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

Brief Chapter Summary and Learning Objectives

2.1 Production Possibilities Frontiers and Opportunity Costs (pages 42–47)

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

- The model of the production possibilities frontier is used to analyze the opportunity costs and trade-offs that individuals, firms, and countries face.

2.2 Comparative Advantage and Trade (pages 48–54)

Describe comparative advantage and explain how it serves as 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 54–63)

Explain the basics of how a market system works.

- Markets enable buyers and sellers of goods and services to come together to trade.

Key Terms

Absolute advantage, p. 50. 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. 55. A model that illustrates how participants in markets are linked.

Comparative advantage, p. 51. 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. 47. The ability of the economy to increase the production of goods and services.

Entrepreneur, p. 59. Someone who operates a business, bringing together the factors of production—labor, capital, and natural resources—to produce goods and services.

Factor market, p. 54. A market for the factors of production, such as labor, capital, natural resources, and entrepreneurial ability.

Factors of production, p. 54. Labor, capital, natural resources, and other inputs used to make goods and services.

Free Market, p. 56. 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. 54. 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. 43. The highest-valued alternative that must be given up to engage in an activity.

Product market, p. 54. A market for goods—such as computers—or services—such as medical treatment.

Production possibilities frontier (PPF), p. 42. A curve showing the maximum attainable combinations of two goods that can be produced with available resources and current technology.

Property rights, p. 61. The rights individuals or firms have to the exclusive use of their property, including the right to buy or sell it.

Scarcity, p. 42. A situation in which unlimited wants exceed the limited resources available to fulfill those wants.

Trade, p. 48. The act of buying and selling.

Chapter Outline

Managers at Tesla Motors Face Trade-Offs

Electric cars have struggled in the marketplace because the batteries that power them are costly. Furthermore, the batteries have to be recharged every 100 to 300 miles. But in early 2013, Tesla Motors announced higher than expected sales of its electric cars. Tesla sells all of its cars online and relies on company-owned service centers to provide maintenance. Tesla's managers face a number of decisions; for example, to reach its goal of producing 1 million vehicles annually will require it to build one additional factory to assemble cars and other factories to make the battery cells used to power the cars. Using more resources to build factories would leave fewer resources to expand production of its two existing product lines.

2.1

Production Possibilities Frontiers and Opportunity Costs (pages 42–47)

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 production possibilities frontier is a simple model that economists can use to analyze trade-offs, such as the trade-off Tesla faces in deciding how many of each type of automobile (in the textbook example, either original models or Model 3s) it should produce at its plant in Fremont, California, given its limited resources.

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

A. Graphing the Production Possibilities Frontier

All combinations of products on the frontier are efficient because all available resources are being used. Combinations inside the frontier are inefficient because maximum output is not obtained from available resources. Points outside the frontier are unattainable given the firm's 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 production possibilities frontier that is bowed outward illustrates increasing marginal opportunity costs, which occur because some workers, machines, and other resources are better suited to one use than to 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 increase the production of goods and services. Economic growth can occur if more resources become available or if a technological advance makes resources more productive. Growth may lead to greater increases in production for one good than another.

Extra
Apply the Facing Trade-offs in Health Care Spending
Concept

Households have limited incomes. If the price of health care rises, households have to choose whether to buy less health care or spend less on other goods and services. The same is true of the federal government's spending on health care. The government provides health insurance to about 30 percent of the population through programs such as Medicare for people age 65 and older and Medicaid for low-income people. If the price of health care rises, the government has to either cut back on the services provided through Medicare and Medicaid or cut spending in another part of the government's budget. (Of course, both households and the government can borrow to pay for some of their spending, but ultimately the funds they can borrow are also limited.)

About 54 percent of the population has private health insurance, often provided by employers. When the fees doctors charge, the cost of prescription drugs, and the cost of hospital stays rise, the cost to employers of providing health insurance increases too. As a result, employers will typically increase the amount they withhold from employees' paychecks to pay for the insurance. Some employers—particularly small firms—will even stop offering health insurance to their employees. In either case, the price employees pay for health care will rise. How do people respond to rising health care costs? Isn't health care a necessity that people continue to consume the same amount of, no matter how much its price increases? In fact, studies have shown that rising health care costs cause people to cut back their spending on medical services, just as people cut back their spending on other goods and services when their prices rise. One research study indicates that for every 1 percent increase in the amount employers charge employees for insurance, 164,000 people become uninsured. Of course, people without health insurance can still visit the doctor and obtain prescriptions, but they have to pay higher prices than people with insurance pay. Although the consequences of being uninsured can be severe, particularly if someone develops a serious illness, economists are not surprised that higher prices for health insurance lead to less health insurance being purchased: Faced with limited incomes, people have to make choices among the goods and services they buy.

The Congressional Budget Office estimates that as the U.S. population ages and medical costs continue to rise, federal government spending on Medicare will more than double over between 2016 and 2027. Many policymakers are concerned that this rapid increase in Medicare spending will force a reduction in spending on other government programs. Daniel Callahan, a researcher at the Hastings Center for Bioethics, has argued that policymakers should consider taking some dramatic steps, such as having Medicare stop paying for open-heart surgery and other expensive treatments for people over 80 years of age. Callahan argues that the costs of open-heart surgery and similar treatments for the very old exceed the benefits, and the funds would be better spent on treatments for younger patients, where the benefits would exceed the costs. Spending less on prolonging the lives of the very old in order to save resources that can be used for other purposes is a very painful trade-off to consider. But in a world of scarcity, trade-offs of some kind are inevitable.

Sources: Daniel Callahan, "The Economic Woes of Medicare," *The New York Times*, November 13, 2008; Ezekiel J. Emanuel, "The Cost-Coverage Trade-off," *Journal of the American Medical Association*, Vol. 299, No. 8, February 27, 2008, pp. 947–949; and Congressional Budget Office, *A Preliminary Analysis of the President's Budget and an Update of CBO's Budget and Economic Outlook*, March 2009.

Question: Suppose the U.S. president is attempting to decide if 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. Use the concepts of opportunity cost and trade-offs to discuss some of 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 nonmedical research expenditures, then the opportunity cost will be different, but a similar analysis should be conducted.

2.2

Comparative Advantage and Trade (pages 48–54)

Learning Objective: Describe comparative advantage and explain how it serves as the basis for trade.

Trade is the act of buying and selling. Trade makes it possible for people to become better off by increasing both their production and their consumption.

A. Specialization and Gains from Trade

PPFs show the combinations of two goods that can be produced if no trade occurs. We can also use *PPFs* to show how someone can benefit from trade even if she is better than someone else at 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. A good example of comparative advantage 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 as an outfielder 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 on the Yankees was 11. It can be argued that Ruth had an absolute advantage as both a hitter and pitcher for the Yankees in 1920, but a comparative advantage only as a hitter.

2.3

The Market System (pages 54–63)

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

In the United States and most other countries, trade is carried out in markets. 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. A **product market** is a market for goods—such as computers—or services—such as medical treatment. A **factor market** is a market 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 Adam 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 in the Market System

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 has to provide a legal environment that allows markets to operate efficiently. **Property rights** are the rights individuals or firms have to the exclusive use of their property, including the right to buy or sell it. To protect intellectual property rights, the federal government grants inventors patents. A patent grants the exclusive right to produce and sell a new product for 20 years from the date the patent is filed. Books, films, and software receive copyright protection. Under U.S. law, the creator of a book, film, or piece of music has the exclusive right to use the creation during the creator’s lifetime. The creator’s heirs retain this right for 50 years after the death of the creator.

Teaching Tips

To initiate class discussion regarding intellectual property rights, ask students these questions:

1. How many of you have downloaded music from the Internet?
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 people 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"**

Alan Krueger, an economist at Princeton University, has argued that Adam Smith was concerned that the invisible hand would not function properly if merchants and manufacturers convinced the government to issue regulations to help them.

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

- a. What types of regulations might merchants and manufacturers seek from the government?
- b. How might these regulations prevent the invisible hand from working?

Solving the Problem**Step 1: Review the chapter material.**

This problem is about 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*, so you may want to review the section "The Gains from Free Markets," on page 56.

Step 2: Answer (a) by describing 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 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 favors from government officials.

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

Because governments in a guild system gave producers the power to control production, producers did not have to respond to consumers' demands for better quality, greater variety, and lower prices. In 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 most of Europe in the eighteenth century.

Extra	An Elementary Case of Copyright
Apply the Concept	

The U.S. Congress provides copyright protection to authors to give them an economic incentive to invest the time and effort required to write books. While a book is under copyright, only the author—or whoever the author sells the copyright to—can legally publish a paper or digital copy of the book. Once the copyright expires, however, the book enters the *public domain*, and anyone is free to publish the book. Copies of classic books written in the 1800s, such as Mark Twain's *Huckleberry Finn* and Charles Dickens's *Oliver Twist*, are available from many publishers that do not have to pay a fee to the authors' heirs.

Arthur Conan Doyle was a doctor in England when he published his first story featuring the detective Sherlock Holmes in 1887. Anyone who wants to publish any of the Sherlock Holmes stories that Doyle wrote from 1887 through the end of 1922 is free to do so. But the last 10 Sherlock Holmes stories that Doyle wrote from 1923 to 1927 remain under copyright protection. Doyle's heirs argue that because the author continued to develop the personalities of Sherlock Holmes and his companion Dr. John Watson in the 10 stories that remain under copyright protection, the characters cannot be used in new books, films, or television shows without payment. Doyle's heirs have asked anyone who wants to include Holmes in a new work to pay them a fee of \$5,000 per use.

The producers of two recent Sherlock Holmes films starring Robert Downey, Jr., and the producers of the television series *Sherlock*, starring Benedict Cumberbatch, and *Elementary*, starring Jonny Lee Miller, agreed to pay the fee, as have most authors of books using Holmes as a character. In 2011, when Leslie S. Klinger published *A Study in Sherlock*, a collection of new stories involving Sherlock Holmes, his publisher insisted that he pay the usual fee to Doyle's descendants. But two years later, when Klinger decided to publish another collection, *In the Company of Sherlock Holmes*, he decided that rather than pay the fee he would sue Doyle's descendants, hoping the federal courts would rule against their copyright claims.

Federal Appeals Judge Richard Posner—who is also an economist—eventually ruled in favor of Klinger. He argued that copyright law did not allow authors or their heirs to require fees for the use of characters from stories in the public domain. He also noted that, “the longer the copyright term is, the less public-domain material there will be and so the greater will be the cost of authorship, because authors will have to obtain licenses from copyright holders for more material.” As a result of this ruling, for the first time since 1887, anyone can use Sherlock Holmes as a character in a book, television show, or movie without having to pay a fee.

Sources: Jennifer Schuessler, “Appeals Court Affirms Sherlock Holmes Is in Public Domain,” *New York Times*, June 17, 2014; Jennifer Schuessler, “Conan Doyle Estate Told to Pay Legal Fees,” *New York Times*, August 5, 2014; Eriq Gardner, “Conan Doyle Estate Loses Appeal Over ‘Sherlock Holmes’ Rights,” *Hollywood Reporter*, June 16, 2014; and *Leslie S. Kling v. Conan Doyle Estate, Ltd.* (7th Cir. 2014), media.ca7.uscourts.gov.

Extra Economics in Your Life & Career: ***Economists Express Their Agreement on Free Trade***

During the summer of 2017, fifteen former leaders of the White House Council of Economic Advisors signed a letter to President Trump urging him not to place tariffs on imports of steel into the United States. The letter notes that “Among us are Republicans and Democrats alike, and we have disagreements on a number of policy issues. But on some policies there is near universal agreement. One such issue is the harm of imposing tariffs on steel imports.” Tariffs are taxes imposed by government on imports. Those who endorse tariffs and other barriers to free international trade believe that such barriers protect domestic industries and the jobs of their employees.

Questions: (a) Why do many economists, including those who have served for both Republican and Democratic administrations, support free trade policies and oppose tariffs and trade barriers even if these barriers are designed to protect domestic workers from losing their jobs? (b) What types of jobs would be most vulnerable to job losses due to competition from imports?

Answers: (a) As you learned in this chapter, countries are better off if they specialize in producing goods and services in which they have a comparative advantage and trading with other countries for other goods and services. Tariffs prevent countries from taking full advantage of the benefits from free trade. The argument that economists who have worked for both Democratic and Republican governments made is based on positive economic analysis (analysis concerned with what is) rather than normative analysis (analysis concerned with what ought to be). Ben Bernanke, former chairman of the Federal Reserve Board, has cited a study that examined the effect of international trade on income in the United States 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.”

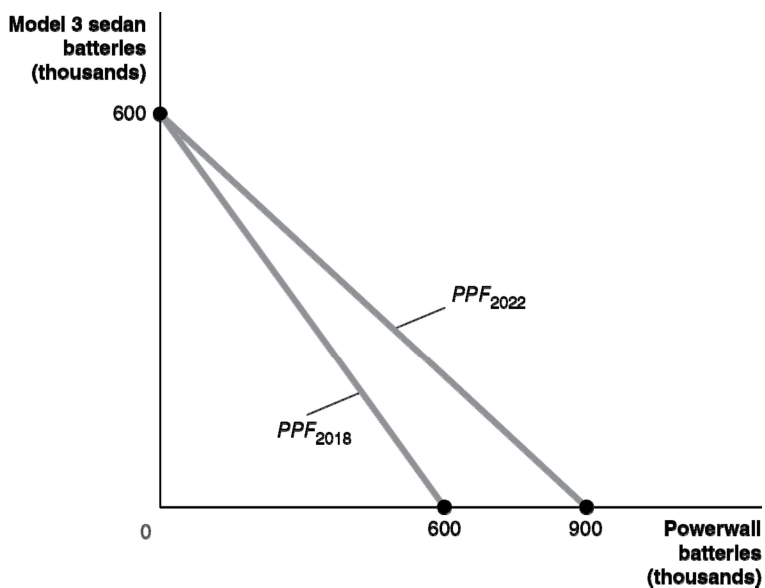
(b) Another study cited by Bernanke found that the 21 occupations in the United States that were most vulnerable to imports from foreign firms were primarily for relatively low-wage positions. In general, the greater the skill requirements for the job you hold, the less vulnerable you will be to losing your job due to competition from imports.

Sources: Nick Timiraos, “Former White House Economists to Donald Trump: Don’t Impose Steel Tariffs,” *Wall Street Journal*, July 12, 2017; 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>; and “Why Open Markets Matter,” oecd.org/trade/whyopenmarketsmatter.htm.

Solutions to End-of-Chapter Exercises

Answers to *Thinking Critically* Questions to accompany the *Inside Look* newspaper feature

- In 2018, maximum production is 600 thousand Model 3 sedan batteries or 600 thousand Powerwall batteries. In 2022, maximum production is 600 thousand Model 3 sedan batteries or 900 thousand Powerwall batteries. Therefore:
 - The opportunity cost of one Model 3 sedan battery in 2018 is one Powerwall battery.
 - The opportunity cost of one Model 3 sedan battery in 2022 is $1\frac{1}{2}$ Powerwall batteries.



- Tesla can't fill all these orders. This point is unattainable because it is beyond the 2022 PPF. Tesla can produce a maximum of 900 thousand Model 3 sedan batteries or Powerwall batteries. The slope of the PPF is 1, so the opportunity cost of making one more Model 3 sedan battery is one less Powerwall battery. If Tesla produces 750 thousand Model 3 sedan batteries, it won't be able to produce 350 thousand Powerwall batteries as well.