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**CHAPTER 2 | Trade-offs,  
Comparative Advantage,  
and the Market System**

*Brief Chapter Summary and Learning Objectives*

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**2.1 Production Possibilities Frontiers and Opportunity Costs (pages 38–44)**

Use a production possibilities frontier to analyze opportunity costs and trade-offs.

- The economic resources nations have to produce goods and services are scarce. Decision-makers face trade-offs as the result of scarcity.
- The model of the production possibilities frontier is used to analyze the opportunity costs and trade-offs that individuals, firms, or countries face.

**2.2 Comparative Advantage and Trade (pages 44–49)**

Understand comparative advantage and explain how it is the basis for trade.

- Comparative advantage is the ability of an individual, firm, or country to produce a good or service at a lower opportunity cost than other producers.

**2.3 The Market System (pages 49–55)**

Explain the basic idea of how a market system works.

- Markets enable buyers and sellers of goods and services to come together to trade.
- Entrepreneurs, those who own and operate businesses, produce goods and services that consumers want and decide how these goods and services should be produced to yield the most profit.
- It is essential that government protects rights to private property in order for a market system to work well.

*Key Terms*

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**Absolute advantage**, p. 46. The ability of an individual, a firm, or a country to produce

more of a good or service than competitors, using the same amount of resources.

**Circular-flow diagram**, p. 50. A model that illustrates how participants in markets are linked.

**Comparative advantage**, p. 47. The ability of an individual, a firm, or a country to produce a good or service at a lower opportunity cost than competitors.

**Economic growth**, p. 44. The ability of the economy to produce increasing quantities of goods and services.

**Entrepreneur**, p. 53. Someone who operates a business, bringing together the factors of production—labor, capital, and natural resources—to produce goods and services.

**Factor markets**, p. 49. Markets for the factors of production, such as labor, capital, natural resources, and entrepreneurial ability.

**Factors of production**, p. 49. The inputs used to make goods and services.

**Free market**, p. 50. A market with few government restrictions on how a good or service can be produced or sold or on how a factor of production can be employed.

**Market**, p. 49. A group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade.

**Opportunity cost**, p. 39. The highest-valued alternative that must be given up to engage in an activity.

**Product markets**, p. 49. Markets for goods—such as computers—and services—such as medical treatment.

**Production possibilities frontier (PPF)**, p. 38. A curve showing the maximum attainable combinations of two products that may be produced with available resources and current technology.

**Property rights**, p. 53. The rights individuals or firms have to the exclusive use of their property, including the right to buy or sell it.

**Scarcity**, p. 38. A situation in which unlimited wants exceed the limited resources available to fulfill those wants.

**Trade**, p. 44. The act of buying and selling.

## Chapter Outline

### Managers Making Choices at BMW

The managers at firms such as BMW (Bavarian Motor Works) must make decisions regarding the production and marketing of their products. These decisions include the location and relocation of manufacturing plants and the production methods used at these plants.

#### >>Teaching Tips

**An Inside Look** at the end of the chapter discusses how managers decide between producing hybrid cars and improving conventional gasoline-powered cars. After you have gone through the chapter in class, ask your students to read **An Inside Look** as the basis for classroom discussion. See related problem 1.5.

**Economics in YOUR LIFE!** asks students to consider the trade-offs they face when purchasing a car. The authors return to this example at the end of the chapter.

## 2.1 Production Possibilities Frontiers and Opportunity Costs (pages 38–44)

Learning Objective: Use a production possibilities frontier to analyze opportunity costs and trade-offs.

**Scarcity** is a situation in which unlimited wants exceed the limited resources available to fulfill those wants.

A graph of a linear production possibilities frontier (*PPF*) is used to illustrate the trade-off BMW faces in deciding how many roadsters and SUVs it should produce given its limited resources and technology.

A **production possibilities frontier** is a curve showing the maximum attainable combinations of two products that may be produced with available resources and current technology.

### A. Graphing the Production Possibilities Frontier

Combinations of products on the frontier are technically efficient because the maximum output is obtained from the available resources. Combinations inside the frontier are inefficient because some resources are not being used. Combinations outside the frontier are unattainable with current resources.

**Opportunity cost** is the highest-valued alternative that must be given up to engage in an activity.

### B. Increasing Marginal Opportunity Costs

A convex or “bowed out” *PPF* illustrates increasing marginal opportunity costs. Increasing marginal opportunity costs occur because some workers, machines, and other resources are better suited to one use than another. Increasing marginal opportunity costs illustrate an important concept: the more resources already devoted to any activity, the smaller the payoff to devoting additional resources to that activity.

### C. Economic Growth

**Economic growth** is the ability of the economy to produce increasing quantities of goods and services. Economic growth can occur if more resources become available or if a technological advancement makes resources more productive. Growth may lead to greater increases in production for one good than another.

#### >>Teaching Tips

Encourage students to use **Solved Problem 2-1** to understand how production possibilities frontiers illustrate opportunity costs and trade-offs. The *PPF* is the first of many graphs students will see in the textbook, and some may have initial difficulty measuring and understanding the slope of the frontier. See related problem 1.9. **Making the Connection** in this section describes the trade-offs the United States will face as the population ages and medical costs continue to rise. See related problems 1.10, 1.11, 1.12, and 1.13.

### *Extra* Making Trade-offs: Hurricane Katrina, Tsunami Relief, and the Charitable Giving Connection

When Hurricane Katrina hit the Gulf Coast region in August 2005, it resulted in massive flooding that destroyed large sections of New Orleans and other towns in Louisiana, Mississippi, Alabama, and Texas. More than 1,800 people lost their lives. In response, there was a massive outpouring of charitable donations to aid the victims. More than two-thirds of Americans donated money to hurricane relief. Although these funds helped to reduce the suffering of many hurricane victims, donations to some other causes actually declined. For instance, the head of the United Way in Allegheny County, Pennsylvania, indicated that it had suffered a decline in donations during 2005: “We’re seeing declines this year, not all entirely due to the economy but also due to the effect of so much fund raising in August and September for hurricanes Katrina and Rita.” The director of the Women’s Center and Shelter of Great Pittsburgh had a similar experience: “What they’ve told us is there are so many important causes that they are aware of that they want to support. The choices are greater than what they’ve been faced with before.”

Unfortunately, the trade-off of an increase in charitable giving to one cause resulting in a decrease in charitable giving to other causes is common following a disaster. In December 2004, an earthquake caused

a tidal wave—or tsunami—to flood coastal areas of Indonesia, Thailand, Sri Lanka, and other countries bordering the Indian Ocean. More than 280,000 people died, and billions of dollars worth of

property was destroyed. Governments and individuals around the world moved quickly to donate to relief efforts. The U.S. government donated \$950 million, and individual U.S. citizens donated an additional \$500 million. Both governments and individuals face limited budgets, however, and funds used for one purpose are unavailable to be used for another purpose. Although governments and individuals did increase their total charitable giving following the tsunami disaster, much of the funds spent on tsunami relief appear to have been diverted from other uses. A difficult trade-off resulted: Giving funds to victims of the tsunami meant fewer funds were available to aid other good causes.

For example, some of the funds provided by the U.S. government for reconstruction in the tsunami-devastated areas came from existing aid programs. As a result, spending on other aid projects in the region declined. Similarly, nonprofit organizations in New York City reported sharp declines in donations to the homeless and the poor, as donors gave funds for tsunami relief instead. According to a report in the newspaper *Crain's New York Business*, "Some groups such as Bailey House, which helps homeless people who have AIDS, have even started receiving letters from longtime donors warning that this year's gifts are being redirected to the tsunami relief effort." As one commentator observed, "The milk of human kindness is probably flowing at the usual rate in the United States. It's just getting channeled in different directions."

Sources: Steve Levin, "Disaster Aid Is Extra Giving," *Pittsburgh Post Gazette*, April 22, 2006; Jacqueline L. Salmon, "Katrina Compassion Drives Disaster Donations to a Record," *Washington Post*, June 19, 2006, p. A05; and Daniel Gross, "Zero-Sum Charity," *Slate*, January 20, 2005.

**Question:** Suppose the president is attempting to decide whether the federal government should spend more on research to find a cure for heart disease. He asks you, one of his economic advisors, to prepare a report discussing the relevant factors he should consider. Discuss the main issues you would deal with in your report.

**Answer:** If the federal government has a fixed budget for medical research, then the opportunity cost of funding more research on heart disease is the reduction in funding for research on other diseases. The decision should be made at the margin: to maximize the benefits from government spending on medical research, the last dollar devoted to research on heart disease should result in the same marginal benefit—less disease and fewer deaths—as the last dollar spent on research for other diseases. If the additional funding for research on heart disease comes at the expense of other non-medical research expenditures, then the opportunity cost will change, but a similar analysis should be conducted.

## 2.2

### Comparative Advantage and Trade (pages 44–49)

Learning Objective: Understand comparative advantage and explain how it is the basis for trade.

**Trade** is the act of buying or selling. One of the great benefits of trade is that it makes it possible for people to become better off by increasing both their production and their consumption.

#### A. Specialization and Gains from Trade

*PPFs* depict the combinations of two goods that can be produced if no trade occurs. If one individual's *PPF* shows greater production of both goods, then this individual has an absolute advantage in producing both goods.

## B. Absolute Advantage versus Comparative Advantage

**Absolute advantage** is the ability of an individual, a firm, or a country to produce more of a good or service than competitors, using the same amount of resources.

If the two individuals have different opportunity costs for producing two goods, each individual will have a comparative advantage in the production of one of the goods. **Comparative advantage** is the ability of an individual, a firm, or a country to produce a good or service at a lower opportunity cost than competitors. Comparing the possible combinations of production and consumption before and after specialization and trade occur proves that trade is mutually beneficial.

## C. Comparative Advantage and the Gains from Trade

The basis for trade is comparative advantage, not absolute advantage. Individuals, firms, and countries are better off if they specialize in producing the goods and services for which they have a comparative advantage and obtain the other goods and services they need by trading.

### >>Teaching Tips

Even good students have difficulty understanding comparative advantage. Assign Solved Problem 2-2 for homework. You can ask students to explain the BEFORE TRADE and AFTER TRADE tables to ensure their understanding of the problem. See related problems 2.5 and 2.6. Encourage students to read the feature Don't Let This Happen to YOU! which warns them not to confuse absolute advantage with comparative advantage. See related problem 2.7. Instructors struggle to find examples of people who have had an absolute advantage in two different areas but still benefit from specialization. A good example of this is the career of baseball legend Babe Ruth. Before he achieved his greatest fame as a home run hitter and outfielder with the New York Yankees, Ruth was a star pitcher with the Boston Red Sox. Ruth may have been the best left-handed pitcher in the American League during his years with Boston (1914-1919), but he was used more and more as a fielder in his last two years with the team. In fact, he established a record for home runs in a season (29) in 1919. The Yankees acquired Ruth in 1920 and made him a full-time outfielder. The opportunity cost of this decision for the Yankees was the wins he could have earned as a pitcher. But because New York already had skilled pitchers, the opportunity cost of replacing him as a pitcher was lower than the cost of replacing Ruth as a hitter. No one else on the Yankees could have hit 54 home runs, Ruth's total in 1920; the next highest total was 11. It can be argued that Ruth had an absolute advantage as both a hitter and pitcher in 1920, but a comparative advantage only as a hitter.

### Extra Making the Connection | Specialization and the Olympics

Economists use the concept of comparative advantage to explain how individuals and nations are made better off by specializing in the production of what they do best. The logic of comparative advantage and specialization can be applied to areas other than the production of goods and services. For example, many gifted athletes excel at several sports in high school but specialize in one sport in college or as professionals. In the 2008 Beijing Olympics Usain Bolt and Michael Phelps became household names with record-setting performances in their individual events—track and swimming. Despite their accomplishments, the unofficial title of the “world’s greatest athlete” was bestowed not on Bolt or Phelps but Bryan Clay. Clay became the latest in a series of American Olympic decathlon champions, including Jim Thorpe (1912), Rafer Johnson (1960), Bill Toomey (1968), and Dan O’Brien (1996). Another former gold medal winner, Bruce Jenner (1976), was asked if Phelps’ record-setting performance—eight gold medals—entitled him to be considered the world’s greatest athlete. “No. He’s the world’s greatest



swimmer,” responded Jenner. “Michael Jordan is a phenomenal athlete, but basketball is not a standardized test of a person’s athletic ability. The decathlon is. The basis of athletics is the ability to run, jump and throw. The decathlon tests that.” Although Bryan Clay set an Olympic record in the decathlon, his performance in each of the individual events was well short of the world record at the time, as the following table shows.

	Events	2008 Olympic Performance for Bryan Clay	Men’s World Record Summer 2008
1	100 meters	10.44 seconds	9.69 seconds
2	Long jump	7.78 meters	8.95 meters
3	Shot put	16.27 meters	23.12 meters
4	High jump	1.99 meters	2.45 meters
5	400 meters	48.92 seconds	43.18 seconds
6	110 meter hurdles	13.93 seconds	12.87 seconds
7	Discus	53.79 meters	74.08 meters
8	Pole vault	5.00 meters	6.13 meters
9	Javelin	70.97 meters	98.48 meters
10	1500 meters	5:06:59 minutes/seconds	3:26:00 minutes/seconds

Phelps, Bolt, and other great athletes specialize in events in which they have a comparative advantage and they set world records in these events (the men’s world record in the 100 meter race was set by Bolt in Beijing). Though great athletes use specialization to earn world records in individual events, many sportswriters and analysts agree with Bruce Jenner: the title of “world’s greatest athlete” goes to the winner of the decathlon.

Sources: Dan Patrick, “Just My Type,” *Sports Illustrated*, August 25, 2008. <http://www.trackandfieldnews.com/archive/records>

## 2.3 The Market System (pages 49–55)

Learning Objective: Explain the basic idea of how a market system works.

A **market** is a group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade. **Product markets** are markets for goods—such as computers—and services—such as medical treatment. **Factor markets** are markets for the factors of production, such as labor, capital, natural resources, and entrepreneurial ability. **Factors of production** are the inputs used to make goods and services.

### A. The Circular Flow of Income

A **circular-flow diagram** is a model that illustrates how participants in markets are linked. The diagram demonstrates the interaction between firms and households in both product and factor markets.

### B. The Gains from Free Markets

A **free market** is a market with few government restrictions on how a good or service can be produced or sold, or on how a factor of production can be employed. Adam Smith is considered the father of modern economics. His book, *An Inquiry into the Nature and Causes of the Wealth of Nations*, published in 1776, was an influential argument for the free market system.

### C. The Market Mechanism

A key to understanding Smith's argument is the assumption that individuals usually act in a rational, self-interested way. This assumption underlies nearly all economic analysis.

### D. The Role of the Entrepreneur

Entrepreneurs are an essential part of a market economy. An **entrepreneur** is someone who operates a business, bringing together the factors of production—labor, capital, and natural resources—to produce goods and services.

Entrepreneurs often risk their own funds to start businesses and organize factors of production to produce those goods and services that consumers want.

### E. The Legal Basis of a Successful Market System

The absence of government intervention is not enough for a market economy to work well. Government must provide secure rights to private property. Government can aid the working of a market by enforcing contracts between individuals through an independent court system. **Property rights** refer to the rights individuals or firms have to the exclusive use of their property, including the right to buy or sell it. Intellectual property rights are important. To protect intellectual property rights, the federal government grants inventors patents—exclusive rights to produce and sell a new product for 20 years from the date the product was invented. Books, films, and software receive copyright protection. Under U.S. law, the creator of a book, film, or piece of music has an exclusive right to use the creation. The creator's heirs retain this right for 50 years after the death of the creator.

### >>Teaching Tips

Students first learn scarcity at home, in school, and in other non-market settings. In these environments, scarce items are often allocated by parents, teachers, or others who know those who receive these items; therefore, fairness or equity is usually one criterion used to allocate scarcity. But in markets, prices—not fairness—allocate scarce products. Students seldom know the identity of the people who produce the products they buy. The impersonal and decentralized character of markets is illustrated very well by the reading found in **Making the Connection: A Story of the Market System in Action: How Do You Make an iPod?** See related problem 3.8. The role of government in a free-market economy has often been compared to that of an umpire or referee in a sporting event. The most vocal critics of decisions made by these officials would not argue for their elimination. It would not take long for a tennis match or baseball game to turn into a shouting match (or worse!) if players were allowed to interpret the rules of their own games. However, the quality of sporting events suffers when officials bar players, coaches, or managers from participating in contests for frivolous reasons. **Making the Connection: Property Rights**

**in Cyberspace: YouTube, Facebook, and MySpace** describes the difficulty of protecting property rights in cyberspace. Problem 3.14 is related to this feature. To initiate class discussion, ask students these questions:

1. How many of you have downloaded music via the Internet? (Or know someone who has?)
2. Should the government have the right to grant exclusive rights to musicians and other artists to produce and sell their creative works?
3. Should the government fine or prosecute individuals who illegally obtain music, books, movies, and other creative works in violation of property rights laws?

### Extra Solved Problem 2-3

#### *Adam Smith's "Invisible Hand"*

Supports Learning Objective 2.3: Explain the basic idea of how a market system works.

Alan Krueger, an economist at Princeton University, has argued that Adam Smith "...worryed that if merchants and manufacturers pursued their self-interest by seeking government regulation and privilege, the invisible hand would not work its magic..."

Source: Alan B. Krueger, "Rediscovering the Wealth of Nations," *New York Times*, August 16, 2001.

- What types of regulation and privilege might merchants and manufacturers seek from the government?
- How might these regulations and privileges keep the invisible hand from working?

#### SOLVING THE PROBLEM:

##### **Step 1: Review the chapter material.**

This problem concerns how goods and services are produced and sold and how factors of production are employed in a free market economic system as described by Adam Smith in *An Inquiry into the Nature and Causes of the Wealth of Nations*. You may want to review the section "The Gains from Free Markets," which begins on page 50.

##### **Step 2: Answer question (a) by noting the economic system in place in Europe in 1776.**

At the time, governments gave guilds—associations of producers—the authority to control production. The production controls limited the amount of output of goods such as shoes and clothing, as well as the number of producers of these items. Limiting production and competition led to higher prices and fewer choices for consumers. Instead of catering to the wants of consumers, producers sought the favor of government officials.

##### **Step 3: Answer question (b) by contrasting the behavior of merchants and manufacturers under a guild system and a market system.**

Because governments gave producers the power to control production, producers did not have to respond to consumers' demands for better quality, variety, and lower prices. Under a market system, producers who sell poor quality goods at high prices suffer economic losses; producers who provide better quality goods at low prices are rewarded with profits. Therefore, it is in the self-interest of producers to address consumer wants. This is how the invisible hand works in a free market economy, but not in Europe in the 18<sup>th</sup> century.

### *Extra Making* | **Prices and Communication** the Connection

Few economists have described the operation of a market system as eloquently as Friedrich A. Hayek (1899-1992). Hayek noted that the knowledge needed by consumers and producers to make economic decisions "never exists in concentrated...form but...as the dispersed bits of incomplete and frequently contradictory knowledge...there is...a body of very important but unorganized knowledge...every individual has some advantage over all others because he possesses unique information of which beneficial use might be made, but of which use can be made only if the decisions depending on it are left to him or are made with

his active cooperation.” For example, a farmer in Kansas is an expert in the local climate and soil conditions and the cost of various types of seed and fertilizer. “If we can agree that the

economic problem of society is mainly one of rapid adaptation to changes in particular circumstances of time and place, it would seem to follow that the ultimate decisions must be left to the people who are familiar with these circumstances.

“We must look at the price system as such a mechanism for communicating information if we want to understand its real function... The most significant fact about this system is the economy of knowledge with which it operates, or how little the individual participants need to know in order to be able to take the right action... *It is more than a metaphor to describe the price system as a ... system of telecommunications* [italics added] which enables individual producers to watch merely the movement of a few pointers, as an engineer might watch the hands of a few dials, in order to adjust their activities to changes of which they may never know more than is reflected in the price movement.”

Hayek explains that most people take a market economy’s system of markets and prices for granted and offered an explanation for this complacency. “I am convinced that if it were the result of deliberate human design, and if the people guided by the price changes understood that their decisions have significance far beyond their immediate aim, this mechanism would have been acclaimed as one of the greatest triumphs of the human mind. Its misfortune is the double one that it is not the product of human design and that the people guided by it usually do not know why they are made to do what they do.”

Source: Hayek, F.A. “The Use of Knowledge in Society,” *American Economic Review*, XXXV, No. 4, September 1945, pp. 519-30.

## Extra Economics in YOUR LIFE!

### *International Trade and Household Income*

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While much debate has surrounded the impact of international trade on employment and the degree to which outsourcing has occurred, Ben Bernanke, Chairman of the Federal Reserve Board, cited a study that examined the impact of trade on income in the U.S. since World War II: “...the increase in trade...has boosted U.S. annual incomes on the order of \$10,000 per household. The same study found that removing all remaining barriers to trade would raise incomes anywhere from \$4,000 to \$12,000 per household.”

**Questions:** (a) Should the United States eliminate all trade barriers if this increases the risk of some workers losing their jobs to outsourcing? (b) What type of job would make you more or less vulnerable to outsourcing?

**Answers:** (a) Given the opposition from firms and workers in industries that would be harmed by free trade, it is unlikely that the United States would eliminate all trade barriers. But the studies cited by Ben Bernanke indicate that opposition to free trade has a significant cost. (b) Another study cited by Bernanke found that twenty-one occupations that were most vulnerable to outsourcing were primarily for relatively lower-wage positions.

Source: Ben Bernanke, “Embracing the Challenge of Free Trade: Competing and Prospering in a Global Economy,” The Federal Reserve Board, May 1, 2007. <http://www.federalreserve.gov/boarddocs/speeches/2007/20070501/default.htm>

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## SOLUTIONS TO END-OF-CHAPTER EXERCISES

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### Answers to *Thinking Critically* Questions

1. BMW is unlikely to switch to producing only hybrid drive cars because consumers are unlikely to stop buying traditional, gasoline-powered cars. Traditional, gasoline-powered cars will continue to have a comparative advantage with consumers who face high interest rates on their car loans, for consumers who do a large portion of their driving on the highway, for consumers who do not drive very far, or for consumers in locations where gas is cheap (government subsidized).
2. If the government were to restrict production of traditional, gasoline-powered cars, they would be disproportionately hurting some consumers. Those who do not drive very far, drive mostly on highways, or with access to cheap gas might not find the fuel savings to recoup their increased purchase price. Such a government effort would make this group worse off. And the compensating gain in environmental improvement may not be as large as this group's loss in welfare.

### 2.1

#### Production Possibilities Frontiers and Opportunity Costs

Learning Objective: Use a production possibilities frontier to analyze opportunity costs and trade-offs.

### Review Questions

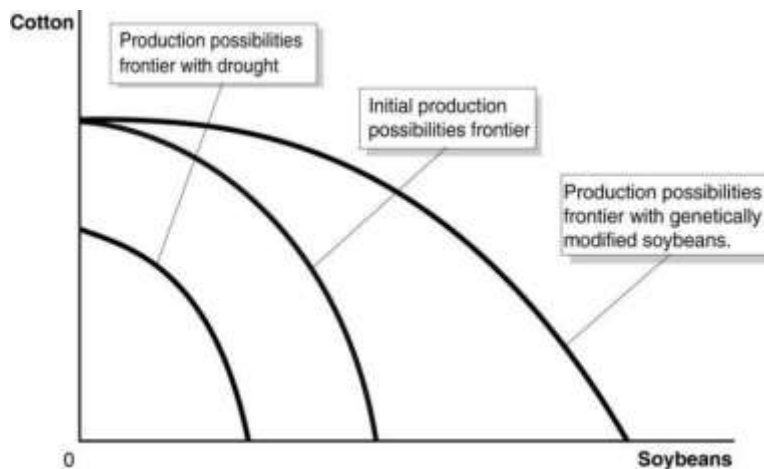
**1.1** Scarcity is the situation in which wants exceed the limited resources available to fulfill those wants. There are some things that are available in such abundance that they exceed our wants. For example, for most people there is enough oxygen in the atmosphere that the amount they want to inhale equals or exceeds the amount available—so oxygen isn't scarce for them. Another example might be weeds in your garden—unlike tomato plants, the amount available exceeds the amount you desire.

**1.2** The production possibilities frontier (*PPF*) is a curve showing all the attainable combinations of two products that may be produced with available resources and existing technology. Combinations of goods that are on the frontier are efficient because all available resources are being fully utilized, and the fewest possible resources are being used to produce a given amount of output. Points inside the production possibilities frontier are inefficient, because the maximum output is not being obtained from the available resources. A production possibilities frontier will shift outward (to the right) if more resources become available for making the products or if technology improves so that firms can produce more output with the same amount of inputs.

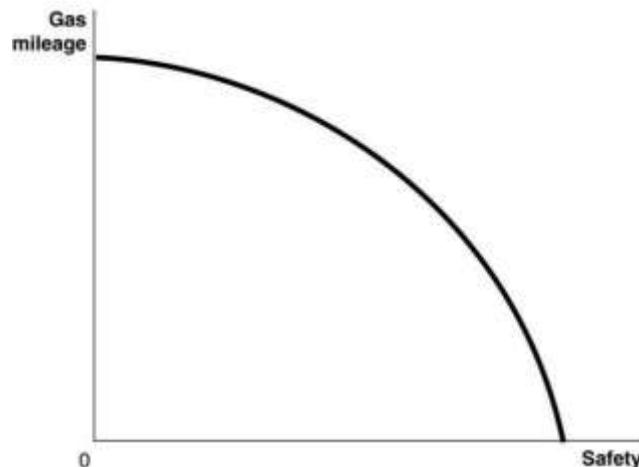
**1.3** Increasing marginal opportunity costs means that as more and more of a product is made, the opportunity cost of making each additional unit rises. It occurs because the first units of a good are made with the resources that are best suited for making it, but as more and more is made, resources must be used that are better suited for producing something else. Increasing marginal opportunity costs implies that the production possibilities frontier is bowed to the right from the origin—that its slope gets steeper and steeper as you move down the production possibilities frontier.

## Problems and Applications

- 1.4**
- a. The production possibilities frontiers in the figure are bowed to the right from the origin because of increasing marginal opportunity costs. The drought causes the production possibilities frontier to shift to the left.
  - b. The genetic modifications would shift to the right the maximum soybean production (doubling it), but not the maximum cotton production.



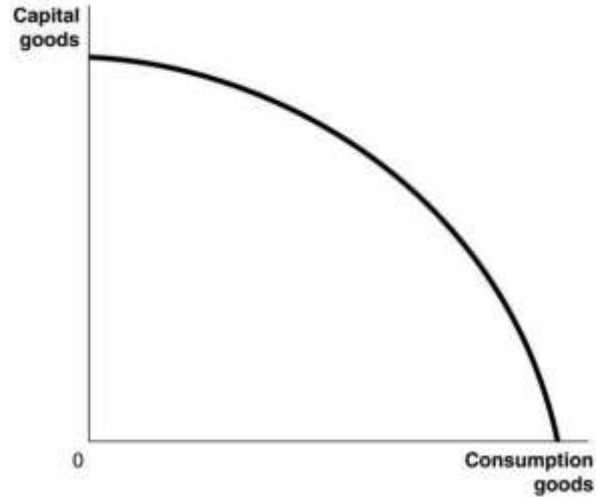
- 1.5** Increased safety will decrease gas mileage, as shown in the figure. Trade-offs can be between physical goods, such as cotton and soybeans in problem 1.4, or between less tangible things like mileage and safety.



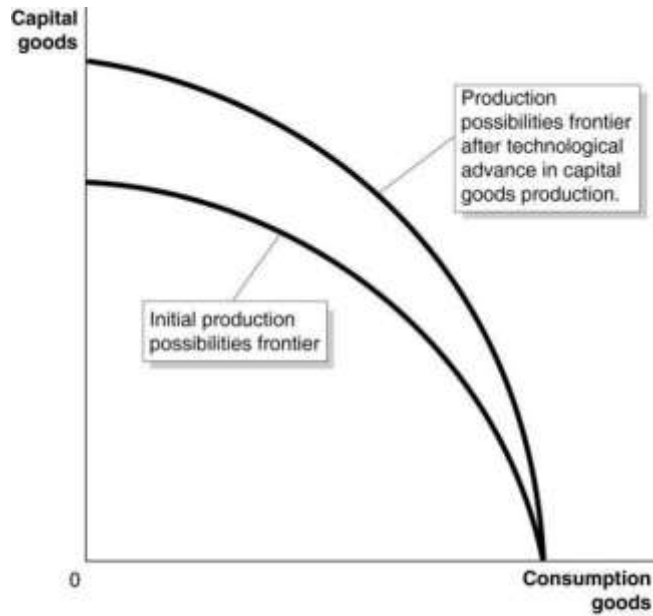
- 1.6** You would still have an opportunity cost represented by the next best use of your time.



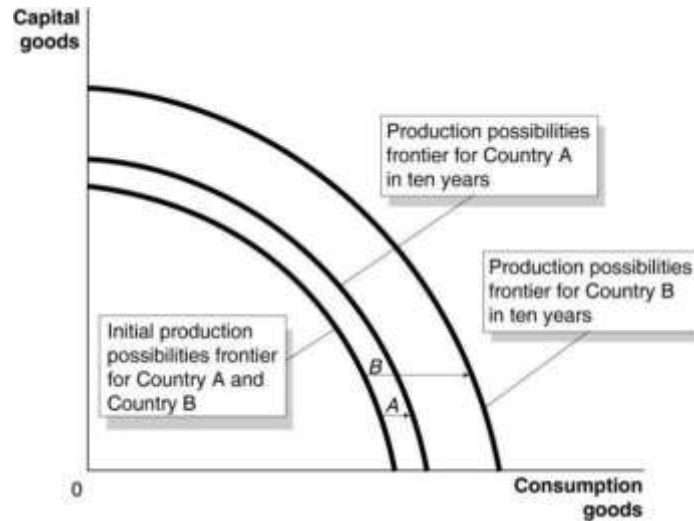
- 1.7 a. The production possibilities frontier will be concave like Figure 2-2 because some economic inputs are likely to be more productive when making capital goods, and others are likely to be more productive when making consumption goods.



b.

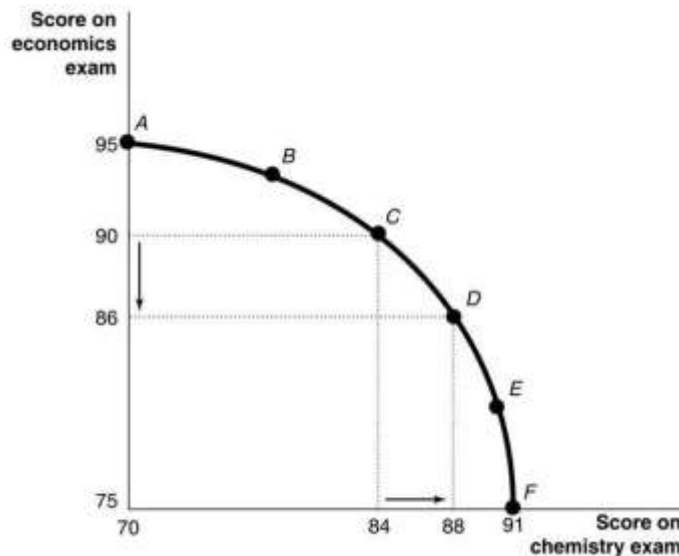


- c. Because it will have more machinery and equipment, Country B is likely to experience more rapid growth.



- 1.8
- Point *E* is outside the production possibilities frontier, so it is unattainable.
  - Points *B*, *C*, and *D* are on the production possibilities frontier, so they are efficient.
  - Point *A* is inside the production possibilities frontier, so it is inefficient.
  - At point *B*, the country is devoting the most resources to producing capital goods, so production at this point is most likely to lead to the highest growth rate. The more capital goods the country produces, the greater the capacity of the country to produce goods and services in the future.

- 1.9 a.



If you spend all 5 hours studying for your economics exam, you will score a 95 on the exam, therefore your production possibilities frontier will intersect the vertical axis at 95. If you

- devote all five hours studying for your chemistry exam, you will score a 91 on the exam, therefore your production possibilities frontier will intersect the horizontal axis at 91.
- b. The points for choices *C* and *D* can be plotted using information from the table. Moving from choice *C* to choice *D* increases your chemistry score by 4 points, but lowers your economics score by 4 points. Therefore your opportunity cost of increasing your chemistry score by 4 points is the 4 point decline in your economics score.
  - c. Choice *A* might be sensible if the marginal benefits of doing well on the chemistry exam are low relative to the marginal benefits from doing well on the economics exam—for example, the chemistry exam is only a small portion of your grade, but the econ exam is a large portion of your grade; or if you are majoring in economics and don't care much about chemistry; or if you already have an A sewn up in chemistry, but the econ professor will replace a low exam grade with this exam grade.

**1.10** If the federal government has a fixed budget for medical research, then the opportunity cost of funding more research on heart disease is the reduction in funding for research on other diseases. The decision should be made at the margin: to maximize the benefits from government spending on medical research, the last dollar devoted to research on heart disease should result in the same marginal benefit—less disease and fewer deaths—as the last dollar spent on research for other diseases. If the additional funding for research on heart disease comes at the expense of other non-medical research expenditures, then the opportunity cost will change, but a similar analysis should be conducted.

**1.11** Nothing is priceless. Every day we makes decisions, such as driving a car or flying in a plane, that increase by at least a small amount the chances that we will be hurt or killed. If health and life were literally priceless, every decision we make would have the sole objective of minimizing the chances of our being injured or killed. In a broader sense, we do not devote all of our resources to improving health care because resources devoted to, say, saving lives through medical resources are not available for other needs, such as improving education. We always have to consider the opportunity cost of using resources in one way rather than in another.

**1.12.** The government should consider if the costs involved in either of the two treatment therapies exceeds the benefits received from the therapies. If the government decides that the cost of Therapy A exceeds its benefit, it may decide that the funds would be better spent on Therapy B. Therapy A will prolong the average lifespan of a patient 4 more months than Therapy B, but at an extra cost of \$725,000 per patient. Although this would be a very painful trade-off to consider, spending less to prolong a patient's life by 4 fewer months would save resources that could be used for other purposes.

**1.13** Resources used to reduce pollution are not available for other uses, such as saving lives via medical research, so it is moral to consider their opportunity costs.

**1.14** Economic systems that do not allow people to keep most of the output they produce do not provide much incentive for people to work hard. Unfortunately, experience has shown that people are more self-interested and less altruistic than would be necessary for the system used in Oz to work in the real world.

## 2.2 Comparative Advantage and Trade

Learning Objective: Understand comparative advantage and explain how it is the basis for trade.

### Review Questions

**2.1** Absolute advantage is the ability to produce more of a good or service than competitors using the same amount of resources. Comparative advantage is the ability to produce a good or service at a lower opportunity cost than competitors. It is possible to have a comparative advantage in producing a good even if someone else has an absolute advantage in producing that good (and every other good). Unless the two producers have exactly the same opportunity costs of producing two goods—the same trade-off between the two goods—one producer will have a comparative advantage in making one of the goods and the other producer will have a comparative advantage in making the other good.

**2.2** The basis for trade is comparative advantage. If each party specializes in making the product in which it has the comparative advantage, they can arrange a trade that makes both of them better off. Each party will be able to obtain the product made by its trading partner at a lower opportunity cost than before.

### Problems and Applications

**2.3** In the example in Figure 2-4 the opportunity cost of 1 pound of apples is 1 pound of cherries to you, and 2 pounds of cherries to your neighbor. Any price of apples between 1 and 2 pounds of cherries will be a fair trading price, and because 10 pounds of apples for 15 pounds of cherries is the same as 1 pound of apples for 1.5 pounds of cherries, it falls within this range. We could take any other value in this range to complete the table. Let's take, for example, 1.25 pounds of cherries per pound of apples. We will keep the pounds of apples traded as before at 10.

The completed table will now be:

**TABLE 2-1:** A Summary of the Gains from Trade

	You		Your Neighbor	
	Apples (pounds)	Cherries (pounds)	Apples (pounds)	Cherries (pounds)
<b>Production and consumption without trade</b>	8	12	9	42
<b>Production with trade</b>	20	0	0	60
<b>Consumption with trade</b>	10	$10 \times 1.25 = 12.5$	10	$60 - 12.5 = 47.5$
<b>Gains from trade (increased consumption)</b>	2	$12.5 - 12 = 0.5$	1	$47.5 - 42 = 5.5$

Note that both you and your neighbor are better off after trade than before trade. Nonetheless, note also that this trading ratio is better for your neighbor than the original ratio and worse for you.

- 2.4**
- a.** Canada has the comparative advantage in making boots. Canada's opportunity cost of making one boot is giving up one shirt. In the United States, the opportunity cost of making one boot is giving up three shirts. The United States has the comparative advantage in making shirts. In the United States, the opportunity cost of making one shirt is giving up one-third of a boot, but Canada's opportunity cost of making one shirt is one boot.
  - b.** Neither country has an absolute advantage in making both goods. The United States has the absolute advantage in shirts, but Canada has the absolute advantage in boots. Remember, both countries have the same amount of resources. If each country puts all their resources into shirts, then the U.S. makes 12 shirts, but Canada makes only 6 shirts. If each country puts all their resources into boots, then Canada makes 6 boots, but the United States makes only 4 boots.
  - c.** If both countries specialize in the good in which they have a comparative advantage and then trade with the other, they can both be better off. Let's use the case in which each trades half of what it makes for half of what the other makes. The United States will specialize by making 12 shirts and Canada will specialize by making 6 boots. Since each gets half of the other's production, they both end up with 6 shirts and 3 boots. This means they are better off than before trading, because they end up with the same amount of boots, but twice as many shirts. Other trades will also make them better off.
- 2.5**
- a.** When Iraq produces 1 more barrel of olive oil, it produces 1 fewer barrel of oil. When Iran produces 1 more barrel of olive oil, it produces 1 fewer barrel of oil. Therefore, neither country has a comparative advantage in either good. In both countries, the opportunity cost of one barrel of oil is one barrel of olive oil. Comparative advantage arises only if someone has a lower opportunity cost, but these two countries have the same opportunity cost.
  - b.** No, the countries can't gain from trade. Trading across the border gives the same trade-offs that can be made within each country.
- 2.6**
- a.** When France produces 1 more bottle of wine, it produces 2 fewer pounds of schnitzel. When Germany produces 1 more bottle of wine, it produces 3 fewer pounds of schnitzel. Therefore, France's opportunity cost of producing wine—2 pounds of schnitzel—is lower than Germany's—3 pounds of schnitzel. When Germany produces 1 more pound of schnitzel, it produces 0.33 fewer bottles of wine. When France produces 1 more pound of schnitzel, it produces 0.50 fewer bottles of wine. Therefore, Germany's opportunity cost of producing schnitzel—0.33 bottles of wine—is lower than that of France—0.50 bottles of wine. We can conclude that France has the comparative advantage in making wine and that Germany has the comparative advantage in making schnitzel.
  - b.** We know that France should specialize where it has a comparative advantage and Germany should specialize where it has a comparative advantage. If both countries specialize, France will make 4 bottles of wine and 0 pounds of schnitzel, and Germany will make 0 bottles of wine and 15 pounds of schnitzel. After both countries specialize, France could then trade 3 bottles of wine to Germany in exchange for 7 pounds of schnitzel. This will give France the same amount of wine as they initially had, but an extra 1 pound of schnitzel. Germany will have 3 bottles of wine and 8 pounds of schnitzel—that is, the same amount of wine, but more schnitzel. Other mutually beneficial trades are possible as well.
- 2.7** Yes, the United States would have benefited from importing those products where Britain had a comparative advantage, which, in fact, is what happened.

**2.8** Falling transportation costs allowed people to trade more easily and to specialize on the basis of their comparative advantage. If they were able to specialize, they could be more productive and, in turn, earn more income.

**2.9** Importing only products that could not be produced here would result in the United States producing—rather than importing—many goods for which it does not have a comparative advantage. These products would be produced at a higher opportunity cost than if they had been imported.

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## 2.3 The Market System

Learning Objective: Explain the basic idea of how a market system works.

### Review Questions

**3.1** The circular flow diagram illustrates how participants in markets are linked. It shows that in factor markets, households supply labor and other inputs to production in exchange for wages and other payments from firms. In product markets, households use the payments they earn in factor markets to purchase the goods and services produced by firms.

**3.2** The two main categories of market participants are households and firms. Households as consumers are the most important in determining what goods and services are produced. Firms make a profit only when they produce goods and services valued by consumers. Therefore, only the goods that consumers are willing and able to purchase are produced.

**3.3** A free market is one with few government restrictions on how goods or services can be produced or sold, or on how factors of production can be employed. Economic decisions are made by buyers and sellers in the marketplace. In a centrally planned economy, the government—rather than households and firms—makes almost all the economic decisions. Free market economies have a much better track record of providing people with rising standards of living.

**3.4** An entrepreneur operates a business. Entrepreneurs play a key role in the economy by bringing together the factors of production—labor, capital, and natural resources—to produce goods and services for sale. Entrepreneurs decide what to produce and how to produce it. They put their own funds or borrowed funds at risk when they start a business.

**3.5** Firms are likely to produce more of a good or service if consumers want more of it. As consumer demand rises, price will rise, which will lead firms to produce more. If demand falls, price will fall, which will lead firms to cut back on production.

**3.6** Private property rights are the rights individuals or firms have to the exclusive use of their property, including the right to buy or sell it. If individuals and firms believe that property rights are insecure, they will be reluctant to risk their wealth by opening new businesses. Thus, the enforcement of property rights and contracts is vital for the functioning of the economy. Independent courts are crucial because property rights and contracts will be enforced only if judges make impartial decisions based on the law, rather than partial decisions in favor of powerful or politically connected individuals.

## Problems and Applications

- 3.7**
- An auto purchase takes place in the product market. The household (George) demands the good and the firm (BMW) supplies the good.
  - The labor market is a factor market. The households supply the labor and the firm demands the labor.
  - This is a factor market. The household (George) supplies the factor of production (labor), while the firm (McDonald's) demands it.
  - The land market is a factor market. The household supplies the factor of production (land) and the firm (McDonald's) demands it.

**3.8** Adam Smith was making the “invisible hand” argument that, in pursuing their self-interest, business people end up producing the goods and services most desired by consumers.[]

**3.9** The invisible hand was a metaphor used by Adam Smith to explain that people acting in their own self-interest may actually promote the interest of society as a whole. The market system works by leading each person, motivated by self-interest, to produce goods and services demanded by other people. The invisible hand is the basic market mechanism. Understanding it is fundamental to all economic analysis.

**3.10** Adam Smith realized—as economists today realize—that people’s motives can be complex. But in analyzing people in the act of buying and selling, economists have concluded that in most instances, the motivation of financial reward provides the best explanation for the actions people take. Moreover, being self-interested—looking out for your own well-being and happiness—and being selfish—caring only about yourself—are not exactly the same things. Many successful business people are, in fact, generous: donating to charity, volunteering for activities, and otherwise acting in a generous way. This is not inconsistent with making business decisions that maximize profits for their companies.

**3.11** Whether self-interest is an “ignoble human trait” is a matter of opinion. There are certainly more noble traits than self-interest, but without at least some self-interest, a person wouldn’t survive. A market system encourages self-interest in the sense that it paradoxically allows people to enrich themselves by fulfilling the needs of others; that is, by producing goods and services that fulfill the wants of consumers.

**3.12** Most economists would agree that this is a good basis on which to judge an economy. It’s hard to disagree with respect to developing countries, where many people live in abject poverty and standards of living are low. It’s easier to disagree if the average person in a society has a very high standard of living, but has to give up a lot to get it by, say, working long hours. Any debate would probably center on what is meant by the “standard of living.” It may include the quantity of goods and services available to the typical person, but it may also include such factors as personal well being, the state of the environment, the level of crime, and so forth.

**3.13** Having secure property rights would enable the owners to use their resources in more efficient ways, because they would spend less time on activities such as guarding their property. Owners would also be able to make improvements to their property without fear that someone would seize the property. They would also be more likely to be able to use their property as collateral for a loan.

**3.14** The purpose of copyright law is to encourage the development of software, books, music, and other products by assuring the author or artist will receive a financial reward for his or her time, effort, and talent. If putting materials on YouTube reduces this financial reward to the point where the products will



not be made, then indeed it is important to enforce property rights and demand payment for the use of the material. However, it is probably time to change the mechanism of payments so that material can be

easily used and re-used, thereby expanding artistic creativity and encouraging cultural development. Newly released films may suffer from lower attendance if the film is easily available on-line, particularly if it is available on-line shortly after its release in theaters. In this case there is likely to be significant financial damage to the copyright holders. It seems possible that some copyright holders could actually benefit from having their material posted online. With respect to CBS, the author of the commentary goes on to state: “If you were to let clips from old broadcast material be uploaded and distributed..., you would realize in short order that the users you once believed to be copyright infringing against you, are in fact doing the work for you to make your content become popular on the web (maybe even viral) without you having to spend a dime on marketing, advertising, or human resources.”

