase from 2000 to 2005? How about from 2005 to 2010? Why are the percentage changes in these periods so different?

**Answer:** From 2000 to 2005, the U.S. monetary base increased from about \$600 billion to about \$750 billion, an increase of 25%. From 2005 to 2010, the U.S. monetary base increased from about \$750 billion to about \$2 trillion, an increase of 167%. The latter period experienced a huge increase in the monetary base because the Fed took aggressive action to stem the effects of the 2007–2009 recession.

18. According to By the Numbers, during which decade did the greatest number of U.S. banks fail? During which decade did the second most U.S. banks fail?

**Answer:** The decade that saw the most bank failures was the 1980s, and the decade that saw the second most bank failures was the 1990s.

## Chapter 24

### Check Your Understanding

1. Why is it important for the Federal Reserve Board to be independent of the executive branch of the federal government?

**Answer:** If the Fed were not independent, it would be subject to more political pressure. Independence permits the Fed to focus on fighting inflation, along with appropriate concerns about employment and output. Countries where the central bank is not independent tend to have higher long-run inflation rates.

2. When the interest rate falls, why do people desire higher money balances?

**Answer:** One reason is that the opportunity cost of holding money is the interest rate; when it falls, people are willing (and want) to hold higher money balances.

3. Describe how open market operations alter the supply of money.

**Answer:** The Fed either buys or sells government securities. When the government sells securities, individual buyers or banks use checks or cash to buy those bonds. As a result, the money supply immediately shrinks, as do bank reserves. This leads to a further contraction in the money supply. To entice buyers to purchase the bonds, the Fed may receive a lower price (the supply of bonds has now increased), and these lower prices mean interest rates rise. The opposite is true when the Fed buys bonds.

4. What does the equation of exchange,  $M \times V = P \times Q$ , help to explain?

**Answer:** The equation of exchange helps to explain the long-run relationship between the money supply ( $M$ ) and the price level ( $P$ ). In the long run, velocity ( $V$ ) is a function of institutions and technology, and the economy hovers around full employment output ( $Q$ ). As a result,  $V$  and  $Q$  are fixed, therefore changes in  $M$  lead directly to changes in  $P$ .

5. How is the impact of expansionary monetary policy different when the economy is considerably below full employment than when it is at full employment?

**Answer:** When the economy is considerably below full employment, increases in the money supply will lead primarily to increases in output and income, with some rise in the price level. But at full employment, increases in the money supply lead primarily to increases in the price level.

6. How do sticky wages and prices make monetary policy effective in the short run?

**Answer:** When wages and prices are sticky, changes in the money supply will have a short-term effect on aggregate output. For example, if the Fed increases the money supply, aggregate demand increases and people feel they have more money and will consume more, pushing aggregate output higher. This effect can help push an economy toward full employment more quickly during a recession.

### Apply the Concepts

7. Suppose a rise in consumer confidence causes aggregate demand to increase, resulting in a short-run equilibrium that is above full employment output. What type of monetary policy might the Fed use to reduce inflationary pressures and to bring the economy back to full employment?

**Answer:** If the economy is operating above full employment output, upward pressure on prices will occur. To prevent inflation from rising, the Fed can use contractionary monetary policy to cool the economy. By reducing the money supply, interest rates would rise. Higher interest rates mean that consumers borrow less money for purchases, businesses reduce their investments, government spends more on financing debt, and net exports would likely fall. Each of these effects reduces aggregate output and the price level. The Fed would maintain this policy until long-run equilibrium is restored.

8. It seems that each time the Fed raises interest rates, the stock market has an awful few days. Why do higher interest rates have such an impact on the stock market?

**Answer:** Higher interest rates might affect the stock market for at least two reasons. First, higher rates make bonds a more attractive investment. Second, high rates mean that the Fed is trying in some way to restrain the economy. This often means slower growth and lower corporate profits.

9. If the Fed persistently pursues an easy money policy, what is the likely outcome?

**Answer:** Easy money policies (lower interest rates and a more rapid growth in the money supply) ultimately lead to higher inflation rates in the long run. These policies can also lead to excessive borrowing, insufficient saving, and unsustainable asset prices (bubbles).

10. When NASA scientists were operating the Mars rovers to get them to drive across the Martian landscape and collect and analyze rocks and crevices, the scientists complained that the 20-minute delay between when they issued a command and when the rovers responded made their job more challenging. Isn't this somewhat similar to what monetary policymakers face? How is it different?

**Answer:** Yes, it is very similar. The Fed makes policy based on where the economy is today, and where they think it is going, but their policy changes take a long time to have an impact. They differ in that Fed policymakers have a more complex environment in which to make policy. Not only must the Fed worry about what consumers and businesses in the United States will do, but they must also be concerned with international impacts and changes as well.

11. Suppose another spike in energy prices causes a negative supply shock to occur. What type of monetary policy should the Fed use if the goal is to maintain price stability in the economy? What are the consequences of doing so?

**Answer:** A negative supply shock causes the SRAS curve to shift left, raising the aggregate price level and reducing aggregate output. If the Fed wishes to maintain price stability, it would use contractionary monetary policy to shift the AD curve to the left, thereby pushing the price level back down. The consequence of doing so is the further reduction of aggregate output, which could lead to a recession if output remains depressed for a long period of time.

12. Explain how the housing bubble at the beginning of the 21st century led to the Taylor rule target exceeding the actual federal funds rate. Could increasing the federal funds rate during this time have helped to reduce the severity of the last recession?

**Answer:** The housing bubble caused prices of housing and related goods to rise, contributing to higher inflation. Two of the four components in the Taylor rule equation are positively influenced by

inflation. Also, increased aggregate demand from the housing bubble contributed to a positive output gap, which further increased the Taylor rule estimate. If the Fed had increased the federal funds rate, mortgage rates would likely have increased, which would have tempered some of the demand for housing, and the subsequent crash that led to the recession.

In the News

13. *There are two forces that cause the economy to grow. One is real, the other is an illusion. The real force—entrepreneurial innovation and creativity—comes naturally as long as government policies do not drive it away. The artificial force is easy money. An increased supply of money, by creating an illusion of wealth, can increase spending in the short run, but this eventually turns into inflation. Printing money cannot possibly create wealth; if it could, counterfeiting would be legal.*

BRIAN WESBURY, “ECONOMIC REHAB,” *WALL STREET JOURNAL*, JUNE 7, 2006, P. A14.

Does this quote illustrate the short-run versus the long-run aspects of monetary policy? Why or why not?

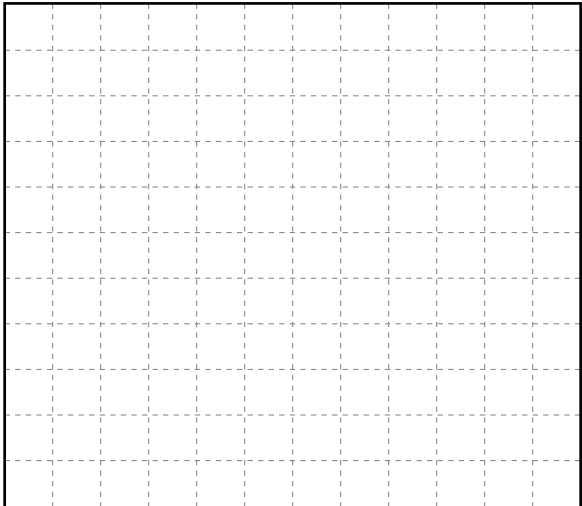
**Answer:** Yes, the quote illustrates the short-run versus the long-run aspects of monetary policy. In the short run, monetary expansion can increase output, income, employment, and the price level and probably wealth as well. But over the long run, increases in the money supply simply turn into higher prices.

14. *The Economist* commented on the Greek debt crisis in an aptly titled article on February 11, 2012, “Brinkmanship in Athens,” as Greece led the European economy to the edge as a battle brewed between Greek political leaders attempting to satisfy its citizens’ demands and the European Central Bank, which held the much needed rescue funds but demanded major fiscal reforms in return. Using an AD/AS model, explain how a major monetary stimulus from the European Central Bank would affect Greece’s economy. Next, explain what the required austerity measures (i.e., budget cuts) might do to the economy. Do these measures conflict with each other? Explain.

**Answer:** A major monetary stimulus would shift the AD curve to the right, promoting an increase in aggregate output which can reduce unemployment, leading to an improved economy which is more capable of repaying debt. However, the required austerity measures have the opposite effect, because such measures reduce AD and have a negative effect on output. The overall effect depends on which AD effect is stronger. If austerity measures are too severe, it could lead to a worsening of the economy, which could subsequently worsen the debt.

Solving Problems

15. Why are supply shocks so much harder than demand shocks for monetary policy to adjust to? Use the grid below to show your answer to this question.



**Answer:** The Federal Reserve’s response to demand shocks is effective because if, for example, aggregate demand shifts to  $AD_1$ , where the price level and output fall, the Fed can use expansionary policy

to return to the initial equilibrium point  $e$ . The same is true if aggregate demand expands to  $AD_2$ ; contractionary policy will bring the economy back to point  $e$ .

Supply shocks, on the other hand, pose a more difficult problem for the Fed. If a negative supply shock hits the economy (energy prices jump), shifting the aggregate supply curve to  $AS_1$ , now the Fed faces a dilemma: Expansionary policy will bring the economy back to output  $Q_0$ , but the price level will rise to  $P_2$  (point  $b$ ). Using contractionary policy to return to the original price level will make the recession worse as output declines to  $Q_2$  (point  $c$ ).

16. In 2012, the U.S. inflation rate was 2.1% and output was 4.8% below its long-run potential output due to the slow recovery of the economy. Assuming that the inflation target is 2%, what would be the federal funds target rate if the FOMC used the Taylor rule? How does this compare to the actual federal funds rate of 0.1%?

**Answer:** The Taylor rule says that the target federal funds rate should be  $2\% + 2.1\%$  (Inflation Rate)  $+ 1/2(0.1\%)$  (Inflation Gap)  $+ 1/2(-4.8\%)$  (Output Gap)  $= 1.75\%$ . This target is higher than the actual federal funds rate of 0.1%, because the Fed had committed to keeping interest rates low for an extended period until the unemployment rate fell back to normal levels.

## Using the Numbers

17. According to By the Numbers, what were the approximate interest rates for the following types of loans in September 2013: federal funds rate, discount rate, prime rate, 30-year mortgage rate? Why aren't these interest rates all the same?

**Answer:** The federal funds rate was around 0.1%, the discount rate was 0.75%, the prime rate was 3.25%, and the 30-year mortgage rate was 4.3%. These interest rates are not all the same because of the varying levels of risk involved. Mortgage loans have the greatest risk of default, while the federal funds rate is used on virtually risk-free overnight loans between banks.

18. According to By the Numbers, in what region outside of the United States is the largest percentage of U.S. \$100 bills in circulation held? Why is the answer not China, which holds the most U.S. debt?

**Answer:** In Europe and Russia, with 28% of all U.S. \$100 bills. Although China holds the most U.S. debt, including money and bonds, nearly all of this is held electronically rather than in actual paper currency.

## Chapter 25

### Check Your Understanding

1. The Phillips curve for the United States in the 1960s shown in Figure 4 becomes very steep after unemployment drops below 4%, and rather shallow as unemployment exceeds 6%. Why is a typical Phillips curve shaped this way?

**Answer:** When the economy has a lot of slack, say, when unemployment exceeds 6%, the economy can expand with little pressure on prices. However, when the economy approaches full employment (when unemployment gets below 4%), labor and other markets tighten and any further expansion is met by rapidly rising prices.

2. Does the long-run Phillips curve make it difficult (if not impossible) for policymakers to increase output and employment beyond full employment in the long run?

**Answer:** Yes, the vertical long-run Phillips curve (LRPC) means that expanding aggregate demand to move the economy to higher levels of employment when the economy is at full employment will result in a higher level of inflation.

3. Explain why inflation accelerates if policymakers use monetary and fiscal policy to keep unemployment below the natural rate.

**Answer:** Expansionary monetary and fiscal policy designed to keep the economy below the natural rate of unemployment leads to a higher rate of inflation (on the original Phillips curve). This higher rate of inflation raises inflationary expectations, shifting the Phillips curve right and worsening the

inflation-unemployment tradeoff. Now, to keep the economy below the natural rate requires more expansionary policy, raising inflation even further. And thus the cycle repeats itself.

4. Does having rational expectations mean that all economic actors act rationally and are always correct?

**Answer:** No. Rational expectations imply that economic actors take into account all available information and put that information into a reasonable economic model. Economic actors are not always right, but there are no systematic biases in their errors.

5. Would policymakers prefer a Phillips curve with a steep or a shallow slope? Why?

**Answer:** A steep slope would mean that small reductions in the unemployment rate lead to large changes in inflation rates. The opposite is true for a shallow slope curve. Thus, policymakers would prefer a shallow slope curve—low unemployment rates would be associated with lower inflation rates.

6. A negative supply shock (a huge natural disaster or significant energy price spike) would do what to the short-run Phillips curve? To the long-run Phillips curve?

**Answer:** It would shift out and to the right. Now, higher unemployment rates are temporarily associated with higher inflation rates. There would be no impact on the long-run Phillips curve.

## Apply the Concepts

7. Why would policymakers want to drive unemployment below the natural rate, given that inflation will result?

**Answer:** Politicians, some policymakers, and some academics see unemployment as a bigger problem than moderate inflation. For politicians, a low unemployment rate makes re-election easier. Further, there are different views on how low unemployment can be pushed before inflation becomes a problem.

8. Why are inflationary expectations so important for policymakers to keep under control? When a supply shock such as an oil price spike hits the economy, does it matter how fast policymakers attempt to bring the economy back to full employment?

**Answer:** High inflationary expectations shift the Phillips curve rightward, worsening the tradeoff between inflation and unemployment for policymakers. High inflationary expectations make their job of reducing inflation harder. The speed at which policymakers increase aggregate demand to return the economy to full employment could affect inflationary expectations. For this reason, policymakers typically try a slower growth path back to full employment to keep inflationary expectations muted.

9. How are the long-run Phillips curve (LRPC) and the long-run aggregate supply (LRAS) curve related?

**Answer:** Both show equilibrium points for the economy at full employment over the long run. The long-run aggregate supply curve shows long-run equilibrium rates for the price level, while the long-run Phillips curve shows equilibrium rates of inflation.

10. Would the credibility of policymakers' (Congress and the Fed) commitment to keeping inflation low have an effect on inflationary expectations when the economy is beset by a supply shock?

**Answer:** Probably. Today, even with energy prices rising, inflationary expectations are low because individuals and businesses have confidence in the Fed's commitment to low inflation targets. This low level of inflationary expectations probably makes their job easier.

11. Explain why those who favor the rational expectations approach to modeling the economy do not favor discretionary policymaking.

**Answer:** Those who believe that the world is best modeled with rational expectations see policymaking as ineffective. If the economy consists of individuals and businesses that are governed by rational expectations, when policymakers decided to implement some policy, people and business react in ways that are counterproductive and render policy ineffective.

12. If efficiency wages are widespread throughout the economy but most workers feel they are significantly underpaid, will paying workers more prevent them from shirking?

**Answer:** If employees are convinced that they are significantly underpaid, efficiency wages may have little impact on shirking, productivity, or turnover. However, those who think that they are underpaid

and begin looking for a new position often must face the reality that they are overpaid when no offers are forthcoming, or when information filters back to them about those who quit and ended up with lower-paying jobs.

### In the News

13. Fed Chairman Ben Bernanke recently noted that “in the 1970s the public had little confidence that the Fed would keep inflation low and stable.” As a result, when oil prices rose, wages and prices quickly followed. This caused the Fed to have to increase interest rates sharply to curtail inflation. Do people have a different perspective on the Fed today than they did in the past?

**Answer:** Oil prices are rising, but the Fed does not have to push interest rates as severely because inflationary expectations are considerably lower. After the Fed’s performance over the last three decades, people are confident that Fed policy will be able to keep inflation low over the long term.

14. About every year, Congress is tasked with increasing the debt ceiling that allows the government to continue borrowing. In past decades, such legislation would pass easily because it was authorizing the payment of expenses already incurred. However, in recent years, congressional leaders took the drastic approach to oppose raising the debt ceiling as a way to reign in government spending. If these leaders were successful in preventing the debt ceiling from being raised, what would be some benefits and costs of this action?

**Answer:** The benefit of opposing an increase in the debt ceiling is that it would force an immediate reduction in government spending. Therefore, such a policy would make spending cuts a necessary rather than a proposed fiscal policy action. However, the costs of not raising the debt ceiling can be substantial. First, the debt ceiling is raised to pay for government spending already incurred. Opposing it would be similar to asking a credit card company to lower the credit limit *after* one has already charged up the card. Second, it would likely lead to a drop in confidence in U.S. assets, which would raise their interest rates. Higher interest rates mean payments on the debt rise, making it even harder to stay within the ceiling. Finally, much of government spending is mandatory rather than discretionary. Therefore, unless the law changes on popular programs such as Social Security and Medicare, the government does not have much flexibility to cut significant amounts of spending in the short run.

### Solving Problems

15. In Canada, the consensus estimate of the natural rate of unemployment was 4.5% in 1970 and 7% in 2005. A minority view has claimed that the change to 7% is beyond explanation and must be too high. A similar change has taken place in the United States over this period, but the consensus estimate of the natural rate of unemployment is closer to 5.5% today. What would be the result if the Bank of Canada (the central bank of Canada) and the Federal Reserve in the United States assumed that the natural rate was 7% when it really was closer to 5.5%?

**Answer:** Under this assumption, anytime unemployment slipped below 7%, the U.S. Federal Reserve and the Bank of Canada would tighten monetary policy. Inflation would be very low (possibly even deflation), but most important, both countries would be losing a lot of output and income as policy-makers kept the economy below full employment.

16. When the recessions of 1990–1991 and 2001 ended, unemployment kept rising and it took roughly two-and-a-half years before unemployment returned to where it was at the *trough* of the recession. The figure below shows the path of unemployment (indexed to 100 = trough level) after the recession had officially ended.



Following the 1990–1991 recession, unemployment only returned to its lowest level (at the peak before the recession) after four-and-a-half years, and with the recession of 2001, unemployment never returned to its lowest level. Does this phenomenon of unemployment continuing to rise after a recession has ended help foster the conclusion that these two recoveries were jobless recoveries?

**Answer:** Yes it does. The longer unemployment keeps rising after the trough has been reached, the more likely it will take a longer period for unemployment to fall to its previous lowest level (at the peak of the cycle). All of the other reasons for jobless recoveries we discussed add to the time needed to get unemployment back to its previous low.

## Using the Numbers

17. According to By the Numbers, in which year did the median value of existing homes peak? By what percentage did the median existing home price increase from the year 2000 until its peak? By what percentage did the median existing home price fall from its peak to the year 2012?

**Answer:** Existing home prices peaked in the year 2006. From 2000 to 2006, the median existing home price rose about 88%, or \$125,000 in value. From 2006 to 2012, the median existing home price fell about 35%, or \$91,000 in value.

18. According to By the Numbers, what was the value of monthly real retail sales when it reached its lowest point in 2009? By what percentage did monthly real retail sales increase from 2009 to 2013?

**Answer:** Monthly real retail sales reached its lowest point in 2009 at a value of about \$157 billion. In 2013, monthly real retail sales surpassed \$180 billion, an increase of about 15%.

## Chapter 26

### Check Your Understanding

1. What is the difference between absolute and comparative advantage? Why would Michelle Wie, who is better than you at both golf and laundry, still hire you to do her wash?

**Answer:** A country (or individual) has an absolute advantage when it can produce more of a good or service than another. A comparative advantage exists when one country's (or individual's) opportunity cost to produce a good is lower than another's. Michelle Wie would hire you to do laundry because your opportunity cost of doing laundry is less than hers. In the two or three hours that it takes to do her laundry, she could earn far more than what she would have to pay you.

2. If the United States has a comparative advantage in the production of strawberries compared to Iceland, how might trade affect the prices of strawberries in the two countries?

**Answer:** If the United States has a comparative advantage in strawberry production relative to Iceland, this means that the pretrade price of strawberries is lower in the United States than in Iceland. With trade, strawberry prices would rise in the United States (due to greater overall demand from exports) while strawberry prices would fall in Iceland (due to greater supply from imports).

3. Who are the beneficiaries from a large U.S. tariff on French and German wine? Who are the losers?

**Answer:** The U.S. government, California, and Australian (and other nations') wine companies would clearly benefit, and consumers of wine would lose. French and German wine companies also would clearly lose.

4. Why does a quota generate a larger loss to the importing country than a tariff that restricts imports to the same quantity?

**Answer:** A quota generates a larger loss to the importing country because the government does not collect tariff revenues on imports. This equivalent amount is instead kept by the exporting country through the higher prices as a result of the quota.

5. What is the difference between an infant industry and a key industry? Why do producers in both industries desire protection against foreign imports?

**Answer:** An infant industry is one that is relatively new in a country and has not generated the cost efficiencies to compete against established foreign companies. A key industry is any industry that produces goods deemed vital to national defense. Both types of industries seek protection against foreign imports in order to protect the many jobs that depend on the existence of the industry.

6. How could free trade between the United States and China potentially lead to *more* jobs in the United States?

**Answer:** Although the United States has made progress increasing exports to China, barriers to trade make it hard for American companies to sell their goods to China. Free trade between the two nations would greatly expand American exports, leading to many more jobs in the United States for export industries such as cars, airplanes, and machinery. However, increased imports from China may offset some of the growth in jobs, but the overall effect on jobs is likely to be positive given the vast untapped consumer markets in China that have a great appetite for American-made products.

## Apply the Concepts

7. South Korean film production companies have been protected for half a century by policies enacted to protect an infant industry. But beginning in July 2006, the days that local films *must* be shown by any movie house was reduced to 73 from 146. South Korean film celebrities and the industry fought the changes even though local films commanded half the box office. Why would a country enact special protection for the local film industry? Who would be the major competitor threatening the South Korean film industry? If films made by the local industry must be shown at least 146 days a year, does the local industry have much incentive to develop good films and be competitive with the rest of the world?

**Answer:** While not an industry with a huge economic impact, domestic film companies have a cultural role to play. Many countries feel that foreign films will swamp the existing industry and important art forms will be lost. Hollywood is their main competitor. Guaranteeing local production companies that their films will be shown exclusively half the time reduces the need (incentive) to be competitive.

8. Expanding trade in general benefits both countries, or they would not willingly engage in trade. But we also know that consumers and society often gain while particular industries or workers lose. Since society and consumers gain, why don't the many gainers compensate the few losers for their loss?

**Answer:** A recognition of this problem of many people gaining at the expense of a few workers prompted the federal government to provide trade assistance to those industries harmed by trade agreements. For workers, this assistance involves helping with retraining expenses.

9. Some activist groups are calling for "fair trade laws" by which other countries would be required to meet or approach our environmental standards and provide wage and working conditions approaching those of developed nations in order to be able to trade with us. Is this just another form of rent seeking by industries and unions for protection from overseas competition?



**Answer:** Although this is not the stated goal, it would be the impact if many foreign firms or countries were required to meet our environmental and labor laws and wage rates. Many countries are not at the stage of development at which they can afford to mimic U.S. infrastructure. Worker productivity in many countries is not high enough to support high wages or the tax rates necessary for the level of government services provided in the United States.

10. Why is there free trade between states in the United States but not necessarily between countries?

**Answer:** The states of the United States generally have the same objectives and goals, whereas countries often have very different cultures, goals, and objectives. This is one of the difficulties the European Union is having in developing common rules to, in effect, structure itself in a similar way to the United States.

11. Remittances from developed countries amount to over \$325 billion each year. These funds are sent to their home countries by migrants in developed nations. Is this similar to the gains from trade discussed in this chapter, or are these workers just taking jobs that workers in developed countries would be paid more to do in the absence of the migrants?

**Answer:** It is very much like the gains from trade examples discussed in the chapter. Developing nations send workers who produce output in developed countries, and the developing world gets some income (remittances) in return. We benefit and they benefit. Quite possibly the migrants to developed nations may reduce wages for some jobs that domestic workers in these countries might do if the pay were higher, therefore some domestic workers may suffer a loss as consumers reap the benefits.

12. Suppose Brazil developed a secret process that effectively quadrupled its output of coffee from its coffee plantations. This secret process enabled it to significantly undercut the prices of U.S. domestic producers. Would domestic producers receive a sympathetic ear to calls for protection from Brazil's lower cost coffee? How is this case different from that of protection against cheap foreign labor?

**Answer:** Given that Brazil's secret process is not cheap labor, domestic producers would probably not get much of a hearing (they would be encouraged to develop their own secret process). This is very much like the domestic auto industry going to Washington for help in 2006 and being politely rebuffed. There really isn't any real difference; comparative advantage is comparative advantage.

## In the News

13. Economist Steven Landsburg (*New York Times*, January 16, 2008, p. A23) made the point that “bullying and protectionism have a lot in common. They both use force (either directly or through the power of the law) to enrich someone else at your involuntary expense. If you're forced to pay \$20 an hour to an American for goods you could have bought from a Mexican for \$5 an hour, you're being extorted.” He also argued, “Surely we have fellow citizens who are hurt by those [trade] agreements, at least in the limited sense that they'd be better off in a world where trade flourishes, except in this one instance. What do we owe those fellow citizens?” The United States has programs to educate and retrain workers displaced from free trade agreements. Do we even owe them that? Why?

**Answer:** Everyone benefits from trade. When you shop at Wal-Mart instead of your local store, you gain, or you wouldn't buy there. When you buy books from Amazon.com instead of your local independent bookstore, you have freely engaged in trade. What do you owe the owner of the local bookstore? Nearly every transaction we engage in every day essentially involves trade—one firm and their workers get your business while others lose out. What do you owe the losers? The answer given by our actions day after day is nothing.

Does the argument change when public policy is involved? If high salaries for steel workers were based on previous protectionist policies (tariffs and quotas for instance), when these protections are removed, do these workers have a claim on your income because you benefit from lower auto prices? Probably not. Education and retraining make sense due to the fact that the entire economy loses when people are unemployed (or unemployable if their skills are so specific). The public payoff from this investment in people over the long run is highly positive because they will pay higher taxes and be less of a drain on the public purse.

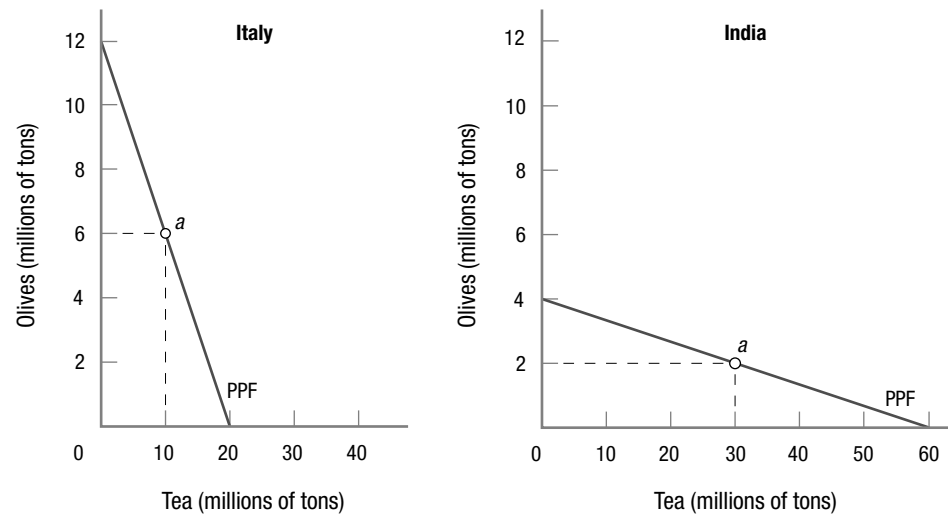
14. *The Economist* (November 21, 2009) suggested that in a highly globalized world where production is easily moved to other countries, there is an inherent tension between our desire to reduce carbon

emissions to stem global climate change and our commitment to free trade. Do you agree? Why or why not?

**Answer:** Reducing carbon emissions essentially requires putting a higher cost on those emissions. This would force producers to pay the full cost of their production, including their impact on climate change. This would inevitably result in higher prices. If other countries do not enact the same stringent costs on their producers, there is an incentive for high-carbon industries to shift production to these countries, just as production shifts from high-wage to low-wage countries when possible. To stop high-carbon production migration, taxes and tariffs on imports from low-cost countries have been suggested, hence the tension.

Solving Problems

15. The figure below shows the production possibilities frontiers (PPFs) for Italy and India for their domestic production of olives and tea. Without trade, assume that each is consuming olives and tea at point *a*.



- a. If Italy and India were to consider specialization and trade, what commodity would each specialize in? What is India's opportunity cost for tea and olives? What is Italy's opportunity cost for tea and olives?
- b. Assume the two countries agree to specialize entirely in one product (the one in which each country has a comparative advantage), and agree to split the total output between them. Complete the table below. Are both countries better off after trade?

| Country and Product |        | Before Specialization | After Specialization | After Trade |
|---------------------|--------|-----------------------|----------------------|-------------|
| Italy               | Olives | 6 million tons        | _____                | _____       |
|                     | Tea    | 10 million tons       | _____                | _____       |
| India               | Olives | 2 million tons        | _____                | _____       |
|                     | Tea    | 30 million tons       | _____                | _____       |

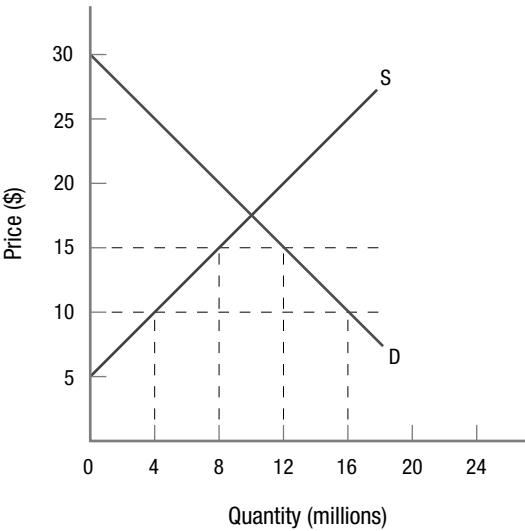
**Answer:**

- a. India in tea, Italy in olives. India's opportunity cost for 1 million tons of olives is 15 million tons of tea. Italy's opportunity cost for olives is 1.7 million tons of tea for 1 million tons of olives. Italy's opportunity cost for olives is lower, therefore it will specialize in olive production. India's opportunity cost for 1 million tons of tea is 1/15 million (or 0.066 million) tons of olives. Italy's opportunity cost for tea is 0.6 million tons of olives. India's opportunity cost for tea is lower, therefore it will specialize in tea production.

b. See the table below. Yes, they both are better off, as shown in the last column.

| Country and Product |        | Before Specialization | After Specialization | After Trade     |
|---------------------|--------|-----------------------|----------------------|-----------------|
| Italy               | Olives | 6 million tons        | 12 million tons      | 6 million tons  |
|                     | Tea    | 10 million tons       | 0                    | 30 million tons |
| India               | Olives | 2 million tons        | 0                    | 6 million tons  |
|                     | Tea    | 30 million tons       | 60 million tons      | 30 million tons |

16. The following figure shows the annual domestic demand and supply for 10 GB compact flash cards for digital cameras.



- a. Assume that the worldwide price of these 10 GB cards is \$10. What percent of United States sales would be imported?
- b. Assume the U.S. government puts a \$5 tariff per card on imports. How many 10 GB flash cards would be imported into the United States?
- c. Given the tariff in question (b), how much revenue would the government collect from this tariff?
- d. Given the tariff in question (b), how much more sales revenue would domestic companies enjoy as a result of the tariff?

**Answer:**

- a. At \$10, unit total sales will be 16 million, with imports equal to the difference between 16 million total sales and domestic supply of 4 million units, therefore imports will be 12 million and as a percent of U.S. sales are equal to  $12/16 = 75\%$ .
- b. 4 million; at a price of \$15 ( $\$10 + \$5$  tariff), total sales are 12 million and domestic supply is 8 million units.
- c. Imports are 4 million times \$5 a unit, therefore the total revenue from the tariff is \$20 million.
- d. When the price was \$10, domestic sales revenue was  $\$10 \times 4$  million units = \$40 million. With the \$5 tariff, sales revenue is  $\$15 \times 8$  million units = \$120 million, therefore revenues have increased by \$80 million. No wonder domestic industries like tariffs on foreign products.

**Using the Numbers**

17. According to By the Numbers, approximately when was the last time the United States had a trade surplus? As a percentage of GDP, what was the highest trade surplus the United States has achieved? What was the highest trade deficit the United States has achieved?

**Answer:** The last time the United States had a trade surplus was in 1975 (1976 is also a valid answer because a trade surplus existed in the early part of that year). The highest trade surplus the United States has achieved was about 1% of GDP in 1964 and 1975. The highest trade deficit the United States has achieved was about 5.8% in 2006 and 2007.

18. According to By the Numbers, most of the developed countries (Canada, Australia, the United States, and Switzerland) have relatively low tariff barriers while much of the developing world still has high tariffs on imports. What reasons might account for why these countries continue to have high tariffs?

**Answer:** Reasons for why many developing countries still have high tariffs include: (1) reliance on tariffs for government revenues, (2) protection of infant industries, and (3) weaker productivity of labor.

## Chapter 27

### Check Your Understanding

1. Describe the balance of trade. What factors contribute to our trade deficit?

**Answer:** The balance of trade is the difference between exports and imports ( $X - M$ ). As noted in an earlier chapter, the U.S. budget deficit is contributing to the trade deficit, and the trade deficit is affected by the low savings rate of U.S. consumers. The demand in this country for imports exceeds world demand for our exports.

2. Mexican immigrants working in the United States often send money back home (known as remittances) to help their families or to add to their savings account for the future. In 2012, these remittances surpassed \$22 billion. How are these transfers recorded in the balance of payments accounts?

**Answer:** In Table 1, remittances from foreigners working in the United States and sending money home would be logged under the Income Payments (outflow) subsection Net Transfers.

3. What is the important difference between the current account and the capital account, given that the sum of the two values must equal 0?

**Answer:** The current account measures payments for exports and imports of goods and services, incomes, and transfers of money in and out of the country. The capital account summarizes the flows of funds in and out of domestic and foreign assets such as plants and equipment, ownership of companies, and so on.

4. If the euro appreciates by 30%, what will happen to imports of Mercedes-Benz automobiles in the United States?

**Answer:** An appreciating euro means that the dollar buys fewer euros, and European goods will now cost roughly 30% more in United States. Thus, fewer Mercedes-Benz cars will be ordered, and imports of the vehicles will decline.

5. Describe the difference between fixed and flexible exchange rates.

**Answer:** Under a fixed exchange rate system, governments alter their macroeconomic policies to maintain the exchange rate at a set level. Countries that adopt a flexible exchange rate system let exchange rate markets adjust the exchange rate to their macroeconomic policies.

6. Describe the difference between the nominal and real exchange rates. What does rising inflation do to a country's real exchange rate?

**Answer:** The nominal exchange rate is the price of one country's currency for another. The real exchange rate takes the price levels of both countries into account; it is the nominal rate times the ratio of the price levels of the two countries. High inflation in one country means that the real exchange rate is higher because prices abroad become relatively cheaper; this puts downward pressure on that country's currency (it will likely depreciate).

### Apply the Concepts

7. Assume that global warming and especially high temperatures in Northern California have rendered it impossible for wine grapes in the Napa Valley (and all over California) to grow properly. Unable to get California wines, demand jumps dramatically for Australian wines. How would this affect the Australian dollar? Is this good for other Australian exports?

**Answer:** As wholesalers and other wine merchants need Australian dollars to purchase wine, the demand for Australian dollars grows in the foreign exchange market, causing the Australian dollar to appreciate. This is a dual-edged sword, however, as other Australian export products are now higher priced, making them a little less competitive in world markets.

8. If the European economies begin having a serious bout of stagflation—high rates of both unemployment and inflation—will this affect the value of the dollar?

**Answer:** Relative to the euro, the dollar should become stronger as the exchange rate for the euro drops. This would probably not affect the exchange rate between the dollar and the yen or other non-European currencies.

9. Trace through the reasoning why monetary policy is enhanced by a flexible exchange rate system.

**Answer:** An increase in the money supply leads to lower interest rates and therefore a capital outflow as investors seek higher returns elsewhere. This leads to a weakening of the dollar, therefore imports fall while exports rise. Rising exports and falling imports increase aggregate demand, improving income and output, and making monetary policy a little stronger.

10. Zimbabwe devalued its currency in mid-2006, essentially turning a \$20,000 Zimbabwe bill into a \$20 bill. People were permitted only three weeks during which to turn in their old currency for new notes; individuals were limited to \$150 a day and companies were restricted to \$7,000 a day. Who do you think were the losers from this devaluation, especially considering the limited turn-in period for the old currency?

**Answer:** People holding a large hoard of cash were unable to redeem all the old banknotes for the new notes. The poor did not hold as much as the wealthy. The other group harmed is black market currency traders.

11. Exchange rates and purchasing power parity should be the same between countries. If it costs 300 U.S. dollars to purchase an iPad in the United States and 400 Australian dollars to purchase one in Sydney, then the exchange rate between Australia and the United States should be 4:3. Why might purchasing power parity be different from the exchange rate?

**Answer:** Trade barriers and import taxes can play a role. The level of competition can also be important. If a company has a monopoly in one country, and competition prevails in the other, relative prices will differ.

12. When the dollar gets stronger against the major foreign currencies, does the price of French wine rise or fall in the United States? Would this be a good time to travel to Australia? What happens to U.S. exports?

**Answer:** The dollar appreciates, therefore French wine will be cheaper as the dollar now buys more euros. Yes, it would be a good time to go to Australia when the Australian dollar is weak relative to the U.S. dollar. Exports in the United States will fall as U.S. goods become more expensive in world markets.

## In the News

13. In the latter half of 2012, the worldwide musical hit *Gangnam Style* by South Korean K-pop singer Psy, contributed to a boost in tourism to South Korea (“Gangnam Brings Fans—and Tourism Revenue—to Korea,” CNBC.com, January 23, 2013). Record numbers of tourists from China, Japan, and even the United States wanting to see the Gangnam district in person helped South Korea’s economy in 2012. How does an increase in South Korean tourism affect the foreign exchange market for the South Korean won (its currency)?

**Answer:** An increase in the number of tourists to South Korea would increase the demand for South Korean won in the foreign exchange market. This would lead to an appreciation of the won relative to the currencies being traded (in the case of tourists from China, Japan, and the United States: the yuan, yen, and dollar), assuming all else equal. In the latter half of 2012, the South Korean won appreciated about 10% against the U.S. dollar, suggesting that the increased tourism had a real effect on the exchange rate.

14. The Eurozone crisis has led more than one nation to consider abandoning the euro and returning to its previous currency (“Pondering a Dire Day: Leaving the Euro,” *New York Times*, December 12, 2011). If a nation were to exit the Eurozone and significantly devalue its currency against the euro and

other major currencies, what are some implications for trade, the current account, and the standard of living for its citizens?

**Answer:** An exit from the Eurozone and a major devaluation in the currency would carry many important effects. With regard to trade and the current account, a major devaluation would lead to a boost in exports (which would be cheaper) and a reduction in imports (which would be more expensive), helping to improve the nation's current account. However, the high price of inputs would lead to inflation, decreasing the purchasing power of the nation's citizens, which would lead to a decline in its standard of living. In sum, leaving the Eurozone may result in an easier path for long-run growth (by way of an improved current account), but in the short run would cause a reduction in the standard of living of its citizens.

## Solving Problems

15. Assume that the following exchange rates prevail:

**(U.S. \$ Equivalent)**

|           |                 |
|-----------|-----------------|
| Argentina | 0.1904 (peso)   |
| Canada    | 0.9648 (dollar) |
| Mexico    | 0.0812 (peso)   |
| Bahrain   | 2.6525 (dinar)  |

How many Mexican pesos does it take to get 1 Bahraini dinar? If you had 20 U.S. dollars, could you take a ferry ride in Canada if it cost 25 Canadian dollars? If someone gave you 50 Argentinean pesos to settle a 150 Mexican peso bet, would it be enough?

**Answer:** It takes 32.67 Mexican pesos to get 1 Bahraini dinar ( $2.6525 \div 0.0812 = 32.67$ ). No, you could not afford the ferry trip because \$20 is worth \$20.73 Canadian dollars ( $20 \div 0.9648 = 20.73$ ). No, each Argentine peso is worth 2.34 Mexican pesos; therefore, 50 Argentine pesos are worth 117 Mexican pesos.

16. Suppose that you are given an opportunity to work in Tokyo over the summer as an English tutor, and you are provided with all living expenses and a 500,000-yen cash stipend, which you plan to save and bring home. If the exchange rate is 103 yen per U.S. dollar, how much is your stipend worth in dollars if you traded your money right away? Suppose you predict that the exchange rate will change in the next few months to 92 yen per dollar. Would you receive more dollars if you wait until after the exchange rate changes?

**Answer:** If you exchanged 500,000 yen at a rate of 103 yen per dollar, you would receive \$4,854 ( $500,000 \div 103 = 4,854$ ). If you believe the exchange rate will change to 92 yen per dollar, you are predicting that the value of the yen will appreciate, or be worth more in terms of dollars. Therefore, you should wait. If the exchange rate does change to 92 yen per dollar, 500,000 yen would be worth \$5,435 ( $500,000 \div 92 = 5,435$ ).

## Using the Numbers

17. According to By the Numbers, if approximately \$4 trillion of currency is traded each day in foreign exchange markets, about how much of this is traded in U.S. dollars? Euros? Japanese yen?

**Answer:** About 84.9% of all transactions involve the U.S. dollar, which means approximately \$3.39 trillion ( $84.9\% \times \$4 \text{ trillion}$ ) in U.S. dollars is exchanged each day, assuming that the value of each transaction is the same. Using this assumption, about \$1.56 trillion in euros is traded each day, and about \$0.76 trillion in Japanese yen is traded each day.

18. According to By the Numbers, if you travel to Jordan to visit the archaeological site of Petra and exchange 200 U.S. dollars, about how many Jordanian dinars would you receive? If you had traveled to Petra last year, would the amount of money received for your \$200 have been different?

**Answer:** The exchange rate is 0.71 Jordanian dinar per U.S. dollar, which means that \$200 can be exchanged for 142 dinars ( $0.71 \text{ dinar per dollar} \times \$200$ ). If you had traveled last year, the amount of dinars received would have been roughly the same, because the Jordanian dinar is pegged to the U.S. dollar.