

GLOBAL  
EDITION



# ECONOMICS

8th  
Edition

Glenn Hubbard | Anthony Patrick O'Brien



# Economics

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# Economics

**Eighth Edition**

**Global Edition**

**Glenn Hubbard**  
Columbia University

**Anthony Patrick O'Brien**  
Lehigh University



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**For Constance, Raph, and Will**

—*Glenn Hubbard*

**For Cindy, Matthew, Andrew, and Daniel**

—*Anthony Patrick O'Brien*

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| <b>Credits</b>  | <b>1122</b> |

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# PREFACE

Our approach in this new edition remains what it was in the first edition: to provide students and instructors with a text that delivers complete coverage of economic topics using many real-world examples. Our goal from the beginning has been to teach economics in a “widget-free” way by using real-world business and policy examples.

Much has happened in the world of economics since we prepared the previous edition, including the longest economic expansion in the history of the U.S. economy and the first significant international trade war since the 1930s. We have incorporated many of these developments in the new real-world examples and policy discussions in this edition and also in the extensive digital resources, which include:

- More than 130 author-created application videos of the chapter openers and *Apply the Concept* features
- More than 250 figure animation videos
- More than 20 *Solved Problem* whiteboard videos

## New to This Edition

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Here is an overview of the revisions, followed by a more detailed description of the changes in each chapter.

### Overview of Changes

- All the chapter openers feature either new companies or have updated information.
- Chapters 1–4 include new *An Inside Look* features to help students apply economic thinking to current events and policy debates as they are presented in news articles.
- There are 27 new *Apply the Concept* features and videos to help students tie economic concepts to current events and policy issues. The *Apply the Concept* features and videos that were retained from the previous edition have been updated.
- There are 8 new *Solved Problems*, and many of those retained from the previous edition have been updated. The *Solved Problem* feature uses real-world products, events, and policies to help students break down and answer economic problems step by step. New to this edition are whiteboard videos of select *Solved Problems* that bring these real-world problems to life with audio, background photos, and step-by-step construction of graphs and tables.
- All the figures and tables and their animations have been updated with the latest data available.
- Many of the end-of-chapter *Problems and Applications* have been updated or replaced. In most chapters, one or two problems include graphs or tables for students to analyze. Select chapters have a category titled *Real-Time Data Exercises*, and we have updated some of those exercises.
- Based on marketing feedback and our analysis of instructor assignments, we have made the following organizational changes to the print version of the book:
  - We cut the income statement and balance sheet material from the appendix to Chapter 8 (the discussion of present value was retained); the isoquant and isocost line material from the appendix to Chapter 11; and the gold standard and Bretton Woods material from the appendix to Chapter 30 (now Chapter 28). All of this material is still available within MyLab Economics for instructors and students who wish to use it.



- We removed Chapter 16, “Pricing Strategy,” but retained the coverage of price discrimination and integrated it into Chapter 15, “Monopoly and Antitrust.”
- We streamlined and merged Chapter 29, “Macroeconomics in an Open Economy,” and Chapter 30, “The International Financial System” into one chapter, Chapter 28, “Macroeconomics in an Open Economy”

## New Content and Features by Chapter

Here is a description of key changes by chapter.

**Chapter 1, “Economics: Foundations and Models,”** opens with a new discussion of how the Trump administration’s tariff policy may affect Apple and other firms. *An Inside Look* at the end of the chapter presents a news article and analysis of whether those tariffs are bringing manufacturing jobs back home or primarily raising prices for U.S. consumers. New *Solved Problem 1.1* analyzes the marginal benefit and marginal cost of the U.S. Postal Service delivering packages for Amazon. A new *Apply the Concept* discusses whether a congressional bill aimed at increasing the pay of low-wage workers could backfire.

**Chapter 2, “Trade-offs, Comparative Advantage, and the Market System,”** opens with an updated discussion of the resource allocation decisions Elon Musk and managers at Tesla Motors face. *An Inside Look* at the end of the chapter discusses the plans of Porsche’s parent company, Volkswagen, to create a full line of electric automobiles. A new *Apply the Concept* discusses the recent debates about socialism.

**Chapter 3, “Where Prices Come From: The Interaction of Demand and Supply,”** opens with a new discussion of Nike and the highly competitive market for athletic shoes. We use that market to develop the demand and supply model. *An Inside Look* at the end of the chapter examines plans by BASF and Reebok to release 3D printed shoes. There are three new *Apply the Concepts*: “Forecasting the Demand for Athletic Shoes,” “Fracking, the U.S. Oil Boom, and Expected Oil Prices,” and “Higher Demand for Cobalt—But Lower Prices?” New *Solved Problem 3.4* examines how we can predict changes in the price and quantity of merino wool.

**Chapter 4, “Economic Efficiency, Government Price Setting, and Taxes,”** opens with an updated discussion about the economic link between food riots in Venezuela and the rise in popularity of Uber in the United States. At the end of the chapter, *An Inside Look* examines why Uber is suing New York City over its limit on the number of cars ride-hailing companies are allowed. New *Solved Problem 4.4* examines who bears the burden of the Seattle beverage tax.

**Chapter 5, “Externalities, Environmental Policy, and Public Goods,”** opens with a new discussion of NextEra Energy, which produces more electricity using solar and wind power than any other company in the world. A new *Apply the Concept* discusses whether the United States needs a Green New Deal. New *Solved Problem 5.3* examines the role of congestion fees in addressing traffic problems in Manhattan.

**Chapter 6, “Elasticity: The Responsiveness of Demand and Supply,”** opens with an updated discussion of how to evaluate the success of the soda taxes enacted by several cities, including San Francisco and Philadelphia, in improving people’s health and increasing tax revenue. New *Solved Problem 6.3* covers the possible effect of a city policy to raise the fine for drivers parked at expired meters. A new *Apply the Concept* discusses the price elasticity of demand for the Amazon and Netflix movie streaming services.

**Chapter 7, “The Economics of Health Care,”** opens with a new discussion of whether private insurance companies such as Blue Cross and Blue Shield should be eliminated in favor of a single-payer government health system. New Table 7.2 summarizes and compares the essential aspects of the health care systems in Canada, Japan, and the United Kingdom. A new *Apply the Concept* discusses the debate over “Medicare for All.”

**Chapter 8, “Firms, the Stock Market, and Corporate Governance,”** opens with a new discussion of Lyft’s initial public offering. A new *Apply the Concept* explores why someone would want to buy Lyft stock, given the company’s financial losses. New Table 8.1 summarizes the historical long-run returns from investing in different assets. Coverage of recent issues in corporate governance policy, formerly in Section 8.4, has been streamlined and merged into Section 8.3. The appendix still covers present value, but the coverage of income statements and balance sheets now appears as an online appendix.

**Chapter 9, “Comparative Advantage and the Gains from International Trade,”** opens with a discussion of how the 2019 Trump Administration tariffs on imports from China affected Whirlpool, a home appliance maker based in Benton Harbor, Michigan. A new *Apply the Concept* analyzes who gains and who loses from tariffs on imports from China.

**Chapter 10, “Consumer Choice and Behavioral Economics,”** opens with a discussion of the problems that led Sears to file for bankruptcy and close all of its stores. A new *Apply the Concept* discusses how Taylor Swift avoided ticket scalping problems during her 2018 *Reputation* concert tour. Another new *Apply the Concept* illustrates sunk costs for the San Francisco Giants baseball team. A new *Don’t Let This Happen to You* covers the potential confusion between the income effect of a price change and the effect of an increase in money income.

**Chapter 11, “Technology, Production, and Costs,”** opens with a new discussion of fracking and its effect on the world market for oil. A new *Apply the Concept* examines the use of robots and drones in the oil industry. New *Solved Problem 11.7* examines the long-run average cost curves for fracking companies. The appendix, “Using Isoquants and Isocost Lines to Understand Production and Cost,” now appears as an online appendix.

**Chapter 12, “Firms in Perfectly Competitive Markets,”** opens with an updated discussion of the difficulty farmers have making an economic profit selling cage-free eggs. There are two new *Apply the Concepts*: “What Does ‘Break Even’ Mean in the Oil Fields?” and “The Winding Path to Long-Run Equilibrium in the Egg Market.”

**Chapter 13, “Monopolistic Competition: The Competitive Model in a More Realistic Setting,”** opens with a new discussion of the rise of third wave coffeehouses; a new *Apply the Concept* explores whether third wave coffeehouses can remain profitable; and new *Solved Problem 13.3* analyzes the long-run effects of Amazon Go’s “Just Walk Out” technology.

**Chapter 14, “Oligopoly: Firms in Less Competitive Markets,”** includes two new *Apply the Concepts*: “Are Unlicensed Yoga Instructors a Menace to Public Health?” and “Do Large Firms Live Forever?”

**Chapter 15, “Monopoly and Antitrust Policy,”** opens with a new discussion of the U.S. Postal Service (USPS) and why Congress gave it a monopoly on delivery of first-class mail. A new *Apply the Concept* discusses how package delivery competitors such as FedEx and UPS compete with the USPS. Another new *Apply the Concept* considers whether the Justice Department should break up Google, Amazon, and Facebook. New Table 15.2 summarizes how airlines maximize profit by charging different ticket prices to business travelers and leisure travelers. We have cut the seventh edition’s Chapter 16, “Pricing Strategy,” but retained its coverage of price discrimination and moved it here into Chapter 15 as Section 15.5, “Price Discrimination.”

**Chapter 16, “The Markets for Labor and Other Factors of Production,”** opens with a new discussion of how robotic technology is being used in three areas: in restaurants to make hamburgers, in Amazon Go convenience stores, and at a mining company in Australia.

**Chapter 17, “Public Choice, Taxes, and the Distribution of Income,”** opens with an updated discussion of the Tax Cut and Jobs Act of 2017. A new *Apply the Concept* explores whether the federal government should tax wealth and whether such a tax is economically efficient.

**Chapter 18, “GDP: Measuring Total Production and Income,”** opens with a new discussion of how General Motors and other car companies deal with the business cycle. A new *Apply the Concept* discusses whether gross domestic income is a more reliable measure of total production than gross domestic product.

**Chapter 19, “Unemployment and Inflation,”** opens with a new discussion of how Wisconsin-based Stoughton Trailers dealt with the challenge of finding workers during a period of very low unemployment. A new *Apply the Concept* discusses whether advances in information technology permanently increase structural unemployment. A new section covers trends in labor force participation rates.

**Chapter 20, “Economic Growth, the Financial System, and Business Cycles,”** begins with a new opener that discusses how millennials (people born between 1981 and 1996) have experienced both technological change and the effects of the business cycle. New Figure 20.9 and surrounding text also cover this topic.

**Chapter 21, “Long-Run Economic Growth: Sources and Policies,”** opens with a new discussion of the role of technological change and creative destruction in lifting living standards. A new *Apply the Concept* explores the economic growth of sub-Saharan Africa and projections of future growth for that region.

**Chapter 22, “Aggregate Expenditure and Output in the Short Run,”** opens with a new opener about how the business cycle affects manufacturers of recreational vehicles (RVs), such as Airstream, many of which are based in Elkhart, Indiana. A new section covers the volatility of consumer spending on durables, and new Table 22.1 summarizes the relationship between actual investment and planned investment.

**Chapter 23, “Aggregate Demand and Aggregate Supply Analysis,”** opens with a new discussion of the effect of the business cycle on General Motors and other auto manufacturers. A new *Apply the Concept* discusses whether there really is a business cycle.

**Chapter 24, “Money, Banks, and the Federal Reserve System,”** opens with a new discussion of the Venmo app, which allows people to send money to friends using their smartphones.

**Chapter 25, “Monetary Policy,”** opens with a new discussion of the organization of the Federal Reserve and Fed Chair Jerome Powell’s relationship with President Trump in 2019. Coverage of the financial crisis of 2007–2009 has been streamlined.

**Chapter 26, “Fiscal Policy,”** opens with a new discussion of the effects of fiscal policy on the growth rate of real GDP. A new *Apply the Concept* discusses modern monetary theory (MMT) and whether policymakers should worry about the national debt. New *Solved Problem* 26.6 explores how the Italian government confronts its budget deficit.

**Chapter 27, “Inflation, Unemployment, and Federal Reserve Policy,”** opens with a new discussion of the Fed’s challenge of meeting its dual mandate of low inflation and unemployment while dealing with political pressure from President Trump. A new *Apply the Concept* considers whether the Phillips curve has disappeared. There are two new sections in the chapter: One covers the recent debates about the future of the Federal Reserve, and another discusses whether the Fed should be independent of Congress and the president.

**Chapter 28, “Macroeconomics in an Open Economy,”** includes streamlined and updated content from two seventh edition chapters: Chapter 29 of the same title and Chapter 30, “The International Financial System.” The appendix on the gold standard and Bretton Woods that appeared in the seventh edition Chapter 30 is now an online appendix.

To make room for new content, we cut 21 *Apply the Concepts* and 9 *Solved Problems* from the previous edition and transferred some of them to the book's *Instructor's Manual*, where they are available for instructors who wish to continue using them. As noted earlier, as a result of market feedback and analysis of instructor assignments we moved three appendices to appear within MyLab Economics, cut one chapter, and streamlined and merged two chapters.

## Solving Teaching and Learning Challenges

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Many students who take a principles of economics course have difficulty seeing the relevance of key concepts such as opportunity cost, trade-offs, scarcity, and demand and supply to their lives and their careers. This reduces the willingness of some students to prepare for class and to be engaged during class. We address this challenge with contextual learning, a modern organization of content, engaging pedagogy, and an extensive selection of digital assets.

### The Foundation: Contextual Learning and Modern Organization

We believe a course is successful if students can apply what they have learned to both their personal lives and their careers and if they have developed the analytical skills to understand what they see in the media. That's why we explain economic concepts by using many real-world business examples and applications in the chapter openers, graphs, *Apply the Concept* features, *An Inside Look* features, and end-of-chapter problems. This approach helps majors from all disciplines become educated consumers, voters, and citizens. In addition to our widget-free approach, we have a modern organization and place interesting policy topics early in the book to pique student interest.

### Microeconomics

We are convinced that students learn to apply economic principles best if they are taught in a familiar context. Whether they become artists, social workers, business managers, engineers, bankers, or government employees, students benefit from understanding economics. We therefore use many diverse real-world business and policy examples to illustrate economic concepts. Here are a few highlights of our approach to microeconomics:

- **A strong set of introductory chapters.** The introductory chapters provide students with a solid foundation in the basics. We emphasize the key ideas of marginal analysis and economic efficiency. In Chapter 4, "Economic Efficiency, Government Price Setting, and Taxes," we use the concepts of consumer surplus and producer surplus to measure the economic effects of price ceilings and price floors as they relate to the familiar examples of rental properties and the minimum wage. (We revisit consumer surplus and producer surplus in Chapter 9, "Comparative Advantage and the Gains from International Trade," where we analyze government policies that affect trade, including the trade war that began in 2018; and in Chapter 15, "Monopoly and Antitrust Policy," where we analyze price discrimination and the effect of market power on economic efficiency.) In Chapter 8, "Firms, the Stock Market, and Corporate Governance," we provide students with a basic understanding of how firms are organized, raise funds, and provide information to investors. We also illustrate how in a market system entrepreneurs meet consumer wants and efficiently organize production.
- **Early coverage of policy issues.** To expose students to policy issues early in the course, we discuss trade policy and tariffs in Chapter 1, "Economics: Foundations and Models"; rent control and the minimum wage in Chapter 4, "Economic Efficiency, Government Price Setting, and Taxes"; air pollution, global warming, and public goods in Chapter 5,

“Externalities, Environmental Policy, and Public Goods”; government policy toward soda and other sweetened beverages in Chapter 6, “Elasticity: The Responsiveness of Demand and Supply”; and health care policy in Chapter 7, “The Economics of Health Care.”

- **Complete coverage of monopolistic competition.** We devote a full chapter, Chapter 13, “Monopolistic Competition: The Competitive Model in a More Realistic Setting,” to monopolistic competition prior to covering oligopoly and monopoly in Chapter 14, “Oligopoly: Firms in Less Competitive Markets,” and Chapter 15, “Monopoly and Antitrust Policy.” Although many instructors cover monopolistic competition very briefly or dispense with it entirely, we think it is an overlooked tool for reinforcing the basic message of how markets work in a context that is much more familiar to students than are the agricultural examples that dominate discussions of perfect competition. We use the monopolistic competition model to introduce the downward-sloping demand curve material usually introduced in a monopoly chapter. This approach helps students grasp the important point that nearly all firms—not just monopolies—face downward-sloping demand curves. Covering monopolistic competition directly after perfect competition also allows for early discussion of topics such as brand management and sources of competitive success. Nevertheless, we wrote the chapter so that instructors who prefer to cover monopoly (Chapter 15, “Monopoly and Antitrust Policy”) directly after perfect competition (Chapter 12, “Firms in Perfectly Competitive Markets”) can do so without loss of continuity.
- **Extensive, realistic game theory coverage.** In Chapter 14, “Oligopoly: Firms in Less Competitive Markets,” we use game theory to analyze competition among oligopolists. Game theory helps students understand how companies with market power make strategic decisions in many competitive situations. We use familiar companies such as Apple, Amazon, Dell, Spotify, and Walmart in our game theory applications.

## Macroeconomics

Students come to study macroeconomics with a strong interest in understanding events and developments in the economy. We capture that interest and develop students’ economic intuition and understanding by presenting macroeconomics in a way that is modern and based in the real world of business and economic policy. And we believe we achieve this presentation without making the analysis more difficult. We avoid the recent trend of using simplified versions of intermediate models, which are often more detailed and complex than what students need to understand the basic macroeconomic issues. Instead, we use a more realistic version of the familiar aggregate demand and aggregate supply model to analyze short-run fluctuations and monetary and fiscal policy. We also avoid the “dueling schools of thought” approach often used to teach macroeconomics at the principles level. We emphasize the many areas of macroeconomics where most economists agree. And we present throughout real business and policy situations to develop students’ intuition. Here are a few highlights of our approach to macroeconomics:

- **A careful discussion of macro statistics.** Many students pay some attention to the financial news and know that the release of statistics by federal agencies can cause movements in stock and bond prices. A background in macroeconomic statistics helps clarify some of the policy issues encountered in later chapters. In Chapter 18, “GDP: Measuring Total Production and Income,” and Chapter 19, “Unemployment and Inflation,” we provide students with an understanding of the uses and potential shortcomings of the key macroeconomic statistics, without getting bogged down in the minutiae of how the statistics are constructed. For instance, we discuss the important differences between the payroll survey and the household survey for understanding conditions in the labor market. We explain why financial markets react more strongly to news from the payroll survey. We provide a discussion of the employment–population ratio, which is not covered in some other texts but which many economists regard as a key measure of labor market performance.



- **Early coverage of long-run topics.** We place key macroeconomic issues in their long-run context in Chapter 20, “Economic Growth, the Financial System, and Business Cycles,” and Chapter 21, “Long-Run Economic Growth: Sources and Policies.” Chapter 20 puts the business cycle in the context of underlying long-run growth and discusses what actually happens during the phases of the business cycle. We believe this material is important if students are to have the understanding of business cycles they will need to interpret economic events; this material is often discussed only briefly or omitted entirely in other books. We know that many instructors prefer to have a short-run orientation to their macro courses, with a strong emphasis on policy. Accordingly, we have structured Chapter 20 so that its discussion of long-run growth is sufficient for instructors who want to move quickly to short-run analysis. Chapter 21 uses a simple neoclassical growth model to explain important growth issues. We apply the model to topics such as the decline of the Soviet economy, the long-run prospects for growth in China, the implications of the slowdown in productivity growth for the U.S. economy, and the failure of many developing countries to sustain high growth rates. We also challenge students with the discussion “Why Isn’t the Whole World Rich?”
- **A dynamic model of aggregate demand and aggregate supply.** We take a fresh approach to the standard aggregate demand and aggregate supply (AD–AS) model in Chapter 23, “Aggregate Demand and Aggregate Supply Analysis.” We realize there is no good, simple alternative to using the AD–AS model when explaining movements in the price level and in real GDP. But we know that more instructors are dissatisfied with the AD–AS model than with any other aspect of the macro principles course. The key problem, of course, is that AD–AS is a static model that attempts to account for dynamic changes in real GDP and the price level. Our approach retains the basics of the AD–AS model but makes it more accurate and useful by making it more dynamic. We emphasize two points:
  1. Changes in the position of the short-run (upward-sloping) aggregate supply curve depend mainly on the state of expectations of the inflation rate.
  2. The existence of growth in the economy means that the long-run (vertical) aggregate supply curve shifts to the right every year.

This “dynamic” AD–AS model provides students with a more accurate understanding of the causes and consequences of fluctuations in real GDP and the price level. We introduce this model in Chapter 23 and use it to discuss monetary policy in Chapter 25, “Monetary Policy,” and fiscal policy in Chapter 26, “Fiscal Policy.” The material on dynamic AD–AS is presented in self-contained sections in Chapters 23, 25, and 26, so instructors may safely omit the sections on the dynamic AD–AS model without any loss in continuity to the discussion of macroeconomic theory and policy.

- **Extensive coverage of monetary policy.** Because of the central role monetary policy plays in the economy and in students’ curiosity about business and financial news, we devote two chapters to the topic: Chapter 25, “Monetary Policy,” and Chapter 27, “Inflation, Unemployment, and Federal Reserve Policy.” We emphasize the issues involved in the Fed’s choice of monetary policy targets, and we include coverage of the Taylor rule. We also cover the Fed’s new policy tools and the debate over whether the Fed’s policies during and after the 2007–2009 financial crisis were consistent with its mandate under the Federal Reserve Act, and recent challenges to the Fed’s independence.
- **Coverage of both the demand-side and supply-side effects of fiscal policy.** Our discussion of fiscal policy in Chapter 26, “Fiscal Policy,” carefully distinguishes between automatic stabilizers and discretionary fiscal policy. We also provide significant coverage of the supply-side effects of fiscal policy. A new section discusses the requirements for the Trump administration to hit its goal of restoring the long-run annual growth rate of real GDP to 3 percent.



- **A self-contained but thorough discussion of the Keynesian income–expenditure approach.** The Keynesian income–expenditure approach (the “45°-line diagram,” or “Keynesian cross”) is useful for introducing students to the short-run relationship between spending and production. Many instructors, however, prefer to omit this material. Therefore, we use the 45°-line diagram only in Chapter 22, “Aggregate Expenditure and Output in the Short Run.” The discussions of monetary and fiscal policy in Chapter 25, “Monetary Policy,” and Chapter 26, “Fiscal Policy,” respectively, use only the AD–AS model, making it possible to omit Chapter 22.
- **Extensive international coverage.** We include two chapters devoted to international topics: Chapter 9, “Comparative Advantage and the Gains from International Trade,” and Chapter 28, “Macroeconomics in an Open Economy.” Having a good understanding of the international trading and financial systems is essential to understanding the macroeconomy and to satisfying students’ curiosity about the economic world around them. In addition to the material in our two international chapters, we weave international comparisons into the narratives of several other chapters, including our discussion of labor market policies in Chapter 27, “Inflation, Unemployment, and Federal Reserve Policy,” and central banking in Chapter 24, “Money, Banks, and the Federal Reserve System.”
- **Flexible chapter organization.** Because we realize that there are a variety of approaches to teaching principles of macroeconomics, we have structured our chapters for maximum flexibility. For example, our discussion of long-run economic growth in Chapter 20, “Economic Growth, the Financial System, and Business Cycles,” makes it possible for instructors to omit the more thorough discussion of these issues in Chapter 21, “Long-Run Economic Growth: Sources and Policies.” Our discussion of the Keynesian 45°-line diagram is confined to Chapter 22, “Aggregate Expenditure and Output in the Short Run,” so that instructors who do not use this approach can proceed directly to aggregate demand and aggregate supply analysis in Chapter 23, “Aggregate Demand and Aggregate Supply Analysis.” While we devote two chapters to monetary policy, the first of these—Chapter 25, “Monetary Policy”—is a self-contained discussion, so instructors may safely omit the material in Chapter 27, “Inflation, Unemployment, and Federal Reserve Policy,” if they choose to. Finally, instructors may choose to omit both of the international chapters (Chapter 9, “Comparative Advantage and the Gains from International Trade,” and Chapter 28, “Macroeconomics in an Open Economy”), cover just Chapter 9 on international trade, or cover just Chapter 28. Please refer to the flexibility chart on pages 40–41 of this preface to help select the chapters and order best suited to your classroom needs.

## Pedagogy That Emphasizes Real-World Examples, Applications, and Practice

A number of pedagogical features illustrate the relevance of economics to students’ everyday lives, help students focus on key concepts, and help them prepare for exams.

### Business Cases and *An Inside Look* News Articles

Each chapter-opening case provides a real-world context for learning, sparks students’ interest in economics, and helps unify the chapter. The case describes an actual company facing a real situation. The company is integrated in the narrative, graphs, and pedagogical features of the chapter. Some of the chapter openers focus on the role of entrepreneurs in developing new products and bringing them to market. For example, Chapter 2 features Elon Musk of Tesla Motors; Chapter 13 features Emily Mange and Doug Zell, who helped launch “third wave coffee” when they opened Intelligentsia; Chapter 24 features Venmo app founders Andrew Kortina and Iqram Magdon-Ismail; and Chapter 28 features Jeff Bezos of Amazon.

# 3 Where Prices Come From: The Interaction of Demand and Supply

## A Basketball Player Takes a Tumble—And So Does Nike

Zion Williamson of Duke University was probably the best male college basketball player during the 2018–2019 season. So it was big news when, during a game against archrival University of North Carolina, Zion's Nike athletic shoe split open while he was dribbling the ball, causing him to fall to the floor and injure his knee. Nike was immediately subjected to intense criticism on social media—a damaging development for a firm in the intensely competitive athletic shoe industry.

The manufacture of shoes designed specifically for playing sports or exercising dates to the mid-1800s, after Charles Goodyear invented the vulcanizing process, which hardened rubber enough for it to be used on the soles of shoes. Initially, athletic shoes were expensive, and they were worn primarily by wealthy people when playing tennis. By the late 1800s, mass production of athletic shoes in factories made them widely available at prices comparable to those of other shoes. Albert Spalding is credited with inventing the basketball in 1894 and the basketball shoe in 1907.

Today, Nike has the largest market share among athletic shoe firms. The firm that became Nike was founded in 1963 by University of Oregon track coach Bill Bowerman and track team member Phil Knight. At first the firm sold only imported shoes that a Japanese firm produced. Nike's goal was to compete with the German firm Adidas, at the time the main supplier of running shoes in the U.S. market. In 1973, the firm introduced the Nike Oregon Waffle, which used a distinctive waffle pattern that provided excellent cushioning and traction. Nike was able to achieve lasting success by combining innovative shoe designs with heavily advertised endorsements from celebrities and star athletes.

In recent years, new entrants to the athletic shoe industry have competed by offering shoes made of different materials or in different styles. For instance, Allbirds began selling shoes with wool uppers, and Skechers focused on comfort. Adopting such strategies allowed these firms to avoid



chasing the latest styles or paying for the endorsements of the hottest celebrities and athletes. Athletic shoes are manufactured primarily in factories in Asia that employ low-wage labor. Contracting with these factories to launch a new shoe brand is relatively low cost, which eases the entry of new firms into the industry. As a result, competition is intense, and firms have to respond quickly to changes in consumer tastes. Nike has adapted to increased competition by offering “Nike by You,” which allows people to customize their athletic shoes by color, style, and treatment of the Nike swoosh logo.

Although sales of athletic shoes were strong in 2019, there are no guarantees in a market system. Will athletic shoes remain popular, allowing Nike, Adidas, and their competitors to continue earning substantial profits? Or will competition and changes in consumer tastes force down prices and eliminate their profits, which happened to other once fashionable products, from men's hats to wrist-watches? Although competition is not always good news for firms, it is great news for consumers because it increases the choice of available products and lowers the prices consumers pay for those products.

**AN INSIDE LOOK** at the end of this chapter discusses plans by BASF and Reebok to release 3D printed liquid shoes.

## Chapter Outline & Learning Objectives

- 1** The Demand Side of the Market, page 125  
List and describe the variables that influence demand.
- 2** The Supply Side of the Market, page 134  
List and describe the variables that influence supply.
- 3** Market Equilibrium: Putting Demand and Supply Together, page 139  
Use a graph to illustrate market equilibrium.
- 4** The Effect of Demand and Supply Shifts on Equilibrium, page 142  
Use demand and supply graphs to predict changes in prices and quantities.

## Economics in Your Life & Career

### Can You Forecast the Future Demand for Athletic Shoes?

Firms face many challenges in responding to changes in consumer demand. For example, firms selling athletic shoes need to forecast future demand in order to determine how much production capacity they will need. If you were a manager for a firm that sells athletic shoes, such as Nike, Adidas, or Allbirds, what factors would you take into account in forecasting future demand? As you read this chapter, try to answer this question. You can check your answer against the one we provide at the end of this chapter.

An *Inside Look* is a two-page feature that shows students how to apply the concepts from the chapter to the analysis of a news article. The feature appears at the end of Chapters 1–4. An *Inside Look* presents an excerpt from an article, analysis of the article, a graph(s), and critical thinking questions.

## AN INSIDE LOOK

### If the Shoe Fits . . . Print It?

#### 3DPRINT.COM

#### BASF and Reebok to Release Additional 3D Printed Liquid Speed Shoes, More Projects in Development

Multiple major shoe manufacturing corporations have been turning to 3D printing over the last couple of years. While 3D printed shoes aren't filling shoe stores just yet, companies are being attracted to the technology for its design potential and customization possibilities. Now we're in the age of the small series of exclusive 3D printing shoe. Earlier this year, Nike introduced the first shoe with a 3D printed upper, while New Balance has led the way in the first partially 3D printed shoe to be made commercially available. And in 2016, Reebok introduced the Liquid Speed shoe, which uses liquid developed by BASF to draw a frame directly onto the shoe. This allows for a lighter fit and is pretty cool-looking too.

The technique also does away with the traditional mold-driven process, which is expensive and time-consuming, and allows for localized production. Currently, nearly all athletic footwear is made in Asian factories due to the labor-intensive nature of the mold process, but thanks to Reebok's 3D printing technology, the Liquid Speed shoe can be made anywhere, including in the company's Liquidity Factory, which is located in Rhode Island.

"The point of automation is to shorten the production cost and enable that automation," said Chau Nguyen, Market Segment Manager for Footwear, BASF North America. BASF, "to instead of a person sitting there and putting a sole on, they were able to dispense it in 3D on the part itself—that saved a lot of time."

Reebok approached BASF, which it had worked with before, about creating a polyurethane material that it could use to create a unique outsole. BASF formulated a urethane-based liquid that could be drawn on the shoe to create an outsole that molds with the shoe on the shoe.

"We provide the material to Reebok that has the required rheology and reactivity to produce a part with no molds," said Nguyen. "Look at it as if drawing with ketchup. When you draw with this material, it's already curing, it's already started to solidify."

Center is in many shoe (except some formal wear), but especially running shoes, where performance depends largely on how comfortably the shoe fits. The design of the Liquid Speed shoe allows for an especially secure and comfortable fit, according to Nguyen.

"In this case the outsole has wings on it and it wraps around to the sides of the shoe. They have traction at the top of your foot, and usually all of the material are combined together," he explained. "Well in this case you have material attached to the sides, the

medial and the lateral parts of your foot, so you get a more custom fit."

Nguyen also calls the shoe the first high-rebound outsole. Until now, most outsoles have been made from rubber, but the polyurethane allows for better rebound.

"When you're running, a certain amount of energy is going to the ground," he said. "So, when you hit the ground, in this case, it absorbs the energy and then it returns it, that's why it's called high-rebound."

When the Liquid Speed shoe was first released in November, only 500 pairs were made, and they sold out within hours for \$119.50 each. The first batch was so limited because Reebok was borrowing lab time, but now that it has opened its own Liquidity Factory, there will be more extensive releases in the future. Reebok is working on additional footwear products with help from BASF as well.

So keep an eye out for Liquid Speed to reemerge on the market before long, as well as some new developments from Reebok. As 3D printed shoes become more easily and frequently made, ones will likely go down as well, making them more accessible—Liquid Speed shoes are already relatively inexpensive compared to some of the other 3D printed shoes that have been released. Many of these other shoes have been made specifically for professional athletes, but Reebok seems to have the average consumer in mind.

#### Key Points in the Article

3D printing technology has entered the realm of the highly competitive athletic shoe market. In 2016, Reebok introduced the Liquid Speed shoe, made in part using 3D printing, with competitors such as Nike and New Balance adopting this technology for a limited number of products in 2018. 3D printing allows shoe manufacturers to improve the fit and performance of their products and eliminates the need for the expensive and time-consuming mold-driven production process common in traditional shoe manufacturing. The cost savings also enables manufacturers to relocate production from low-wage regions such as Asia, as Reebok did by establishing its Liquidity Factory in Rhode Island. As 3D printing shoe manufacturing expands, consumers can expect greater accessibility as a result of decreases in cost.

#### Analyzing the News

Manufacturers are starting to incorporate 3D printing technology into their design and manufacturing processes. While still relatively new, companies such as Reebok, Nike, and New Balance are using the

technology to produce components for certain product lines. 3D printing allows for expanded design possibilities and product customization. Although 3D printing is not yet a dominant production technique, companies see the potential for this process to improve productivity and increase profits.

Using 3D printers would allow shoe companies to avoid much of the traditional production process, which is both time-consuming and expensive. 3D printing represents a positive technological change, allowing a firm to produce more output using the same amount of inputs. Suppose Figure 1 below illustrates the market for athletic shoes. This positive technological change shifts the supply curve to the right, from  $S_1$  to  $S_2$ , resulting in a decrease in the equilibrium price ( $P_1$  to  $P_2$ ) and an increase in the equilibrium quantity ( $Q_1$  to  $Q_2$ ). The lower equilibrium price will also result in an increase in quantity demanded, illustrated by the movement from the original equilibrium point ( $A$ ) to the new equilibrium point ( $B$ ).

Reebok is increasing production of its Liquid Speed shoe and plans to expand 3D printing to other models. Reebok also hopes to attract more customers

who are looking for the better fit and performance these shoes offer. Figure 2 illustrates an increase in consumers' taste for athletic shoes as a result of the better fit these shoes provide. This increase in taste shifts the demand curve to the right, from  $D_1$  to  $D_2$ , resulting in an increase in both the equilibrium price ( $P_1$  to  $P_2$ ) and the equilibrium quantity ( $Q_1$  to  $Q_2$ ). The higher equilibrium price results in an increase in quantity supplied, illustrated by the movement from equilibrium point  $A$  to equilibrium point  $B$ .

#### Thinking Critically

- Why is it particularly important for a firm like Reebok to stay informed of technological advancements and seek out the ones it could possibly use in its operations?
- Suppose that athletic shoe firms experience an improvement in technology from the use of 3D printing and that the improved performance and fit of these 3D printed shoes increases consumers' taste for the shoes. Draw a demand and supply graph to illustrate this situation and explain what happens to equilibrium price and equilibrium quantity.

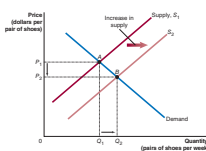


Figure 1 A positive technological change shifts the supply curve for Reebok shoes to the right. All else equal, equilibrium price decreases, and equilibrium quantity increases.

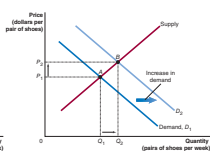


Figure 2 An increase in consumers' taste for Reebok shoes shifts the demand curve to the right. All else equal, both equilibrium price and equilibrium quantity increase.

## Solved Problems

Many students have great difficulty handling applied economics problems. We help students overcome this hurdle by including in each chapter two or three worked-out problems that analyze real-world economic issues they hear and read about in the news. Our goals are to keep students focused on the main ideas of each chapter and give them a model for how to solve an economic problem by breaking it down step by step. We tie additional exercises in the end-of-chapter *Problems and Applications* section to every *Solved Problem*. Additional *Solved Problems* appear in the *Instructor's Manuals*. In addition, the Test Banks include problems tied to the *Solved Problems* in the main book.

New to this edition are whiteboard videos of select *Solved Problems* that bring these real-world problems to life with audio, background photos, and step-by-step construction of graphs and tables.

146 CHAPTER 3 Where Prices Come From: The Interaction of Demand and Supply

**Solved Problem 3.4**

**Can We Predict Changes in the Price and Quantity of Merino Wool?**

When Alibek introduced athletic shoes with uppers made from merino wool, it helped increase the popularity of this type of wool, which is softer than other wools. A news article noted that, "Brands from Adidas to Lululemon and Under Armour are selling wool apparel, touting the fiber's soft feel and odor-resisting properties." Most merino wool is harvested from sheep raised in Australia and New Zealand. The article noted that the sheep population in these countries has been declining because sheep farmers have been converting to dairy farming or raising wheat and other crops.

a. Can we use this information to be certain whether the equilibrium price of merino wool has increased or decreased? Use a demand and supply graph showing the market for merino wool to illustrate your answer.

b. Can we use this information to be certain whether the equilibrium quantity of merino wool has increased or decreased? Use a demand and supply graph showing the market for merino wool to illustrate your answer.

**Solving the Problem**

**Step 1: Review the chapter material.** This problem is about how shifts in demand and supply curves affect the equilibrium price, so you might want to review the section "The Effect of Shifts in Demand and Supply over Time."

**Step 2: Answer part (a) using demand and supply analysis.** The problem gives you the information that consumer tastes have changed, leading to an increase in the demand for merino wool in athletic shoes and other products. So, the demand curve has shifted to the right. The problem also gives you the information that farmers in Australia and New Zealand have been moving out of sheep farming. So, the supply curve for merino wool has shifted to the left. The following graph shows both of these shifts.

As Table 3.3 summarizes, if the demand curve shifts to the right and the supply curve shifts to the left, the equilibrium price must increase. Therefore, we can answer part (a) by stating that we are certain that the equilibrium price of merino wool has increased.

**Step 3: Answer part (b) using demand and supply analysis.** The graph we drew in step 2 shows that the equilibrium quantity of merino wool has increased. But given the information provided, the following graph would also be correct.

The Effect of Demand and Supply Shifts on Equilibrium 147

Unlike the graph in step 2, which shows the equilibrium quantity increasing, this graph shows the equilibrium quantity decreasing. The uncertainty about whether the equilibrium quantity has increased or decreased is consistent with what Table 3.3 indicates happens when the demand curve shifts to the right and the supply curve shifts to the left. Therefore, the answer to part (b) is that we cannot be certain whether the equilibrium quantity of merino wool has increased or decreased.

**Extra Credit:** The article cited in this problem states that sheep farmers had switched to dairy farming or raising crops because wool prices had been declining. The farmers were responding to the market signal they received from the price of wool declining relative to the prices of other products they could supply. Rising wool prices resulting from an increased consumer taste for wool athletic shoes and other apparel will send a signal that some farmers will respond to by returning to raising sheep. Eventually, we would expect that the quantity of merino wool will increase in response to the change in consumer tastes.

**Your Turn:** For more practice, do related problems 4.7 and 4.8 at the end of this chapter.

**Shifts in a Curve versus Movements along a Curve**

When analyzing markets using demand and supply curves, remember that when a shift is a demand or supply curve causes a change in equilibrium price, the change in price does not cause a further shift in demand or supply. Suppose that an increase in supply causes the price of a good to fall, while everything else that affects the willingness of consumers to buy the good is constant. The result will be an increase in the quantity demanded but not an increase in demand. For demand to increase, the whole demand curve must shift. The point is the same for supply: If the price of the good falls but everything else that affects the willingness of sellers to supply the good is constant, the quantity supplied decreases, but the supply does not, for supply to decrease, the whole supply curve must shift.

## Apply the Concept

Each chapter includes two to four *Apply the Concept* features that provide real-world reinforcement of key concepts and help students learn how to interpret what they read on the Web and in newspapers. Most of the 100 *Apply the Concept* features use relevant, stimulating, and provocative news stories focused on businesses and policy issues. One-third of them are new to this edition, and most others have been updated. Several discuss health care and trade, which have been at the forefront of recent policy discussions. Each *Apply the Concept* has at least one supporting end-of-chapter problem to allow students to test their understanding of the topic discussed.

### Apply the Concept

#### Forecasting the Demand for Athletic Shoes

It's important for managers to forecast the demand for their products accurately because doing so helps them determine how much of a good to produce. Firms typically set manufacturing schedules at least a month ahead of time. The market for athletic shoes is steadily growing, and firms need to carefully plan increases in productive capacity. Firms that fail to produce a large enough quantity to keep pace with increasing demand can lose out to competitors. But will the demand for athletic shoes continue to grow, or has it reached a peak?

Richard Tedlow of the Harvard Business School has developed a theory of the "three phases of marketing" that can provide some insight into how the markets for many consumer products develop over time. The table below summarizes the phases. The first phase often has many large firms, each producing a relatively small volume of goods and charging high prices. This phase corresponds to the carbonated soft drink industry in the late nineteenth century, the automobile industry in the early twentieth century, and the personal computer industry in the late 1970s. In the second phase, the market consolidates, with one or a few brands attaining high market shares by selling a large number of units at lower prices. This phase corresponds to the soft drink industry during the middle of the twentieth century, the automobile industry during the 1920s, and the personal computer industry during the late 1980s. The third phase of marketing involves a rapid multiplication of products introduced by the leading firms. Colas, automobiles, and personal computers are all currently in this phase. For instance, Coca-Cola and Pepsi are the dominant firms in the carbonated soft drink industry, but they offer a large variety of products, from basic Coke and Pepsi to caffeine-free Coke and Pepsi, Diet Cherry Coke, and Pepsi Mango.



Patrick T. Fallon/Bloomberg via Getty Images  
How will changes in demographics, income, and tastes shape the market for athletic shoes?

| Phase 1   | Phase 2   | Phase 3  |
|---|---|--|
| <p><b>Evolution:</b></p> <ul style="list-style-type: none"><li>Many large firms</li><li>Each firm producing a relatively small volume of goods and charging high prices</li></ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"><li>The carbonated soft drink industry in the late nineteenth century</li><li>The automobile industry in the early twentieth century</li><li>The personal computer industry in the late 1970s</li><li>The athletic shoe industry in the late nineteenth century</li></ul> | <p><b>Evolution:</b></p> <ul style="list-style-type: none"><li>Market consolidation, with one or a few brands attaining high market shares.</li><li>Each firm selling a large number of units at lower prices</li></ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"><li>The carbonated soft drink industry during the middle of the twentieth century</li><li>The automobile industry during the 1920s</li><li>The personal computer industry in the late 1980s</li><li>The athletic shoe industry in the 1970s</li></ul> | <p><b>Evolution:</b></p> <ul style="list-style-type: none"><li>A rapid multiplication of products introduced by the dominant firms</li></ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"><li>The carbonated soft drink industry today, with Coca-Cola and Pepsi being the dominant firms</li><li>The automobile industry today</li><li>The personal computer industry today</li><li>The athletic shoe industry today</li></ul> |

The athletic shoe industry is probably in the third phase of marketing, with market leaders Nike, Adidas, Skechers, New Balance, and Under Armour each having market shares of at least 5 percent and offering a variety of styles, and dozens of smaller firms making up the remainder of the market.

Managers at athletic shoe firms will have to take into account a number of factors when estimating the future demand for athletic shoes. Factors that will tend to lead to higher demand for athletic shoes include (1) the popularity of the product with millennials and members of generation Z; (2) the trend away from women wearing high heels toward wearing more casual shoes; and (3) rising incomes in some developing countries, such as China and India, which should increase demand. But in their key North American and European markets, athletic shoe firms face slowing population growth, which will reduce the rate at which demand increases. The industry is also dependent on changing tastes. As millennials and members of generation Z have become less interested in participating in competitive running, the sector of the industry producing running shoes has already experienced declining sales. Similarly, a significant fraction of the demand for basketball shoes comes from people who collect them or buy them intending to resell them to collectors. Although an article in the *Wall Street Journal* described collecting athletic shoes as a "mainstream passion," if tastes change and collectors stop buying hundreds of pairs of new shoes each, demand will decline.

As we saw in Chapter 1, economists can use formal models to forecast future values of economic variables. In this case, an economist forecasting the demand for athletic shoes would want to include the factors mentioned in the previous paragraphs, although forecasting changes in tastes can be difficult and, over the longer run, changes in the growth of income and population across countries cannot be estimated exactly.

**Your Turn:** Test your understanding by doing related problem 1.17 at the end of this chapter.

## Don't Let This Happen to You

We know from many years of teaching which concepts students find most difficult. We include in each chapter a box feature called *Don't Let This Happen to You* that alerts students to the most common pitfalls in that chapter's material. We follow up with a related question in the end-of-chapter *Problems and Applications* section.

## Concept Checks

For each learning objective section, we provide a Concept Check that is accessible in the corresponding section within the MyLab Economics page. Each Concept Check contains one or two multiple-choice, true/false, or fill-in questions. These checks act as “speed bumps” that encourage students to stop and check their understanding of fundamental terms and concepts before moving on to the next section. The goal of this digital resource is to help students assess their progress on a section-by-section basis so they can be better prepared for homework, quizzes, and exams.

## Graphs and Summary Tables

Graphs are an indispensable part of a principles of economics course but are a major stumbling block for many students. Every chapter except Chapter 1 includes end-of-chapter problems that require students to draw, read, and interpret graphs. Video animations of the figures appear within the book's MyLab Economics page. We use four devices to help students read and interpret graphs:

1. Detailed captions
2. Boxed notes
3. Color-coded curves
4. Summary tables with graphs

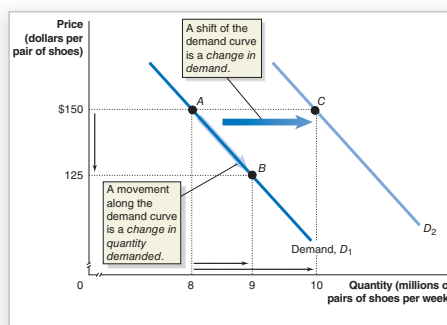
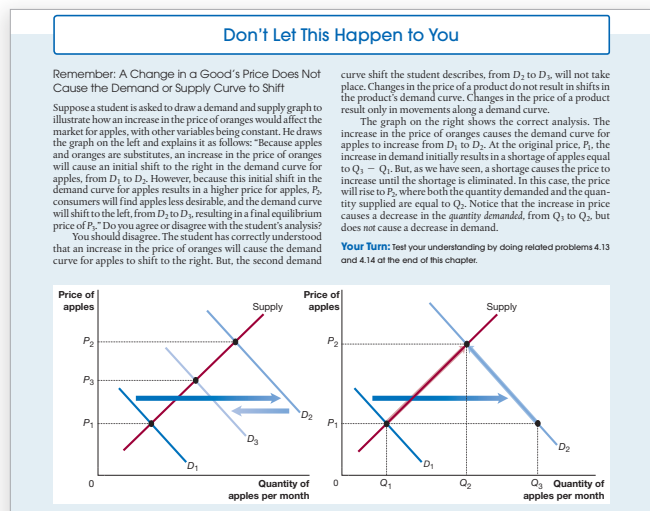


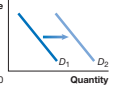
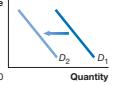
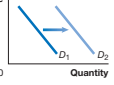
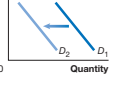
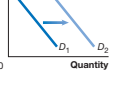
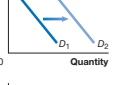
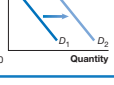
Figure 3.3

### A Change in Demand versus a Change in Quantity Demanded

If the price of athletic shoes falls from \$150 to \$125, the result will be a movement along the demand curve from point A to point B—an increase in quantity demanded from 8 million pairs of shoes per week to 9 million pairs. If consumers' incomes increase, or if another factor changes that makes consumers want more of the product at every price, the demand curve will shift to the right—an increase in demand. In this case, the increase in demand from  $D_1$  to  $D_2$  causes the quantity of athletic shoes demanded at a price of \$150 to increase from 8 million pairs at point A to 10 million pairs at point C.

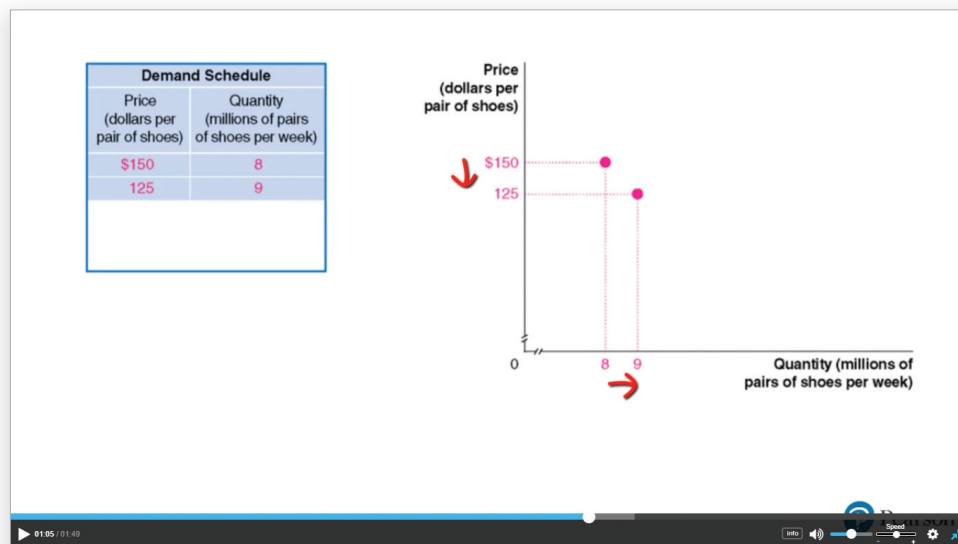
Table 3.1

Variables That Shift Market Demand Curves

| An increase in ...                           | shifts the demand curve ...  | because ...   |
|--|--|---|
| income (and the good is normal)              | Price<br>Quantity<br> | consumers spend more of their higher incomes on the good.                     |
| income (and the good is inferior)            | Price<br>Quantity<br> | consumers spend less of their higher incomes on the good.                     |
| the price of a substitute good               | Price<br>Quantity<br> | consumers buy less of the substitute good and more of this good.              |
| the price of a complementary good            | Price<br>Quantity<br> | consumers buy less of the complementary good and less of this good.           |
| taste for the good                           | Price<br>Quantity<br> | consumers are willing to buy a larger quantity of the good at every price.    |
| population                                   | Price<br>Quantity<br> | additional consumers result in a greater quantity demanded at every price.    |
| the expected price of the good in the future | Price<br>Quantity<br> | consumers buy more of the good today to avoid the higher price in the future. |

Here is a screen capture to show one of the many figure animation videos that appear within MyLab Economics.

**Figure Animation 3.1** A Demand Schedule and Demand Curve



### **Review Questions and Problems and Applications—Grouped by Learning Objective to Improve Assessment**

We group the main end-of-chapter material—*Summary*, *Review Questions*, and *Problems and Applications*—under learning objectives. The goals of this organization are to make it easier for instructors to assign problems based on learning objectives and to help students efficiently review material that they find difficult. If students have difficulty with a particular learning objective, an instructor can easily identify which end-of-chapter questions and problems support that objective and assign them as homework or discuss them in class. Also, student learning will be enhanced by having the summary material and problems grouped together by learning objective, which allows them to focus on the parts of the chapter they find most challenging. Each major section of the chapter, paired with a learning objective, has at least two review questions and three problems.

As in the previous editions, we include one or more end-of-chapter problems that test students' understanding of the content presented in the chapter-opening business vignette, *Solved Problem*, *Apply the Concept*, *Economics in Your Life & Career*, and *Don't Let This Happen to You* special features in the chapter. Instructors can cover a feature in class and assign the corresponding problem(s) for homework. The Test Bank files also include questions that pertain to these special features.

### **Critical Thinking Exercises**

Each chapter includes two or more *Critical Thinking Exercises* that help students build skills in the following areas: (1) analyzing and interpreting information; (2) applying reasoning and logic to new or unfamiliar ideas and situations; (3) examining ideas and concepts from multiple perspectives; and (4) clearly communicating their findings in a brief paper or class presentation.

### **Real-Time Data Exercises**

We end select chapters with at least two *Real-Time Data Exercises* that help students become familiar with a key data source, learn how to locate data, and develop skills in interpreting data. Select *Real-Time Data Analysis Exercises* allow students and instructors to use the very latest data from the Federal Reserve Economic Data (FRED) website.



## Developing Career Skills

It is important for students to learn key economic terms, concepts, and models. But for a course to be successful, students need to develop the skills and confidence to apply what they've learned outside the classroom.

After the chapter-opening real-world business case, we have a feature titled *Economics in Your Life & Career* that adds a personal dimension to the chapter opener by asking students to consider how economics affects their lives and careers. The feature piques the interest of students and emphasizes the connection between the material they are learning and their personal and career decisions.

### Economics in Your Life & Career

#### Can You Forecast the Future Demand for Athletic Shoes?

Firms face many challenges in responding to changes in consumer demand. For example, firms selling athletic shoes need to forecast future demand in order to determine how much production capacity they will need. If you were a manager for a firm that sells athletic shoes,

such as Nike, Adidas, or Allbirds, what factors would you take into account in forecasting future demand? As you read this chapter, try to answer this question. You can check your answer against the one we provide at the end of this chapter.

At the end of the chapter, we use the chapter concepts to answer the questions asked at the beginning of the chapter.

### Economics in Your Life & Career

#### Can You Forecast the Future Demand for Athletic Shoes?

At the beginning of this chapter, we asked what variables you would take into account in forecasting future demand if you were a manager for a firm selling athletic shoes. In Section 3.1, we discussed the factors that affect the demand for a product and provided a list of the most important variables. In the *Apply the Concept* in the same section, we discussed the future demand for athletic shoes.

In forecasting demand for athletic shoes, you should take into account factors such as changing demographics, as millennials and members of generation Z become larger fractions of prime-age consumers, and the extent to which

changing consumer tastes may help or hurt demand. You may also need to consider whether increased advertising of athletic shoes by large firms such as Adidas and Nike in developing countries with rising incomes will raise consumer awareness of the product in those countries and increase demand for athletic shoes being sold by other firms as well.

The factors discussed in this chapter provide you with the basic information needed to forecast demand for athletic shoes, although arriving at numerical forecasts requires using statistical analysis that you can learn in more advanced courses.

Chapter 1, “Economics: Foundations and Models,” includes a section that describes economics as a career and the key skills students of any major can gain from studying economics. As described earlier, features such as chapter-opening business cases, *Apply the Concepts*, *Solved Problems*, and end-of-chapter problems provide real-world context for learning that exposes students to economics as applied in a variety of large and small businesses, government agencies, and nonprofit organizations. End-of-chapter *Critical Thinking Exercises* help build student skills to analyze and interpret information and apply reasoning and logic to new or unfamiliar ideas and situations.



## Instructor Teaching Resources

The authors and Pearson Education have worked together to integrate the text, print, and media resources to make teaching and learning easier.

| Supplements Available to Instructors for Download at <a href="http://www.pearsonglobaleditions.com">www.pearsonglobaleditions.com</a> | Features of the Supplement  |
|---|---|
| <b>Instructor's Manual</b><br>Authored by Edward Scahill of the University of Scranton  | <ul style="list-style-type: none"> <li>• Chapter-by-chapter summaries organized by learning objectives</li> <li>• Extended examples and class exercises</li> <li>• Teaching outlines incorporating key terms and definitions, teaching tips, and topics for class discussion</li> <li>• New <i>Solved Problems</i></li> <li>• New <i>Apply the Concept</i> features</li> <li>• Solutions to all review questions, problems, and <i>Real-Time Data Exercises</i> in the book</li> </ul>  |
| <b>Test Bank</b><br>Authored by Randy Methenitis of Richland College  | <ul style="list-style-type: none"> <li>• Around 8,000 multiple-choice, true/false, short-answer, and graphing questions.</li> <li>• Test questions are annotated with the following categories:<br/> <b>Difficulty</b>—1 for straight recall, 2 for some analysis, and 3 for complex analysis<br/> <b>Type</b>—multiple-choice, true/false, short-answer, essay<br/> <b>Topic</b>—the term or concept the question supports<br/> <b>Learning outcome</b><br/> <b>Page number</b><br/> <b>Special feature</b><br/> <b>The Association to Advance Collegiate Schools of Business (AACSB) Guidelines</b>, which propose learning experiences in the following categories of Assurance of Learning Standards: Written and Oral Communication; Ethical Understanding and Reasoning; Analytical Thinking; Information Technology; Interpersonal Relations and Teamwork, Diverse and Multicultural Work; Reflective Thinking; and Application of Knowledge           </li> </ul> |
| <b>Computerized TestGen</b>   | <ul style="list-style-type: none"> <li>• Allows instructors to customize, save, and generate classroom tests.</li> <li>• Instructors can edit, add, or delete questions from the Test Bank; analyze test results; and organize a database of tests and student results.</li> <li>• Many options are available for organizing and displaying tests, along with search and sort features.</li> <li>• The software and the Test Bank can be downloaded from <a href="http://www.pearsonglobaleditions.com">www.pearsonglobaleditions.com</a>.</li> </ul>   |
| <b>PowerPoint Lecture Presentations</b><br>Authored by Paul Holmes of Ashland University  | <ul style="list-style-type: none"> <li>• A comprehensive set of PowerPoint slides can be used by instructors for class presentations or by students for lecture preview or review. These slides include all the graphs, tables, and equations in the textbook. Two versions are available: step-by-step mode, in which you can build graphs as you would on a blackboard, and automated mode, in which you use a single click per slide.</li> <li>• Student versions of the PowerPoint slides are available as .pdf files on MyLab, for this title. This version allows students to print the slides and bring them to class for note taking.</li> </ul>  |

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# FLEXIBILITY CHART

The following chart helps you organize your syllabus based on your teaching preferences and objectives:

| Core   | Optional   | Policy   |
|--|--|--|
| <b>Chapter 1:</b> Economics: Foundations and Models  | <b>Chapter 1 Appendix:</b> Using Graphs and Formulas   |  |
| <b>Chapter 2:</b> Trade-offs, Comparative Advantage, and the Market System                     |  |  |
| <b>Chapter 3:</b> Where Prices Come From: The Interaction of Demand and Supply                 |  |  |
|  | <b>Chapter 4 Appendix:</b> Quantitative Demand and Supply Analysis                                     | <b>Chapter 4:</b> Economic Efficiency, Government Price Setting, and Taxes |
|  |  | <b>Chapter 5:</b> Externalities, Environmental Policy, and Public Goods    |
| <b>Chapter 6:</b> Elasticity: The Responsiveness of Demand and Supply                          |  |  |
|  |  | <b>Chapter 7:</b> The Economics of Health Care                             |
|  | <b>Chapter 8:</b> Firms, the Stock Market, and Corporate Governance                                    |  |
|  | <b>Chapter 8 Appendix:</b> Using Present Value   |  |
|  | <b>Chapter 8 Online Appendix:</b> Income Statements and Balance Sheets                                 |  |
| <b>Chapter 9:</b> Comparative Advantage and the Gains from International Trade                 |  |  |
|  | <b>Chapter 10:</b> Consumer Choice and Behavioral Economics  |  |
|  | <b>Chapter 10 Appendix:</b> Using Indifference Curves and Budget Lines to Understand Consumer Behavior |  |
| <b>Chapter 11:</b> Technology, Production, and Costs   | <b>Chapter 11 Online Appendix:</b> Using Isoquants and Isocost Lines to Understand Production and Cost |  |
| <b>Chapter 12:</b> Firms in Perfectly Competitive Markets                                      |  |  |
| <b>Chapter 13:</b> Monopolistic Competition: The Competitive Model in a More Realistic Setting |  |  |
| <b>Chapter 14:</b> Oligopoly: Firms in Less Competitive Markets                                |  |  |

| Core  | Optional  | Policy  |
|---|---|---|
| <b>Chapter 15:</b> Monopoly and Antitrust Policy                              |   |   |
| <b>Chapter 16:</b> The Markets for Labor and Other Factors of Production      |   |   |
|   |   | <b>Chapter 17:</b> Public Choice, Taxes, and the Distribution of Income |
| <b>Chapter 18:</b> GDP: Measuring Total Production and Income                 |   |   |
| <b>Chapter 19:</b> Unemployment and Inflation                                 |   |   |
| <b>Chapter 20:</b> Economic Growth, the Financial System, and Business Cycles |   |   |
| <b>Chapter 21:</b> Long-Run Economic Growth: Sources and Policies             |   |   |
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# 1

# Economics: Foundations and Models

## Does Apple Manufacture the iPhone in the United States?

If you were asked to list prominent U.S. firms, you would likely include Apple near the top. When Apple began selling computers in the late 1970s and early 1980s, it manufactured them in the United States. Apple released the iPhone in 2007, and it has become one of the best-selling and most influential products of the twenty-first century. Apple designs the iPhone at its headquarters in Cupertino, California, but most iPhones are assembled in China, in factories owned by Foxconn, a Taiwanese company.

Many categories of products that were once manufactured in the United States are now manufactured overseas. Donald Trump won the 2016 presidential election in part by pledging to increase manufacturing employment in the United States. One aspect of his strategy was to impose tariffs—in effect, taxes—on imports of some goods from other countries. The Trump administration imposed tariffs of 10 percent on \$200 billion worth of Chinese imports and further increased the tariffs in 2019. Such tariffs lead to higher prices of imported goods, making it more likely that both U.S. and foreign companies will manufacture goods in the United States rather than in other countries. The Trump administration also hoped to use tariffs to convince other countries to reduce their restrictions on U.S. imports.

It was unclear whether the Trump administration's policies would be successful. Apple and other U.S. firms were manufacturing some products in other countries because in a *market system*, firms respond to economic incentives. In the case of Apple, the lower wages earned by Chinese workers and their experience in electronics manufacturing significantly reduce the costs of assembling iPhones. Technological progress often creates economic incentives for firms to change how they produce goods and services. For example, U.S. automobile manufacturers have replaced some workers with robots, reducing employment in the



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industry. Firms also respond to changes in consumer tastes. When more people began using smartphones rather than computers to connect to the Internet, they reduced their demand for computers. Firms also react to incentives resulting from government policy. For example, in response to the Trump administration's trade policies and tax reductions offered by the state government, Foxconn planned to build a factory in Wisconsin to manufacture LCD television screens. And in 2019, many U.S. firms were awaiting the outcome of trade negotiations between China and United States before deciding in which country to expand their operations.

In this chapter and the remainder of this book, we will look at how economics provides us with the tools to analyze how firms, consumers, and workers respond to economic incentives and how government policymakers can attempt to reach their objectives by changing those incentives.

**AN INSIDE LOOK** at the end of this chapter discusses whether tariffs are bringing manufacturing jobs back home or just raising prices for U.S. consumers.

## Chapter Outline & Learning Objectives

### 1.1 Three Key Economic Ideas, page 56

Explain these three key economic ideas: People are rational, people respond to economic incentives, and optimal decisions are made at the margin.

### 1.2 The Economic Problem That Every Society Must Solve, page 60

Discuss how an economy answers these questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced?

### 1.3 Economic Models, page 63

Explain how economists use models to analyze economic events and government policies.

### 1.4 Microeconomics and Macroeconomics, page 67

Distinguish between microeconomics and macroeconomics.

### 1.5 Economic Skills and Economics as a Career, page 68

Describe economics as a career and the key skills you can gain from studying economics.

### 1.6 A Preview of Important Economic Terms, page 69

Define important economic terms.

### Appendix: Using Graphs and Formulas, page 79

Use graphs and formulas to analyze economic situations.

## Economics in Your Life & Career

### Should You Consider a Career in Manufacturing?

In the late 1940s and early 1950s, one-third of workers in the United States were employed in manufacturing. Traditionally, many high school graduates viewed working on a manufacturing assembly line as a way to earn a middle-class income. Many college graduates in fields such as engineering, accounting, and management have also found employment in manufacturing. But, will manufacturing be a good source of careers when you graduate? In January 2019, total employment

in U.S. manufacturing was 12.8 million. But the U.S. Bureau of Labor Statistics (BLS) forecasts that by 2026, this number will *decline* to 11.6 million, even though it forecasts that total employment in all jobs will *increase* by 7 percent. What is the basis of the BLS's forecast of manufacturing employment, and how reliable is it? As you read this chapter, try to answer this question. You can check your answer against the one we provide at the end of this chapter.

In this book, we use economics to answer questions such as the following:

- What determines the prices of goods and services, from athletic shoes to pizza to automobiles?
- Why do firms engage in international trade, and how do government policies, such as tariffs, affect international trade?
- Why does the government control the prices of some goods and services, and what are the effects of those controls?

Economists do not always agree on the answers to questions like these, and there are lively debates on some issues. Because new economic questions are constantly arising, economists are always developing new methods to analyze them.

The topics we discuss in this book illustrate a basic fact of life: To attain our goals, we must make choices. We must make choices because we live in a world of **scarcity**, which means that although our wants are *unlimited*, the resources available to fulfill those wants are *limited*. You might want to own a BMW and a condo near a beach, but unless Bill Gates is a close and generous relative, you probably lack the funds to fulfill these wants. Every day, you make choices as you spend your limited income on the many goods and services available. The finite amount of time you have also limits your ability to attain your goals. If you spend an hour studying for your economics midterm, you have one hour less to study for your history midterm. Firms and the government are in the same situation as you: They must also attain their goals with limited resources. **Economics** is the study of the choices consumers, business managers, and government officials make to attain their goals, given their scarce resources.

We begin this chapter by discussing three important economic ideas that we will return to many times in the following chapters: *People are rational, people respond to economic incentives, and optimal decisions are made at the margin*. Then, we consider the three fundamental questions that any economy must answer: *What* goods and services will be produced? *How* will the goods and services be produced? and *Who* will receive the goods and services produced? Next, we consider the role of *economic models* in analyzing real-world economic issues. We then discuss the difference between microeconomics and macroeconomics, and we consider how economic skills can benefit your career. Finally, we preview some important economic terms.

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

**Economics** The study of the choices people make to attain their goals, given their scarce resources.

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

1.1

## Three Key Economic Ideas

**LEARNING OBJECTIVE:** Explain these three key economic ideas: People are rational, people respond to economic incentives, and optimal decisions are made at the margin.

Whether your goal is to buy a smartphone or find a part-time job, you will interact with other people 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. Examples of markets are the markets for smartphones, houses, haircuts, stocks and bonds, and labor. Most of economics involves analyzing how people make choices and interact in markets. Here are the three important ideas about markets that we'll return to frequently:

1. People are rational.
2. People respond to economic incentives.
3. Optimal decisions are made at the margin.

## People Are Rational

Economists generally assume that people are rational. This assumption does *not* mean that economists believe everyone knows everything or always makes the “best” decision. It means that economists assume that consumers and firms use all available information as they act to achieve their goals. Rational individuals weigh the benefits and costs of each action, and they choose an action only if the benefits outweigh the costs. For example, if Apple charges a price of \$999 for its new iPhone, economists assume that the managers at Apple have estimated that this price will earn the company the most profit. Even though the managers may be wrong—maybe a price of \$949 or \$1,049 would be more profitable—economists assume that the managers at Apple have acted rationally, on the basis of the information available to them, in choosing the price of \$999. Although not everyone behaves rationally all the time, the assumption of rational behavior is very useful in explaining most of the choices that people make.

## People Respond to Economic Incentives

People act from a variety of motives, including envy, compassion, anger, and religious belief. While not ignoring other motives, economists emphasize that individuals and firms consistently respond to *economic incentives*. This point may seem obvious, but it is often overlooked. For example, you probably hear news stories about bank or store robberies. You could argue that those robbers didn’t weigh the economic benefit—the money from the robbery—against the economic cost—the time spent in jail if arrested. Most states require anyone convicted of a felony to submit a DNA sample. The samples are entered into databases that police then check when investigating future crimes. DNA databases increase the likelihood that someone who commits a crime will be arrested, thereby reducing the economic incentive to commit crimes by raising the cost. But the DNA will reduce the number of crimes committed only if criminals respond to economic incentives. Jennifer Doleac, an economist at Texas A&M University, has analyzed the effects of adopting DNA testing and found that “the requirement to submit a DNA sample reduces the likelihood of a new conviction within five years by . . . 17 percent for serious violent offenders.” To an economist, it’s not surprising that even criminals respond to economic incentives.

Each chapter has at least two *Apply the Concept* features that discuss a news story or another application related to the chapter material. This *Apply the Concept* discusses the importance of analyzing the incentives provided by a government policy.

## Apply the Concept

### Would a Congressional Bill Aimed at Increasing the Pay of Low-Wage Workers Backfire?

Sometimes a government economic policy can have unintended consequences if it changes economic incentives in an unexpected way. In recent years, some policymakers and economists have become concerned that certain groups in the population haven’t shared in the benefits of U.S. economic growth. For instance, as we saw in the chapter opener, President Trump believed that tariffs might help states where manufacturing employment had been declining.

In 2018, two members of Congress introduced the Stop Bad Employers by Zeroing Out Subsidies Act with the goal of giving firms an incentive to raise the pay of their employees. Low-income workers are eligible for a number of government benefits, including Medicaid, which provides medical insurance to low-income and disabled people, and the Supplemental Nutrition Assistance Program (SNAP), which used to be called the Food Stamp Program. Under the act, firms whose employees received assistance from these programs would be required to pay a tax equal to cost of the assistance.

But would the act actually have the intended effect of causing firms to increase the pay of low-wage workers? Jared Bernstein, who served as an economic adviser



Patti McConville/Alamy Stock Photo

*Can the government incentivize businesses to increase the wages of low-income workers?*



to former Vice President Joe Biden, was skeptical. Bernstein argued that rather than increasing the pay of low-wage workers, the act might give firms an incentive to avoid hiring workers who were likely to be eligible for government assistance: “It’s not hard to imagine that employers would be wary of hiring someone who they think—rightly or wrongly—would invoke the tax.” Economists at the Center on Budget and Policy Studies, a research and policy institute that typically supports policies designed to help low-income workers, agreed:

First, it’s unlikely that employers would generally respond [to this act] by raising wages substantially, as raising wages would entail raising them for all workers in various job categories, not just for those who receive government benefits. . . . In response to the tax penalty, many employers would likely seek to reduce the number of low-wage workers they employ, such as by contracting out . . . various functions where a large share of the employees are paid low wages.

In 2019, it seemed unlikely that Congress would approve the act. The debate over the act shows that it’s important for government policymakers to analyze how the policies will affect economic incentives.

**Your Turn:** Test your understanding by doing related problem 1.8 at the end of this chapter.

## Optimal Decisions Are Made at the Margin

Some decisions are “all or nothing.” For instance, when an entrepreneur decides whether to open a new restaurant, she starts the new restaurant or she doesn’t. When you decide whether to attend graduate school, you either enroll in graduate school or you don’t. But rather than being all or nothing, most decisions in life involve doing a little more or a little less. If you are trying to decrease your spending and increase your saving, the decision is not really between saving all the money you earn or spending it all. Rather, many small choices are involved, such as whether to buy a caffè mocha at Starbucks every day or just once a week.

Economists use the word *marginal* to mean “extra” or “additional.” Comparing the *marginal benefit* (MB) of an activity to its *marginal cost* (MC) can help us make decisions. For example:

- Should you watch another hour of television or spend that hour studying? The *marginal benefit* of watching more television is the additional enjoyment you receive. The *marginal cost* is the reduction in your test score from having studied a little less.
- Should Apple produce an additional 300,000 iPhones? Firms receive *revenue* from selling goods. Apple’s marginal benefit is the additional revenue it receives from selling 300,000 more iPhones. Apple’s marginal cost is the additional cost—for wages, parts, and so forth—of producing 300,000 more iPhones.

Economists reason that *the optimal decision is to continue any activity up to the point where the marginal benefit equals the marginal cost—that is, to the point where  $MB = MC$ .*

Often we apply this rule without consciously thinking about it. Usually you will know whether the additional enjoyment from watching a television program is worth the additional cost you pay by not spending that hour studying without giving the decision a lot of thought. In business situations, however, firms often have to make careful calculations to determine, for example, whether the additional revenue received from increasing production of a good is greater or less than the additional cost of the production. **Marginal analysis** involves comparing marginal benefits and marginal costs.

In each chapter, you will see at least one *Solved Problem* feature. This feature will increase your understanding of the material by leading you through the steps of solving an applied economic problem. After reading the problem, test your understanding by doing the related problems that appear at the end of the chapter.

**Marginal analysis** Analysis that involves comparing marginal benefits and marginal costs.

## Solved Problem 1.1

### The Marginal Benefit and Marginal Cost of Delivering Packages for Amazon

The U.S. Postal Service (USPS) is an independent establishment within the federal government. When the USPS suffers a financial loss, the federal government is responsible for providing the funds to cover that loss. The USPS has many costs, including the salaries of its workers, the cost of operating post offices, and the cost of maintaining its trucks. The USPS doesn't deliver mail to homes on Sundays except

for packages sent by Amazon. President Donald Trump has argued that the additional revenue the USPS receives from Amazon doesn't cover all of the USPS's costs. Managers at USPS have stated that while President Trump is correct, delivering Amazon packages on Sunday still reduces the USPS's losses. Use marginal analysis to demonstrate how President Trump and the USPS managers may both be correct.

### Solving the Problem

**Step 1: Review the chapter material.** This problem is about making decisions, so you may want to review the section “Optimal Decisions Are Made at the Margin.”

**Step 2: Discuss how we can determine whether delivering packages for Amazon on Sunday will increase or decrease the USPS's losses.** The USPS receives payments from Amazon for delivering packages on Sunday. These payments are the additional, or marginal, revenue from providing Amazon with the service. Because the USPS wouldn't otherwise be sending out mail trucks and making deliveries on Sunday, it incurs additional costs such as the pay of mail carriers and the costs of gasoline and maintenance on its mail trucks. These costs are the marginal cost of providing Sunday delivery of packages for Amazon.

To determine whether delivering packages for Amazon on Sunday will increase or decrease the USPS's losses, we need to compare the marginal revenue received for the service with the marginal cost of providing it. If the marginal revenue is *greater than* the marginal cost, the USPS's losses will be reduced as a result of providing the service. If the marginal revenue is *less than* the marginal cost, the USPS's losses will be increased.

**Step 3: Use your analysis in step 2 to demonstrate that President Trump and the USPS managers may both be correct.** If the marginal revenue from Sunday package delivery is greater than the marginal cost, then providing the service reduces the USPS's losses. This position is the one held by USPS's managers. President Trump may be correct, though, that the revenue received from Amazon for this service doesn't cover all of the USPS's costs. For example, the USPS's managers were taking into account only the marginal cost of using mail trucks to deliver packages on Sunday—the pay for the Sunday workers and the additional gasoline used and increased wear and tear on the trucks—and disregarding the original purchase price of the trucks and other costs that don't change as a result of Sunday deliveries.

**Extra Credit:** As we have seen, optimal decisions are made at the margin. In this case, the managers at the USPS had the goal of reducing the USPS's losses. In deciding whether to agree to deliver packages for Amazon on Sunday, the managers were correct to compare the marginal revenue received from Amazon to the marginal cost of providing Amazon with the service.

**Your Turn:** For more practice, do related problems 1.9 and 1.10 at the end of this chapter.

## 1.2

## The Economic Problem That Every Society Must Solve

**LEARNING OBJECTIVE:** Discuss how an economy answers these questions:

What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced?

**Trade-off** The idea that, because of scarcity, producing more of one good or service means producing less of another good or service.

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

Because we live in a world of scarcity, any society faces the *economic problem* that it has only a limited quantity of economic resources—such as workers, machines, and raw materials—and so can produce only a limited amount of goods and services. Therefore, every society faces **trade-offs**: Producing more of one good or service means producing less of another good or service. The best measure of the cost of producing a good or service is the value of what has to be given up to produce it. The **opportunity cost** of any activity is the highest-valued alternative that must be given up to engage in that activity. The concept of opportunity cost is very important in economics and applies to individuals, firms, and society as a whole. For instance, suppose that you earn a salary of \$100,000 per year working as a manager for Apple. You decide to leave your job and open your own information technology consulting firm. In this case, the opportunity cost of the labor you supply to your own firm is the \$100,000 you give up by not working for Apple, *even if you do not explicitly pay yourself a salary*. As in this example, opportunity costs often do not involve actual payments of money.

Trade-offs force society to make choices when answering three fundamental questions:

1. *What* goods and services will be produced?
2. *How* will the goods and services be produced?
3. *Who* will receive the goods and services produced?

Throughout this book, we will return to these questions many times. For now, we briefly introduce each question.

### What Goods and Services Will Be Produced?

How will society decide whether to produce more economics textbooks or more smartphones? More daycare facilities or more football stadiums? Of course, “society” doesn’t make decisions; only individuals make decisions. The answer to the question of what will be produced is determined by the choices of three groups:

1. **Consumers:** You help decide which goods and services firms will produce when you choose to buy an iPhone instead of a Samsung Galaxy or a caffè mocha rather than a chai tea.
2. **Firms:** In response to consumers’ choices, Apple must choose whether to devote the company’s scarce resources to making more iPhones or more smartwatches.
3. **Government:** Members of Congress and the president must choose whether to spend more of the federal government’s limited budget on breast cancer research or on repairing highways.

In each case, consumers, managers of firms, and government policymakers face the problem of scarcity by trading off one good or service for another. And each choice made comes with an opportunity cost, measured by the value of the best alternative given up.

### How Will the Goods and Services Be Produced?

Firms choose how to produce the goods and services they sell. In many cases, firms face a trade-off between using more workers and using more machines. For example:

- A local service station has to choose whether to provide car repair services using more diagnostic computers and fewer auto mechanics or fewer diagnostic computers and more auto mechanics.

- A movie studio has to choose whether to produce animated films using highly skilled animators to draw them by hand or using fewer animators and more computers.
- A firm may have to choose between a production method in the United States that uses fewer workers and more machines and a production method in China that uses more workers and fewer machines.

## Who Will Receive the Goods and Services Produced?

In the United States, who receives the goods and services produced depends largely on how income is distributed. The higher a person's income, the more goods and services he or she can buy. Often, people are willing to give up some of their income—and, therefore, some of their ability to purchase goods and services—by donating to charities to increase the incomes of poorer people. Americans donate more than \$400 billion per year to charity, or an average donation of about \$3,200 for each household in the country. An important policy question, however, is whether the government should intervene to make the distribution of income more equal. Such intervention already occurs in the United States because people with higher incomes pay a larger fraction of their incomes in taxes and because the government makes payments to people with low incomes and provides services to them, such as Medicaid medical insurance and assistance in buying food through the Supplemental Nutritional Assistance Program (SNAP). There is disagreement over whether the current attempts to redistribute income are sufficient or whether there should be more or less redistribution.

## Centrally Planned Economies versus Market Economies

To answer the three questions—what, how, and who—societies organize their economies in two main ways. A society can have a **centrally planned economy**, in which the government decides how economic resources will be allocated. Or a society can have a **market economy**, in which the decisions of households and firms as they interact in markets determine the allocation of economic resources.

**Centrally Planned Economies** From 1917 to 1991, the most important centrally planned economy in the world was that of the Soviet Union, which was established when Vladimir Lenin and the Communist Party staged a revolution and took control of the Russian Empire. In the Soviet Union, the government decided what goods to produce, how the goods would be produced, and who would receive the goods. Government employees managed factories and stores. The objective of these managers was to follow the government's orders rather than to satisfy the wants of consumers. Centrally planned economies like that of the Soviet Union have failed to produce low-cost, high-quality goods and services, so the standard of living of the average person in a centrally planned economy tends to be low. All centrally planned economies have also been political dictatorships. Dissatisfaction with low living standards and political repression finally led to the collapse of the Soviet Union in 1991. Today, only North Korea still has a completely centrally planned economy, although in some other countries, such as Cuba and Venezuela, the government has a large role in planning economic activity.

**Market Economies** All high-income democracies, including the United States, Canada, Japan, and the countries of Western Europe, have market economies. Market economies rely primarily on privately owned firms to produce goods and services and to decide how to produce them. Markets, rather than the government, determine who receives the goods and services produced. In a market economy, firms must produce goods and services that meet the wants of consumers, or the firms will go out of business. In that sense, it is ultimately consumers who decide what will be produced. Because firms in a market economy compete to offer the highest-quality products at the lowest price, they are under pressure to use the lowest-cost methods of production. For example, as we saw in the chapter opener, Apple assembles its iPhones mainly in China rather than in the United States.

In a market economy, the income of an individual is determined by the payments he or she receives for what he or she has to sell. If you become a civil engineer, and firms are willing to pay a salary of \$85,000 per year for someone with your training and skills, you

**Centrally planned economy** An economy in which the government decides how economic resources will be allocated.

**Market economy** An economy in which the decisions of households and firms as they interact in markets determine the allocation of economic resources.



will have this amount of income to purchase goods and services. If you also buy a house that you rent out, your income will be even higher. One of the attractive features of markets is that they reward hard work. Generally, the more extensive the training you have received and the longer the hours you work, the higher your income will be. Of course, luck—both good and bad—also plays a role here. Someone might have a high income because she won the state lottery, while someone else might have a low income because he has severe medical problems. We can conclude that market economies respond to the question “Who receives the goods and services produced?” with the answer “Those who are most willing and able to buy them.”

## The Modern “Mixed” Economy

In the 1800s and early 1900s, the U.S. government engaged in relatively little regulation of markets for goods and services. Beginning in the mid-1900s, government intervention in the economy dramatically increased in the United States and other market economies due primarily to the high rates of unemployment and business bankruptcies during the Great Depression of the 1930s. Some government intervention was also intended to raise the incomes of the elderly, the sick, and people with limited skills. For example, in the 1930s, Congress established the *Social Security system*, which provides government payments to retired and disabled workers, and enacted *minimum wage* legislation, which sets a floor on the wages employers can pay workers in many occupations. In more recent years, government intervention in the economy has also expanded to meet goals such as protecting the environment, promoting civil rights, and expanding access to medical care.

Some economists argue that the extent of government intervention makes it no longer accurate to refer to the economies of the United States, Canada, Japan, and Western Europe as pure market economies. Instead, these countries are considered **mixed economies** because, while most economic decisions result from the interaction of buyers and sellers in markets, the government plays a significant role in the allocation of resources.

One of the most important developments in the international economy in recent years has been the movement of China from being a centrally planned economy to being a mixed economy. The Chinese economy suffered decades of economic stagnation following the takeover of the government in 1949 by Mao Zedong and the Communist Party. Although China remains a political dictatorship, the production of most goods and services is now determined in the market rather than by the government. The result has been rapid economic growth that has lifted more than a billion people in China out of poverty.

## Efficiency and Equity

Market economies tend to be more efficient than centrally planned economies. There are two types of efficiency:

- **Productive efficiency** occurs when a good or service is produced at the lowest possible cost.
- **Allocative efficiency** occurs when production is in accordance with consumer preferences.

Markets tend to be efficient because they promote competition and facilitate voluntary exchange. With **voluntary exchange**, both the buyer and the seller of a product are made better off by the transaction. We know that they are both made better off because, otherwise, the buyer would not have agreed to buy the product or the seller would not have agreed to sell it. Productive efficiency is achieved when competition among firms forces them to produce goods and services at the lowest cost. Allocative efficiency is achieved when the combination of competition among firms and voluntary exchange between firms and consumers results in firms producing the mix of goods and services that consumers prefer the most. Competition will result in firms continuing to produce and sell goods and services as long as the additional benefit to consumers is greater than the additional cost of production. In this way, the mix of goods and services produced will match consumer preferences.

**Mixed economy** An economy in which most economic decisions result from the interaction of buyers and sellers in markets but in which the government plays a significant role in the allocation of resources.

**Productive efficiency** A situation in which a good or service is produced at the lowest possible cost.

**Allocative efficiency** A state of the economy in which production is in accordance with consumer preferences; in particular, every good or service is produced up to the point where the last unit provides a marginal benefit to consumers equal to the marginal cost of producing it.

**Voluntary exchange** A situation that occurs in markets when both the buyer and the seller of a product are made better off by the transaction.



Although markets promote efficiency, they don't guarantee it. Inefficiency can arise from various sources. For instance, it may take some time for firms to learn how to efficiently produce a good or service. When smartphones were introduced, firms did not instantly achieve productive efficiency because it took time to discover the lowest-cost method of producing them. As we will discuss in later chapters, inefficiency can also arise if governments interfere with voluntary exchange in markets. For example, many governments limit the imports of some goods from foreign countries. Doing so reduces efficiency by keeping goods from being produced at the lowest cost, a point we discuss further in the *Apply the Concept*: "What Can Economics Contribute to the Debate over Tariffs?" The production of some goods damages the environment. In this case, government intervention can increase efficiency because without such intervention, firms may ignore the costs of environmental damage and thereby fail to produce the goods at the lowest possible cost.

Not everyone will consider a particular outcome to be desirable, even if the outcome is economically efficient. Many people prefer economic outcomes that they consider fair or equitable, even if those outcomes are less efficient. **Equity** is harder to define than efficiency because there isn't an agreed-upon definition of fairness. For some people, equity means a more equal distribution of economic benefits than would result from an emphasis on efficiency alone. For example, some people support raising taxes on people with higher incomes to provide the funds for programs that aid the poor. Although governments may increase equity by reducing the incomes of high-income people and increasing the incomes of the poor, these policies may reduce efficiency. People have less incentive to open new businesses, work hard, and save if the government takes a significant amount of the income they earn from working or saving. The result is that fewer goods and services are produced, and less saving takes place. As this example illustrates, *there is often a trade-off between efficiency and equity*. Government policymakers frequently confront this trade-off.

**Equity** The fair distribution of economic benefits.

## 1.3

## Economic Models

**LEARNING OBJECTIVE:** Explain how economists use models to analyze economic events and government policies.

As mentioned at the start of the chapter, **economic models** are simplified versions of reality used to analyze real-world economic situations. (This book uses the words *model* and *theory* interchangeably.) Many professions rely on models. Today, most models are mathematical and are analyzed with computer programs. For example:

- An engineer may use a computer model of a bridge to help test whether it will withstand high winds.
- A biologist may use a computer model of a nucleic acid to better understand its properties.

Economists rely on models, or theories, to analyze real-world issues ranging from the effects of tariffs on the prices of imported goods to the most efficient policies for reducing pollution. One purpose of economic models is to make economic ideas sufficiently explicit and concrete so that individuals, firms, or the government can use them to make decisions. For example, we will see in Chapter 3 that the model of demand and supply is a simplified version of how the prices of products are determined by the interactions among buyers and sellers in markets.

Economists use economic models to answer questions such as "How many people will be employed in manufacturing in 2026?" Economists at the U.S. Bureau of Labor Statistics (BLS) build models that allow them to forecast future employment in different occupations. The BLS models provide estimates of future demand for U.S. manufacturing production and estimates of how many employees manufacturing firms will require to produce that level of output. As mentioned at the beginning of the chapter, the BLS forecasts that employment in manufacturing will decline significantly by 2026.

**Economic model** A simplified version of reality used to analyze real-world economic situations.

Sometimes economists use an existing model to analyze a real-world problem or issue, but in other cases, they have to develop a new model. To develop a model, economists generally follow these steps:

1. Decide on the assumptions to use.
2. Formulate a testable hypothesis.
3. Use economic data to test the hypothesis.
4. Revise the model if it fails to explain the economic data well.
5. Retain the revised model to help answer similar economic questions in the future.

## The Role of Assumptions in Economic Models

Any model is based on assumptions because models have to be simplified to be useful. Economic models make *behavioral assumptions* about the motives of consumers and firms. Economists assume that consumers will buy the goods and services that will maximize their well-being or their satisfaction. Similarly, economists assume that firms act to maximize their profits. These assumptions are simplifications because they do not describe the motives of every consumer and every firm. How can we know whether the assumptions in a model are too simplified or too limiting? We can determine the usefulness of assumptions by forming hypotheses based on the assumptions and then testing the hypotheses using real-world information.

## Forming and Testing Hypotheses in Economic Models

An **economic variable** is something measurable that can have different values, such as the number of people employed in manufacturing. In an economic model, a hypothesis is a statement about an economic variable that may be either correct or incorrect. An example of a hypothesis in an economic model is the statement that increased use of industrial robots and information technology in U.S. factories has resulted in a decline in manufacturing employment. The hypothesis may be correct if the main effect of industrial robots has been to replace assembly line workers, thereby reducing employment. Or the hypothesis may be incorrect if the use of robots and other information technology has increased firms' demand for software programmers and other technology workers, thereby increasing employment. An economic hypothesis is usually about a *causal relationship*; in this case, the hypothesis states that increased use of robots and information technology causes, or leads to, lower employment in manufacturing.

Before we can accept a hypothesis, we have to test it by analyzing statistics, or data, on the relevant economic variables. In our example, we could gather (1) data on how the use of industrial robots and information technology in manufacturing has changed over time and (2) data on changes in employment in manufacturing. Testing a hypothesis can be tricky. For example, showing that employment in manufacturing declined at the same time that use of robots increased would not be enough to demonstrate that the increased use of robots *caused* the decline in employment. Just because two things are correlated—that is, they happen at the same time—does not mean that one has caused the other. For example, suppose that at the same time that use of robots in U.S. manufacturing was increasing, U.S. manufacturing firms faced declining sales due to increased competition from foreign firms. In that case, the declining sales, rather than the increased use of robots, might explain the decrease in U.S. manufacturing employment. Over a period of time, many economic variables change, which complicates the testing of hypotheses. In fact, when economists disagree about a hypothesis, it is often because of disagreements over how to interpret the statistical analysis used to test the hypothesis.

Note that hypotheses must be statements that could, in principle, turn out to be incorrect. Statements such as “Increasing employment in manufacturing is good” or “Increasing employment in manufacturing is bad” are value judgments rather than hypotheses because it is not possible to disprove them.

**Economic variable** Something measurable that can have different values, such as the number of people employed in manufacturing.

Economists accept and use an economic model if it leads to hypotheses that are confirmed by statistical analysis. In many cases, the acceptance is tentative, however, pending the gathering of new data or further statistical analysis. In fact, economists often refer to a hypothesis having been “not rejected” rather than having been “accepted” by statistical analysis. But what if statistical analysis clearly rejects a hypothesis? For example, what if a model leads to a hypothesis that increased use of industrial robots will cause a decline in manufacturing employment, but the data reject this hypothesis? In this case, the model should be reconsidered. It may be that an assumption used in the model was too simplified or too limiting. For example, perhaps the model ignored the fact that the mix of products being manufactured in the United States was changing. The assembly of electric cars might require more workers than does the assembly of gasoline-powered cars. Or perhaps the model did not include the effect of tariffs on the demand for U.S. manufactured goods because such tariffs had typically been low. If tariffs sharply increase, the model may not be able to accurately estimate the relationship between changes in the use of industrial robots and changes in employment.

As we saw at the beginning of the chapter, the BLS has forecast that total employment in U.S. manufacturing will decline from 12.8 million in January 2019 to 11.6 million in 2026. The BLS periodically analyzes the accuracy of its projections. It has had difficulty accurately projecting manufacturing employment. For example, in 2000, the BLS projected that in 2010, 19,047,000 people would be employed in manufacturing. In fact, in 2010, only 11,529,000 people were employed in manufacturing. The BLS concluded that this large error was the result of its model failing to account for the extent to which U.S. firms would move manufacturing operations overseas, how quickly firms would improve their ability to produce the same output with fewer workers, and the lasting effects of the severe 2007–2009 recession. Analyzing its errors helps the BLS improve its models and employment projections.

The process of developing models, testing hypotheses, and revising models occurs not just in economics but also in disciplines such as physics, chemistry, and biology. This process is often called the *scientific method*. Economics is a *social science* because it applies the scientific method to the study of interactions among individuals.

## Positive and Normative Analysis

Throughout this book, as we build economic models and use them to answer questions, bear in mind the following important distinction:

1. **Positive analysis** is concerned with *what is*.
2. **Normative analysis** is concerned with *what ought to be*.

Economics is about positive analysis, which measures the costs and benefits of different courses of action.

We can use the federal government’s minimum wage law to compare positive and normative analysis. In 2019, under this law, it was illegal for an employer to hire a worker at a wage less than \$7.25 per hour. (Some states and cities had enacted higher minimum wages.) Without the minimum wage law, some firms and workers would voluntarily agree to a lower wage. Because of the minimum wage law, some workers have difficulty finding jobs, and some firms end up paying more for labor than they otherwise would have. A positive analysis of the federal minimum wage law uses an economic model to estimate how many workers have lost their jobs because of the law, its effect on the costs and profits of businesses, and the gains to workers receiving the minimum wage. After economists complete this positive analysis, the decision as to whether the minimum wage law is a good or a bad idea is a normative one and depends on how people evaluate the trade-off involved. Supporters of the law believe that the losses to employers and workers who are unemployed as a result of the law are more than offset by the gains to workers who receive higher wages than they would without the law. Opponents of the law believe the losses to be greater than the gains. The assessment by any individual depends, in part, on that person’s values and political views. The positive analysis an economist provides would play a role in the decision but can’t by itself decide the issue one way or the other.

**Positive analysis** Analysis concerned with what is.

**Normative analysis** Analysis concerned with what ought to be.

In each chapter, you will see a *Don't Let This Happen to You* box like the one below. These boxes alert you to common pitfalls in thinking about economic ideas.

## Don't Let This Happen to You

### Don't Confuse Positive Analysis with Normative Analysis

"Economic analysis has shown that the minimum wage law is a bad idea because it causes unemployment." Is this statement accurate? In 2019, the federal minimum wage law prevented employers from hiring workers at a wage of less than \$7.25 per hour. This wage is higher than some employers are willing to pay some workers. If there were no minimum wage law, some workers who currently cannot find any firm willing to hire them at \$7.25 per hour would be able to find employment at a lower wage. Therefore, positive economic analysis indicates that the minimum wage law causes unemployment. (In Chapter 4, we'll explore why economists disagree about *how much* unemployment the minimum wage law causes.) But some workers

who have jobs benefit from the minimum wage law because they are paid a higher wage than they otherwise would be paid. In other words, the minimum wage law creates both losers—the workers who become unemployed and the firms that have to pay higher wages—and winners—the workers who receive higher wages.

Should we value the gains to the winners more than we value the losses to the losers? The answer involves normative analysis. Positive economic analysis can show the consequences of a particular policy, but it cannot tell us whether the policy is "good" or "bad." So, the statement at the beginning of this box is inaccurate.

**Your Turn:** Test your understanding by doing related problems 3.6 and 3.7 at the end of this chapter.

## Economics as a Social Science

Because economics studies the actions of individuals, it is a social science, as are psychology, political science, and sociology. Economics differs from other social sciences because it puts more emphasis on how the decisions of individuals explain outcomes such as the prices firms charge or the policies governments enact. Economics considers individual decision making in every context, not just in the context of business. Economists have studied issues such as why people have difficulty attaining goals such as losing weight, why people sometimes ignore relevant information when making decisions, and how couples decide to divide up household chores. Government policymakers have also increasingly relied on economic analysis when evaluating laws or regulations. As we will see throughout this book, economists have played an important role in influencing government policies in areas such as the environment, health care, and efforts to reduce poverty.

## Apply the Concept

### What Can Economics Contribute to the Debate over Tariffs?

What effect do tariffs on imports of goods from China and other countries have on the U.S. economy? Governments typically impose tariffs to raise revenue or to discourage imports by raising the selling prices of imported goods. If imports of goods decline, production and employment at domestic firms that compete with imports may increase. For example, a tariff on imports of furniture from China would raise their prices and lead U.S. consumers to buy more furniture manufactured in the United States. We can create a preliminary list of potential winners and losers in a country that imposes a tariff: The government gains from collecting the tariff revenue, and domestic firms and their workers gain from the higher prices of competing imported goods. Consumers lose because they pay higher prices for goods on which the tariff has been enacted. If some of the imported goods are used as inputs or are sold by domestic firms—for example, Walmart may sell furniture imported from China—those firms will also lose from the tariff.

Economics can provide valuable information to policymakers and the general public as they consider actions such as implementing tariffs. As we will discuss further in Chapters 2 and 9, economic analysis shows that trade between countries occurs primarily on the basis of comparative advantage. A country has



Erika Skogg/National Geographic Image

*Because of its fertile soil and warm climate, Colombia has a comparative advantage in coffee bean production relative to the United States.*



a comparative advantage if it can produce a good at a lower opportunity cost than competitors. For example, due to the climate and soil in Colombia, coffee can be grown there without requiring the transfer of significant resources from producing other goods and services—so the opportunity cost of producing coffee in Colombia is low. The United States is not well suited for producing coffee, so the opportunity cost of producing coffee in the United States is very high. We can conclude that Colombia has a comparative advantage relative to the United States in producing coffee. Imposing a tariff on imports to the United States of Colombian coffee would reduce economic efficiency by shifting production of coffee from Colombia, where it can be grown at a low cost, to the United States, where it can only be grown at a high cost.

Economists can use models to estimate the dollar amounts gained by the winners from the imposition of a tariff, the amount lost by the losers, and the size of the loss of economic efficiency. Economic analysis of tariffs typically shows that the dollar losses from the government imposing a tariff are larger than the dollar gains, so the tariff causes a net loss for the country as a whole.

Although economic analysis can contribute to the debate over policy proposals by measuring their likely effects, it cannot by itself decide whether a proposal should be enacted. Policymakers and a majority of the general public may decide to support a tariff because they place a higher value on the gains to some groups—workers and firms struggling to compete against imported goods—than on the losses to other groups—consumers as a whole. In other words, policymakers and the general public would be making a normative judgment in favor of tariffs. Ultimately policymakers and the general public are responsible for weighing trade-offs and deciding whether a proposal should be enacted.

**Your Turn:** Test your understanding by doing related problem 3.8 at the end of this chapter.

1.4

Microeconomics and Macroeconomics

LEARNING OBJECTIVE: Distinguish between microeconomics and macroeconomics.

Economic models can be used to analyze decision making in many areas. We group some of these areas together as *microeconomics* and others as *macroeconomics*. **Microeconomics** is the study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices. **Macroeconomics** is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth. Table 1.1 gives examples of microeconomic and macroeconomic issues.

The division between microeconomics and macroeconomics is not a bright line. Many economic situations have *both* a microeconomic aspect and a macroeconomic aspect. For example, the level of total investment by firms in new

**Microeconomics** The study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices.

**Macroeconomics** The study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.

| Examples of Microeconomic Issues  | Examples of Macroeconomic Issues   |
|---|--|
| <ul style="list-style-type: none"><li>• How consumers react to changes in product prices</li><li>• How firms decide what prices to charge for the products they sell</li><li>• Which government policy would most efficiently reduce opioid addiction</li><li>• The costs and benefits of the federal government's approving the sale of a new prescription drug</li><li>• The most efficient way to reduce air pollution</li></ul> | <ul style="list-style-type: none"><li>• Why economies experience periods of recession and increasing unemployment</li><li>• Why, over the long run, some economies have grown much faster than others</li><li>• What determines the inflation rate</li><li>• What determines the value of the U.S. dollar in exchange for other currencies</li><li>• Whether government intervention can reduce the severity of recessions</li></ul> |

Table 1.1

Issues in Microeconomics and Macroeconomics



machinery and equipment helps determine how rapidly the economy grows—which is a macroeconomic issue. But to understand how much new machinery and equipment firms decide to purchase, we have to analyze the incentives individual firms face—which is a microeconomic issue.

## 1.5

## Economic Skills and Economics as a Career

**LEARNING OBJECTIVE:** Describe economics as a career and the key skills you can gain from studying economics.

How do economists do what they do? The following analogy may be helpful: When people are thinking of buying a house, they may hire a structural engineer as a consultant to examine the house and prepare a report. That report is likely to both *describe* any problems with the house—like cracks in the foundation—and *advise* the potential buyer how to fix the problems and the likely cost.

You have seen that economics is about making choices. Economists spend much of their time describing how individuals, businesses, and governments make choices and analyzing the results of the choices. Then, like a structural engineer advising a homeowner how to fix a leaky basement, economists advise on how better decisions can be made.

In this book, we will see how broadly economic principles can be applied:

- *Individuals* can use economic principles to improve how they make important decisions, such as what career to pursue, what financial investment to make, or whether to lease or buy a car. Economic principles are also useful in understanding policy debates such as those on the minimum wage, tariffs, and environmental policy. Mastering the principles of economics provides you with practical skills no matter what subject you end up majoring in.
- *Managers* in businesses can use economic principles to improve how they make important decisions, such as what prices to charge for their products, whether to begin selling their products in a foreign market, or whether to invest in new software.
- *Government policymakers* can use economic principles to make decisions such as whether to raise taxes on cigarettes to discourage teenage smoking, whether to raise interest rates to reduce the threat of inflation, and whether to allocate additional funds to research on cancer or to research ways to reduce opioid addiction.

Many of the choices we discuss in this book will be those that businesses make. Economists have developed a set of tools designed specifically to help businesses make better decisions. It is not too surprising that more chief executive officers of Fortune 500 firms majored in economics than in any other subject. Examples include:

- Elon Musk of Tesla and SpaceX
- Meg Whitman of Hewlett-Packard
- Warren Buffett of Berkshire Hathaway

Many businesses, government agencies, and nonprofit organizations—including hospitals, museums, and charities—hire economists. Colleges and universities also hire economists to teach and to carry out academic research on business, the economy, and economic policy. A first step for many students in deciding whether to pursue a career in economics is to seek a summer internship with a firm or an agency that employs economists.

The Bureau of Labor Statistics website ([www.bls.gov](http://www.bls.gov)) lists activities economists often perform while pursuing careers in different organizations. We summarize some of these activities in Table 1.2. To learn more, visit the BLS website and search for “Occupational Outlook Handbook.”

| Company or Organization  | What an Economist at the Company Might Do  |
|--|--|
| Ford Motor Company   | Forecast the demand for electric cars over the next 10 years.  |
| Goldman Sachs, a Wall Street investment firm   | Use economic models to forecast future values of interest rates.   |
| McDonald's   | Determine whether the firm should open additional restaurants in China.  |
| Pfizer, a pharmaceutical company   | Analyze the financial cost and benefits of a new treatment for cancer.   |
| <i>Wall Street Journal</i>   | Report on the Federal Reserve and interpret monetary policy for the paper's readers.   |
| A college or university  | Teach economics and do research on economic issues.  |
| A regional Federal Reserve Bank  | Forecast trends in employment and production in that region.   |
| U.S. Federal Trade Commission  | Gather and analyze data on whether two firms should be allowed to reduce competition in a market by merging to form a combined firm, as when AT&T proposed merging with Time Warner in 2018. |
| The World Bank, an international economic organization with the mission of reducing poverty and increasing economic growth | Write a report analyzing the effectiveness of a development program in a low-income country.   |

Table 1.2

Applying Economics in a Career

## 1.6

## A Preview of Important Economic Terms

LEARNING OBJECTIVE: Define important economic terms.

In the following chapters, you will encounter certain important terms again and again. Becoming familiar with these terms is a necessary step in learning economics. Here we provide a brief introduction to some of these terms. We will discuss them all in greater depth in later chapters:

- **Firm, company, or business.** A *firm* is an organization that produces a good or service. Most firms produce goods or services to earn a profit, but there are also non-profit firms, such as universities and some hospitals. Economists use the terms *firm*, *company*, and *business* interchangeably.
- **Entrepreneur.** An *entrepreneur* is someone who operates a business. In a market system, entrepreneurs decide what goods and services to produce and how to produce them. An entrepreneur starting a new business puts his or her own funds at risk. If an entrepreneur is wrong about what consumers want or about the best way to produce goods and services, his or her funds can be lost. Losing money in a failed business is not unusual: In the United States, about half of new businesses fail within four years. Without entrepreneurs willing to assume the risk of starting and operating businesses, economic progress would be impossible in a market system.
- **Innovation.** There is a distinction between an *invention* and an *innovation*. An *invention* is a new good or a new process for making a good. An *innovation* is the practical application of an invention. (*Innovation* may also be used more broadly to refer to any significant improvement in a good or in the means of producing a good.) Much time often passes between the appearance of a new idea and its development for widespread use. For example, the Wright brothers first achieved self-propelled

flight at Kitty Hawk, North Carolina, in 1903, but the Wright brothers' plane was very crude, and it wasn't until the introduction of the DC-3 by Douglas Aircraft in 1936 that regularly scheduled intercity airline flights became common in the United States. Similarly, the first digital electronic computer—the ENIAC—was developed in 1945, but the first IBM personal computer was not introduced until 1981, and widespread use of computers did not have a significant effect on the productivity of U.S. businesses until the 1990s.

- **Technology.** A firm's *technology* is the processes it uses to produce goods and services. In the economic sense, a firm's technology depends on many factors, such as the skill of its managers, the training of its workers, and the speed and efficiency of its machinery and equipment.
- **Goods.** *Goods* are tangible merchandise, such as books, computers, or smartphones.
- **Services.** *Services* are activities performed for others, such as providing haircuts or investment advice.
- **Revenue.** A firm's *revenue* is the total amount received for selling a good or service. We calculate it by multiplying the price per unit by the number of units sold.
- **Profit.** A firm's *profit* is the difference between its revenue and its costs. Economists distinguish between *accounting profit* and *economic profit*. In calculating accounting profit, we exclude the costs of some economic resources that the firm does not pay for explicitly. In calculating economic profit, we include the opportunity costs of all resources used by the firm. When we refer to *profit* in this book, we mean economic profit. It is important not to confuse *profit* with *revenue*.
- **Household.** A *household* consists of all persons occupying a home. Households are suppliers of factors of production—particularly labor—used by firms to make goods and services. Households also demand goods and services produced by firms and governments.
- **Factors of production, economic resources, or inputs.** Firms use *factors of production* to produce goods and services. The main factors of production are labor, capital, natural resources—including land—and entrepreneurial ability. Households earn income by supplying the factors of production to firms. Economists use the terms *factors of production*, *economic resources*, and *inputs* interchangeably.
- **Capital.** In everyday speech, the word *capital* can refer to *financial capital* or to *physical capital*. Financial capital includes stocks and bonds issued by firms, bank accounts, and holdings of money. In economics, though, *capital* refers to physical capital, which includes manufactured goods that are used to produce other goods and services. Examples of physical capital are computers, factory buildings, machine tools, warehouses, and trucks. The total amount of physical capital available in a country is called its *capital stock*.
- **Human capital.** *Human capital* refers to the accumulated training and skills that workers possess. For example, college-educated workers generally have more skills and are more productive than workers who have only high school diplomas; therefore, college-educated workers have more human capital.

Continued from chapter opener

## Economics in Your Life & Career

### Should You Consider a Career in Manufacturing?

At the beginning of this chapter, we posed the question “What is the basis of the BLS’s forecast that manufacturing employment will decline by 2026, and how reliable is this forecast?” As we saw in this chapter, the BLS uses economic models to forecast future employment in U.S. manufacturing. In recent years, the BLS has had difficulty accurately forecasting manufacturing employment.

For example, in 2000, the BLS forecast that manufacturing employment would increase over the following 10 years, when in fact it declined substantially. The BLS analyzes errors like these in attempting to improve its forecasts. So, it is likely that the BLS’s forecasts will become more accurate over time, but it would be a mistake to expect the forecasts to be exact.

## Conclusion

Economics is a group of useful ideas about how individuals make choices, given their scarce resources. Economists have put these ideas into practice by developing economic models. Consumers, business managers, and government policymakers use these models every day to help make choices. In this book, we explore many key economic models and give examples of how to apply them in the real world.

Reading the news is an important part of understanding the current state of the economy. It can also help in learning how to apply economic concepts to a variety of real-world events. At the end of each of the first four chapters, you will see a two-page feature titled *An Inside Look*. This feature consists of an excerpt from an article that relates to the company or economic issue introduced at the start of the chapter and also to the concepts discussed in the chapter. A summary and an analysis with a supporting table or graph highlight the key economic points of the article.

# Are Tariffs Bringing Manufacturing Jobs Back Home or Just Raising Prices?

CNBC.COM

## U.S. manufacturers say Trump tariffs will bring higher prices, not more jobs: Survey

**a** The Trump administration's widening trade war will raise prices for U.S. consumers, but it won't bring back many manufacturing jobs that have moved overseas.

That's what more than 800 companies said in a survey released Thursday by IHS Markit, a London-based economics research firm.

When the administration ramped up tariffs in July [2018], President Donald Trump insisted the higher duties would encourage U.S. manufacturers to bring overseas jobs back home.

Instead, more than 4 in 10 companies surveyed said they plan to raise prices to offset the higher cost of production. Just 1 in 10 said they plan to reduce the share of total output produced outside the U.S. Roughly the same number said the tariffs would encourage them to move more jobs offshore. . . .

Though many companies have tried to hold the line on price increases, the cost of higher tariffs will eventually be borne by consumers. One recent study estimated the economic impact of lost wages and higher prices at \$2,400 per household in 2019.

Citing unfair trade practices, Trump imposed 10 percent tariffs on \$200 billion of Chinese imports in September. China retaliated by imposing taxes on \$60 billion worth of U.S. goods.

The U.S. duties are set to increase to 25 percent in January [2019]. Trump has also threatened to impose duties on \$267 billion more of goods if Beijing does not meet his demands. That would expand U.S. tariffs to almost all of China's exports to the U.S.

When Trump first sparked global trade tensions with major U.S. trading partners in July [2018], U.S. businesses had hoped the disputes would be resolved quickly. But while the U.S., Canada, and Mexico are set to sign an updated trade deal on Friday [November 30, 2018], negotiations with China have shown little progress.

Just days ahead of a meeting with Chinese President Xi Jinping in Argentina, Trump said Monday he expected to move ahead with raising tariffs on \$200 billion in Chinese imports to 25 percent from the current 10 percent and repeated his threat to slap tariffs on all remaining imports from China.

Trump told *The Wall Street Journal* it was "highly unlikely" he would accept China's request to hold off on the increase, which is due to take effect on Jan. 1 [2019].

"The only deal would be China has to open up their country to competition from the United States," Trump told the *Journal*. "As far as other countries are concerned, that's up to them."

Trump, who is due to meet Xi at a G-20 summit in Buenos Aires this weekend, said that if negotiations were unsuccessful, he would also put tariffs on the rest of Chinese imports.

"If we don't make a deal, then I'm going to put the \$267 billion additional on," at a tariff rate of either 10 percent or 25 percent, Trump told the *Journal*.

**b** As Chinese tariffs take a bigger bite out of profits, U.S. manufacturers with operations there are scrambling to find alternatives. But few are moving those operations back home, according to a separate survey in October [2018] by the American Chamber of Commerce in South China.

Instead, more than 70 percent of U.S. firms operating in southern China are putting off further investment there and moving some or all of their manufacturing to other countries. Sixty-four percent of the more than 400 companies surveyed said they were considering relocating production lines to outside of China, but only 1 percent said they had any plans to establish manufacturing bases in North America.

**c** Nearly half the companies surveyed also said there had been an increase in non-tariff barriers, including increased bureaucratic oversight and slower customs clearance. Analysts have warned of such a risk to U.S. firms as China is increasingly unable to match U.S. measures on a dollar-for-dollar basis.

Chinese manufacturers are also getting squeezed by the trade war. Profit growth among China's industrial companies slowed for a sixth straight month in October as sales growth continued to slow.



## Key Points in the Article

A November 2018 survey of more than 800 companies indicates that tariffs implemented by the Trump administration would result in higher prices for U.S. consumers but would not likely return many manufacturing jobs from overseas. President Trump indicated that the higher tariffs would give U.S. manufacturers an incentive to bring production back to the United States. However, of the companies surveyed, more than 40 percent planned to raise prices to offset the increased costs brought on by the tariffs, and only about 10 percent planned to reduce overseas output.

## Analyzing the News

**a** The figure below shows the number of manufacturing jobs in the United States from 2015 to the beginning of 2019. One key economic idea is that people respond to economic incentives, and the Trump administration promoted the tariffs as providing an incentive for firms to return manufacturing jobs to the United States from overseas. As the figure shows, the number of manufacturing jobs increased between January 2015 and January 2019, but the IHS Markit survey

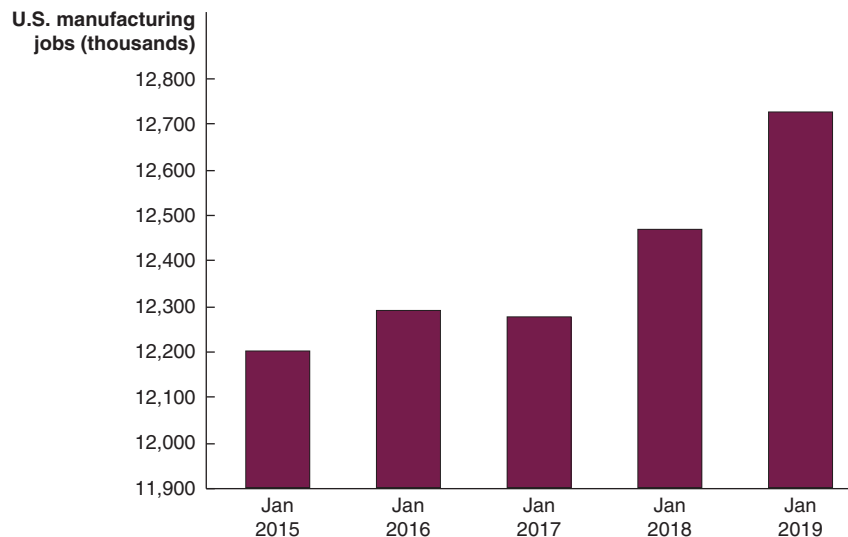
indicates that this increase was not necessarily due to the tariffs. Another key economic idea is that people are rational, and economists assume that consumers and firms use all available information as they act to achieve their goals. U.S. firms would be acting rationally if they chose to raise prices instead of moving production as the most effective way of dealing with the increased cost of producing goods overseas for sale in the United States.

**b** The tariffs on Chinese-manufactured products led many U.S. manufacturers to move production out of China to other countries, but few returned production to the United States. This decision also shows firms responding to economic incentives. These manufacturers likely wished to remain in countries where labor costs were low. The low cost of labor created an initial incentive for managers at U.S. manufacturing companies to move production to China in order to produce goods at a lower cost than would be possible in the United States. The low cost of labor in other countries on whose exports the U.S. has not imposed tariffs creates an incentive for manufacturers to consider moving operations to these countries.

**c** The survey indicates that, in addition to tariffs, barriers such as increased bureaucratic oversight and slower customs clearance affect manufacturers' production decisions. These barriers result in costs that rational managers take into account when deciding where to locate factories.

## Thinking Critically

1. In 2018, the Trump administration implemented tariffs as high as 25 percent on imports from China. Explain how tariffs can provide an economic incentive for companies to return manufacturing jobs from China to the United States.
2. Evaluate the following statement and use the concepts of positive and normative analysis to explain whether you agree with it: "The figure shows that the number of U.S. manufacturing jobs increased by more than 250,000 during 2018, the same year the Trump administration's tariffs went into effect. This increase indicates that the tariffs are effective in bringing jobs back to the United States and that they should be increased to bring more manufacturing jobs back home."



### Number of U.S. manufacturing jobs

The total number of manufacturing jobs in the United States increased from 12.2 million in January 2015 to more than 12.7 million in January 2019. (Note that numbers on the vertical axis do not begin at 0.)

**Source:** Federal Reserve Bank of St. Louis.



# CHAPTER SUMMARY AND PROBLEMS

## Key Terms

|                                  |                          |                           |                              |
|----------------------------------|--------------------------|---------------------------|------------------------------|
| Allocative efficiency, p. 62     | Economics, p. 56         | Market economy, p. 61     | Positive analysis, p. 65     |
| Centrally planned economy, p. 61 | Equity, p. 63            | Microeconomics, p. 67     | Productive efficiency, p. 62 |
| Economic model, p. 63            | Macroeconomics, p. 67    | Mixed economy, p. 62      | Scarcity, p. 56              |
| Economic variable, p. 64         | Marginal analysis, p. 58 | Normative analysis, p. 65 | Trade-off, p. 60             |
|                                  | Market, p. 56            | Opportunity cost, p. 60   | Voluntary exchange, p. 62    |

## 1.1 Three Key Economic Ideas

**LEARNING OBJECTIVE:** Explain these three key economic ideas: People are rational, people respond to economic incentives, and optimal decisions are made at the margin.

## Summary

**Economics** is the study of the choices consumers, business managers, and government officials make to attain their goals, given their scarce resources. We must make choices because of **scarcity**, which means that although our wants are unlimited, the resources available to fulfill those wants are limited. A **market** is a group of buyers and sellers who trade a good or service. Economists assume that people are rational in the sense that consumers and firms use all available information as they take actions intended to achieve their goals. Rational individuals weigh the benefits and costs of each action and choose an action only if the benefits outweigh the costs. Although people act from a variety of motives, ample evidence indicates that they respond to economic incentives. Economists use the word *marginal* to mean extra or additional. **Marginal analysis** involves comparing marginal benefits and marginal costs. The optimal decision is to continue any activity up to the point where the marginal benefit equals the marginal cost ( $MB = MC$ ).

## Review Questions

- 1.1 Briefly discuss the meaning of each of the following economic ideas: People are rational, people respond to economic incentives, and optimal decisions are made at the margin.
- 1.2 What is scarcity? Why is scarcity central to the study of economics?

## Problems and Applications

- 1.3 Comment on the assumption common to most economic models that all individuals are rational and make optimal decisions in response to economic incentives.
- 1.4 According to the FBI Bank Crime Statistics, there were more than 3,900 bank robberies in the United States in 2017. The FBI claims that banks have made themselves easy targets by refusing to install clear acrylic partitions, called *bandit barriers*, that separate bank tellers from the public. According to a special agent with the FBI, "Bandit barriers are a great deterrent. We've talked to guys who rob banks, and as soon as they see a bandit barrier, they go find another bank." Despite this finding, many banks have been reluctant to install these barriers. What information would you need to determine

whether banks have an economic incentive to install bandit barriers?

- 1.5 The grading system plays an important role in student learning. In their book *Effective Grading: A Tool for Learning and Assessment in College*, Barbara Walvoord and Virginia Anderson stated that "grading infuses everything that happens in the classroom." They also argued that grading "needs to be acknowledged and managed from the first moment that an instructor begins planning a class."
  - a. How could the grading system a teacher uses affect the incentives of students to learn the course material?
  - b. If teachers put too little weight in the grading scale on a certain part of the course, such as readings outside the textbook, how might students respond?
  - c. Teachers often wish that students came to class prepared, having read the upcoming material. How could a teacher design the grading system to motivate students to come to class prepared?
- 1.6 In the United Kingdom, patients can access non emergency hospital treatment for free if referred by a family doctor, also known as a general practitioner (GP). A patient gets in contact with the National Health Service (NHS) via a GP almost nine times out of ten. GPs often work in practices with two to five doctors. Practices are open during weekdays from 8 A.M. to 5 P.M. and are closed during weekends. Patients need to book an appointment to see their GP. In 2013, the Prime Minister of England introduced a Challenge Fund initiative, investing £50 million to pilot the new scheme, under which a limited number of practices have been asked to stay open during weekends.
  - a. As a result of weekend access to primary care, do you think that the costs incurred by the NHS to treat patients in the accident and emergency (A&E) departments has increased or decreased? Briefly explain.
  - b. A newly elected government has recently expressed the intention to implement important changes to the way patients access GP services. Given your answer to part (a), do you think that the new government is likely to recommend universal GP access seven days a week by 2020? Briefly explain.
  - c. How might the government have failed to correctly forecast the costs of weekend opening hours? Briefly explain.

**Sources:** Nick Triggle, “The Battle over GP Opening,” *BBC News*, September 30, 2014; Nick Triggle, “NHS Weekend: 7-day GP Opening ‘Unachievable,’” *BBC News*, September 5, 2015; and Royal Economic Society, “Weekend Opening of GP Surgeries Can Solve A&E Overload,” Media Briefing, March 2015

- 1.7 Many universities and corporations offer health and wellness programs that help their employees improve or maintain their health and get paid (a relatively small amount) for doing so. The programs vary but typically consist of employees completing a health assessment, receiving a program for healthy living, and monitoring their monthly health activities.
  - a. Why would universities and corporations pay employees to improve or maintain their health?
  - b. How does health insurance affect the incentive of employees to improve or maintain their health?
  - c. Would a wellness program increase or decrease the health insurance premiums that an insurance company would charge the university or corporation to provide insurance coverage? Briefly explain.
- 1.8 [Related to the Apply the Concept: “Would a Congressional Bill Aimed at Increasing the Pay of Low-Wage Workers Backfire?”] An opinion columnist in the *Washington Post* argues that the Stop Bad Employers by Zeroing Out Subsidies Act is “virtually guaranteed to hurt the very low-income working families its sponsors want to help.”
  - a. What were the main provisions of this act?
  - b. Why would the columnist argue that the act was more likely to hurt than help low-income families?
  - c. If the columnist is correct, why did the sponsors of the act in Congress write the act the way that they did?
- 1.9 [Related to Solved Problem 1.1] The U.S. Postal Service (USPS) charges Amazon about \$2 to deliver a package. The USPS argues that its contract with Amazon allows it to reduce the loss it suffers on its overall operations. A business writer for the *Washington Post* observes, “Looked at

from the standpoint of incremental revenue (huge) minus these incremental expenses (modest), the Postal Service could very easily have come to the conclusion that, even at \$2 a package, the Amazon contract was likely to be highly profitable.” What does the writer mean by “incremental revenue” and “incremental cost”? Why would he focus on incremental revenue and incremental cost rather than on total revenue and total cost?

- 1.10 [Related to Solved Problem 1.1] Late in the semester, a friend tells you, “I was going to drop my psychology course so I could concentrate on my other courses, but I had already put so much time into the course that I decided not to drop it.” What do you think of your friend’s reasoning? Would it make a difference to your answer if your friend has to pass the psychology course at some point to graduate? Briefly explain.
- 1.11 In a paper written by Bentley College economists Patricia M. Flynn and Michael A. Quinn, the authors state:

We find evidence that Economics is a good choice of major for those aspiring to become a CEO [chief executive officer]. When adjusting for the size of the pool of graduates, those with undergraduate degrees in Economics are shown to have had a greater likelihood of becoming an S&P 500 CEO than any other major.

A list of famous economics majors published by Marietta College includes business leaders Elon Musk, Warren Buffett, Steve Ballmer, David Rockefeller, Arnold Schwarzenegger, Bill Belichick, Diane von Furstenberg, and Sam Walton, as well as Presidents George H.W. Bush, Gerald Ford, Ronald Reagan, and Donald Trump, and Supreme Court Justice Sandra Day O’Connor. Why might studying economics be particularly good preparation for being the top manager of a corporation or a leader in government?

## 1.2

## The Economic Problem That Every Society Must Solve

**LEARNING OBJECTIVE:** Discuss how an economy answers these questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced?

### Summary

Society faces **trade-offs**: Producing more of one good or service means producing less of another good or service. The **opportunity cost** of any activity—such as producing a good or service—is the highest-valued alternative that must be given up to engage in that activity. The choices of consumers, firms, and governments determine what goods and services will be produced. Firms choose how to produce the goods and services they sell. In the United States, who receives the goods and services produced depends largely on how income is distributed in the marketplace. In a **centrally planned economy**, most economic decisions are made by the government. In a **market economy**, most economic decisions are made by consumers and firms. Most economies, including that of the United States, are **mixed economies** in which most economic decisions are made by consumers and firms but in which the government also plays a significant role. There are two types of efficiency: (1) **productive efficiency**, which occurs when a good or service is produced at the lowest possible cost, and (2) **allocative efficiency**, which

occurs when production corresponds with consumer preferences. **Voluntary exchange** is a situation that occurs in markets when both the buyer and the seller of a product are made better off by the transaction. **Equity** usually involves a fair distribution of economic benefits. Government policymakers often face a trade-off between equity and efficiency.

### Review Questions

- 2.1 Why does scarcity imply that every society and every individual face trade-offs?
- 2.2 What are the three economic questions that every society must answer? Briefly discuss the differences in the way centrally planned, market, and mixed economies answer these questions.
- 2.3 What is the difference between productive efficiency and allocative efficiency?
- 2.4 What is the difference between efficiency and equity? Why do government policymakers often face a trade-off between efficiency and equity?

## Problems and Applications

- 2.5 According to *Forbes* magazine, in 2019, Jeff Bezos was the world's richest person, with wealth of \$136 billion. Does Jeff Bezos face scarcity? Does everyone? Are there any exceptions?
- 2.6 Consider an organization dedicated to helping low-income people. The members of the organization are discussing alternative methods of aiding the poor, when a proponent of one particular method asserts, "If even one poor person is helped with this method, then all our time and money would have been worth it." If you were a member of the organization, how would you reply to this assertion?
- 2.7 College football attendance, especially student attendance, has been on the decline. In 2017, home attendance at major college football games declined for the seventh consecutive year and was the lowest since 2000. The opportunity cost of engaging in an activity is the value of the best alternative that must be given up in order to engage in that activity. How does your opportunity cost of attending a game compare with the opportunity cost facing a college student 17 years ago? Can this change account for the decline in college football attendance? Briefly explain.
- 2.8 In a market economy, why does a firm have a strong incentive to be productively efficient and allocatively efficient? What does the firm earn if it is productively and allocatively efficient, and what happens if it is not?
- 2.9 Alberto Chong of Georgia State University and several colleagues conducted an experiment to test the efficiency of government postal services around the world. They mailed letters to nonexistent businesses in 159 countries and kept track of how many of the letters were returned. Was this test most relevant to evaluating the productive efficiency or the allocative efficiency of these postal services? Briefly explain.
- 2.10 The Food and Drug Administration (FDA) is part of the federal government's Department of Health and Human Services. Among its other functions, the FDA evaluates the safety and effectiveness of drugs and medical devices. FDA approval had to be granted before OraSure was allowed to market its home HIV test. In a centrally planned economy, the government decides how resources will be allocated. In a market economy, the decisions of households and firms interacting in markets allocate resources. Briefly explain which statement is more accurate: (a) The regulation of the production and sale of drugs and medical devices in the United States is an example of how resources are allocated in a centrally planned economy, or (b) the regulation of the production and sale of drugs and medical devices in the United States is an example of how resources are allocated in a market economy.
- 2.11 Steven Pearlstein, a columnist for the *Washington Post*, observed, "Arthur Okun's book . . . *Equality and Efficiency: The Big Tradeoff*, remains a classic." Why is there a trade-off between equality and efficiency? Why might an economist write an entire book on the subject?
- 2.12 Leonard Fleck, a philosophy professor at Michigan State University, has written:
- When it comes to health care in America, we have limited resources for unlimited health care needs. We want everything contemporary medical technology can offer that will improve the length or quality of our lives as we age. But as presently healthy taxpayers, we want costs controlled.
- Why is it necessary for all economic systems to limit services such as health care? How does a market system prevent people from getting as many goods and services as they want?
- 2.13 Suppose that your college decides to give away 1,000 tickets to the football game against your school's biggest rival. The athletic department elects to distribute the tickets by giving them away to the first 1,000 students who show up at the department's office at 10 A.M. the following Monday.
- Which groups of students will be most likely to try to get the tickets? Think of specific examples and then generalize.
  - What is the opportunity cost to students of distributing the tickets this way?
  - Productive efficiency occurs when a good or service (such as the distribution of tickets) is produced at the lowest possible cost. Is this an efficient way to distribute the tickets? If possible, think of a more efficient method of distributing the tickets.
  - Is this an equitable way to distribute the tickets? Briefly explain.

### 1.3

## Economic Models

LEARNING OBJECTIVE: Explain how economists use models to analyze economic events and government policies.

### Summary

An **economic variable** is something measurable that can have different values, such as the number of people employed in manufacturing. **Economic models** are simplified versions of reality used to analyze real-world economic situations. Economists accept and use an economic model if it leads to hypotheses that are confirmed by statistical analysis. In many cases, the acceptance is tentative, however, pending the gathering of new data or further statistical analysis. Economics is a *social science* because it applies the scientific method to the study of the interactions among individuals. Economics is concerned with positive analysis rather than normative analysis. **Positive analysis** is concerned with what is. **Normative**

**analysis** is concerned with what ought to be. As a social science, economics considers human behavior in every context of decision making, not just in business.

### Review Questions

- What is the relationship between economic models and economic data?
- Describe the five steps economists follow to arrive at a useful economic model.
- What is the difference between normative analysis and positive analysis? Is economics concerned mainly with normative analysis or positive analysis? Briefly explain.



## Problems and Applications

- 3.4 Suppose an economist develops an economic model and finds that it works well in theory but fails in practice. What should the economist do next?
- 3.5 Suppose that Dr. Strangelove's theory is that the price of mushrooms is determined by the activity of subatomic particles that exist in another universe that is parallel to ours. When the subatomic particles are emitted in profusion, the price of mushrooms is high. When subatomic particle emissions are low, the price of mushrooms is also low. How would you go about testing Dr. Strangelove's theory? Discuss whether this theory is useful.
- 3.6 [Related to the **Don't Let This Happen to You**] Briefly explain which of the following statements represent positive analysis and which represent normative analysis.
- A 50-cent-per-pack tax on cigarettes will lead to a 12 percent reduction in smoking by teenagers.
  - The federal government should spend more on research to reduce opioid addiction.
  - Rising wheat prices will increase bread prices.
  - The price of coffee at Starbucks is too high.
- 3.7 [Related to the **Don't Let This Happen to You**] Annie Lowery, a business reporter, wrote the book *Give People Money: How a Universal Basic Income Would End Poverty, Revolutionize Work, and Remake the World*, which advocates that the federal government adopt a universal basic income (UBI) under which every person in the country would receive a monthly check of \$500 to \$1,000. She argues that "in a society as rich as ours . . . everyone deserves a guarantee of financial security." Is Lowery correct that it is the role of the federal government to guarantee that people have financial security?
- 3.8 [Related to the **Apply the Concept: "What Can Economics Contribute to the Debate over Tariffs?"**] The *Apply the Concept* feature explains that there are both positive and normative aspects to the debate over whether the federal government should enact tariffs on imports from China. What economic statistics would be most useful in evaluating the positive elements in this debate? Assuming that these statistics are available or could be gathered, are they likely to resolve the normative issues in this debate?
- 3.9 [Related to the **Chapter Opener**] According to an article in the *Wall Street Journal* in early 2019, "United States Steel Corp. said it plans to add 1.6 million tons of steelmaking capacity next year by resuming the construction of a new furnace in Alabama as tariffs on foreign metal raise profits on domestic steel."
- How does a tariff on imported steel make a U.S. steel company more profitable?
  - Briefly explain whether each of the following groups is likely to be helped or hurt by a tariff on imported steel.
    - U.S. firms, such as automobile firms, that use steel to make their products
    - U.S. consumers
    - Workers at U.S. steel firms
    - People who had invested in U.S. steel firms
  - Would people in the United States helped by the steel tariffs necessarily support the tariffs? Would people who were hurt by the tariffs necessarily oppose the tariffs? Briefly explain.
- 3.10 [Related to the **Economics in Your Life & Career**] Suppose you are building an economic model to forecast the number of people employed in U.S. manufacturing in 2026. Should your model take into account possible changes in economic policy enacted by the president and Congress? Briefly explain.
- 3.11 To receive a medical license in the United States, a doctor must complete a residency program at a hospital. Hospitals are not free to expand their residency programs in a particular medical specialty without approval from a residency review committee (RRC), which is made up of physicians in that specialty. A hospital that does not abide by the rulings of the RRC runs the risk of losing its accreditation from the Accreditation Council for Graduate Medical Education (ACGME). The RRCs and ACGME argue that this system ensures that residency programs do not expand to the point where they are not providing residents with high-quality training.
- How does this system help protect consumers?
  - Is it possible that this system protects the financial interests of doctors more than it protects the well-being of consumers? Briefly explain.
  - Discuss whether you consider this system to be good or bad. Is your conclusion an example of normative economics or of positive economics? Briefly explain.

### 1.4

## Microeconomics and Macroeconomics

LEARNING OBJECTIVE: Distinguish between microeconomics and macroeconomics.

### Summary

**Microeconomics** is the study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices. **Macroeconomics** is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.

### Review Questions

- Briefly discuss the difference between microeconomics and macroeconomics.
- Would the term "investment" be regarded as a microeconomic or a macroeconomic issue? Briefly explain.



## Problems and Applications

- 4.3** Briefly explain whether each of the following is primarily a microeconomic issue or a macroeconomic issue.
- The effect of higher cigarette taxes on the quantity of cigarettes sold
  - The effect of higher income taxes on the total amount of consumer spending
  - The reasons the economies of East Asian countries grow faster than the economies of sub-Saharan African countries
  - The reasons for low rates of profit in the airline industry

- 4.4** Briefly explain whether you agree with the following assertion:

Microeconomics is concerned with things that happen in one particular place, such as the unemployment rate in one city. In contrast, macroeconomics is concerned with things that affect the country as a whole, such as how the rate of teenage smoking in the United States would be affected by an increase in the tax on cigarettes.

## Critical Thinking Exercises

- CT1.1** For this exercise, your instructor may assign you to a group. As you saw in this chapter, an economy must answer three key questions: what to produce, how to produce it, and who receives the goods and services produced. High-income countries like the United States have capitalist economic systems, which economists call *market economies*. This exercise focuses on the ideas about capitalism that you and other students bring to this class so we can connect what you already know with how economists think about the economic system (and they think a lot about it!). Using the concepts in this chapter, explain common complaints you have about capitalism or that you have heard from others. Be sure to use the following terms or concepts in your analysis: *market*, *market economy*, *equity*, *allocative efficiency*, *centrally planned economy*, *normative analysis*, and *positive analysis*. Each member of the group should describe at least one complaint about capitalism and use at least one of the terms or concepts listed above. Each group should then produce a one-page paper for this analysis to either turn in or to discuss in class.
- CT1.2** Suppose that you're very athletic. For example, you might like to run, swim, play volleyball, or bike. You would like to perform better at your next competition. Perhaps you want to run a 5-kilometer race 1 minute faster or perhaps you want your team to advance further in a team sports competition, like volleyball. What concept can you use from this chapter to design your training program? *Hint:* This question is not about using concepts like markets, positive or normative analysis, or assuming that people act rationally, but there is one concept introduced in this chapter that is applicable to improving your athletic performance.

# Appendix

## Using Graphs and Formulas

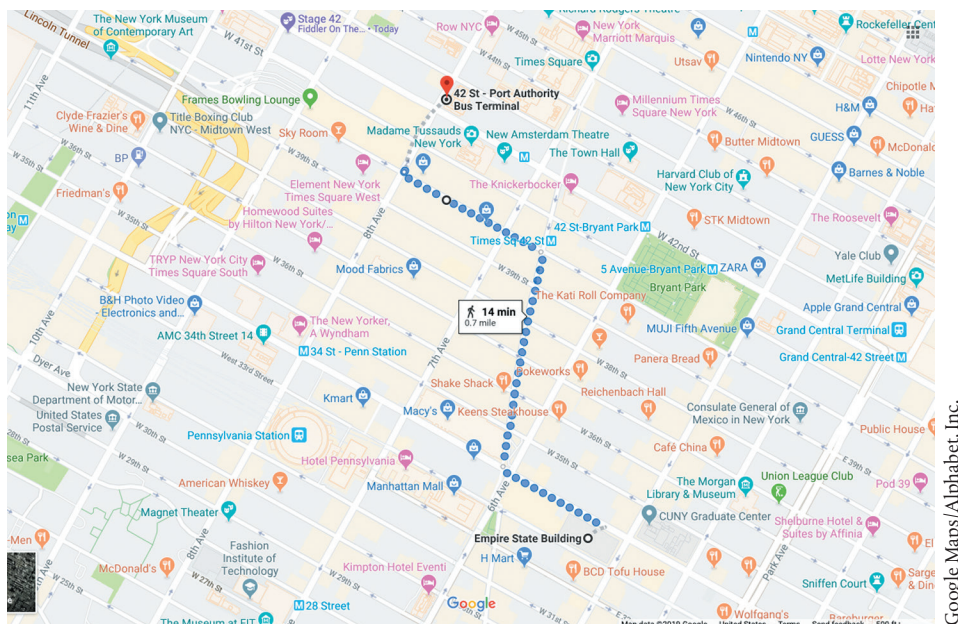
LEARNING OBJECTIVE: Use graphs and formulas to analyze economic situations.

Graphs are used to illustrate key ideas in economics textbooks, on websites, and in newspaper and magazine articles that discuss business and economics. Graphs serve two useful purposes: (1) They simplify economic ideas, and (2) they make the ideas more concrete so people can apply them to real-world problems. Economic, business, and policy issues can be complicated, but a graph can help cut through complications and highlight the key relationships needed to understand the issue. In that sense, a graph can be like a street map.

Suppose you take a bus to New York City to see the Empire State Building. After arriving at the Port Authority Bus Terminal, you will probably use Google Maps or a similar app to find your way to the Empire State Building.

Maps are simplified versions of reality. The following map shows the streets in this part of New York City and some of the most important buildings. The map does not show most stores, most buildings, or the names, addresses, and telephone numbers of the people who live and work in the area. In fact, the map shows almost nothing about the messy reality of life in this section of New York City, except how the streets are laid out, which is the essential information you need to get from the Port Authority Bus Terminal to the Empire State Building.

Think about someone who says, “I know how to get around in the city, but I just can’t figure out how to read a map.” It certainly is possible to find your destination in a city without a map, but it’s a lot easier with one. The same is true of using graphs in economics. It is possible to arrive at a solution to a real-world problem in economics and business without using graphs, but it is usually a lot easier if you use them.



*Maps are simplified versions of reality. This map shows only the streets and most important buildings in this area of New York City.*

Several simple mathematical formulas are also helpful in applying economic ideas. With practice, you will become familiar with the graphs and formulas in this text, and you will know how to use them to analyze problems that would otherwise seem very difficult. What follows is a brief review of how graphs and formulas are used.

## Graphs of One Variable

A firm's *market share* is its percentage of industry sales. Figure 1A.1 displays values for market shares in the U.S. automobile market, using two common types of graphs. In this case, the information is for firms grouped by where the firm is headquartered: U.S.-based firms,\* Japanese-based firms, European-based firms, and Korean-based firms. Panel (a) displays the information about market shares as a *bar graph*, with the market share of each group of firms represented by the height of its bar. Panel (b) displays the same information as a *pie chart*, with the market share of each group of firms represented by the size of its slice of the pie.

Information about an economic variable is also often displayed in a *time-series graph*, like Figure 1A.2, which shows on a coordinate grid how the values of a variable change over time. In a coordinate grid, we can measure the value of one variable along the vertical axis (or *y-axis*) and the value of another variable along the horizontal axis (or *x-axis*). The point where the vertical axis intersects the horizontal axis is called the *origin*. At the origin, the value of both variables is zero. The points on a coordinate grid represent values of the two variables.

Figure 1A.2 measures the number of automobiles and trucks sold worldwide by Ford Motor Company on the vertical axis, and it measures time on the horizontal axis. In time-series graphs, the height of the line at each date shows the value of the variable measured on the vertical axis. Both panels of Figure 1A.2 show Ford's worldwide sales during each year from 2006 to 2018. The difference between panel (a) and panel (b)

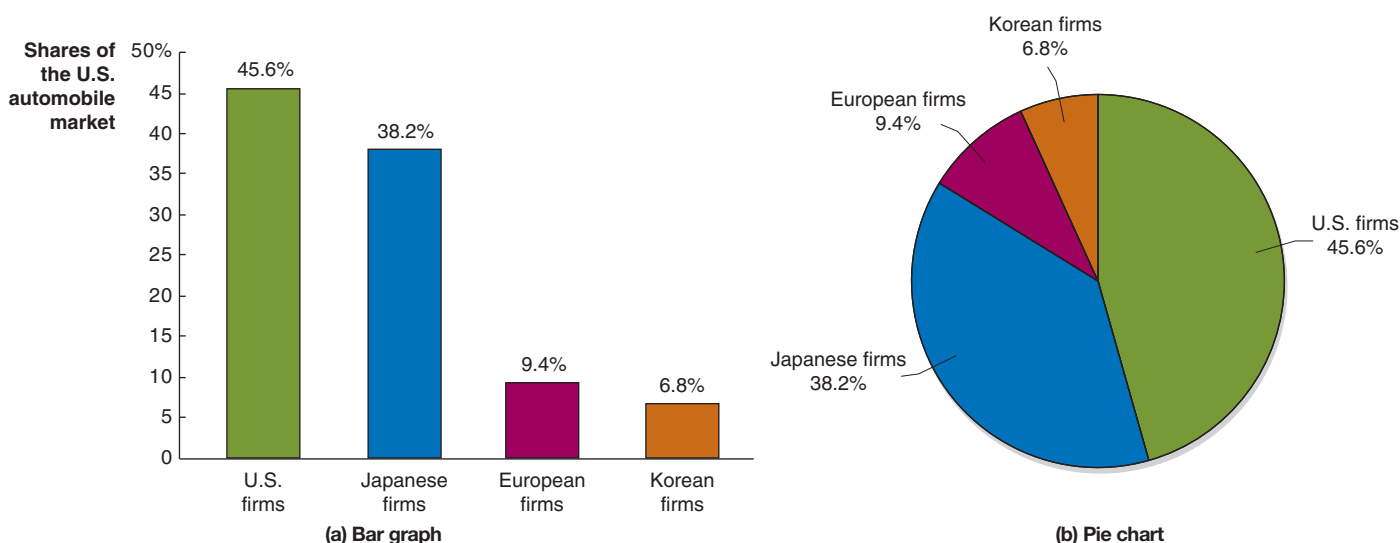


Figure 1A.1 Bar Graph and Pie Chart

Values for an economic variable are often displayed as a bar graph or a pie chart. In this case, panel (a) shows market share data for the U.S. automobile industry as a bar graph, with the market share of each group of firms represented by the height of its bar.

Panel (b) displays the same information as a pie chart, with the market share of each group of firms represented by the size of its slice of the pie.

**Source:** "Auto Sales," *Wall Street Journal*, April 3, 2018.

\*In this case, the category "U.S.-based firms" includes Chrysler, which while a member of the traditional U.S. "Big Three" automobile firms and producing most of its vehicles in North America, has been owned by the Italian-based Fiat Chrysler Automobiles NV since 2009.

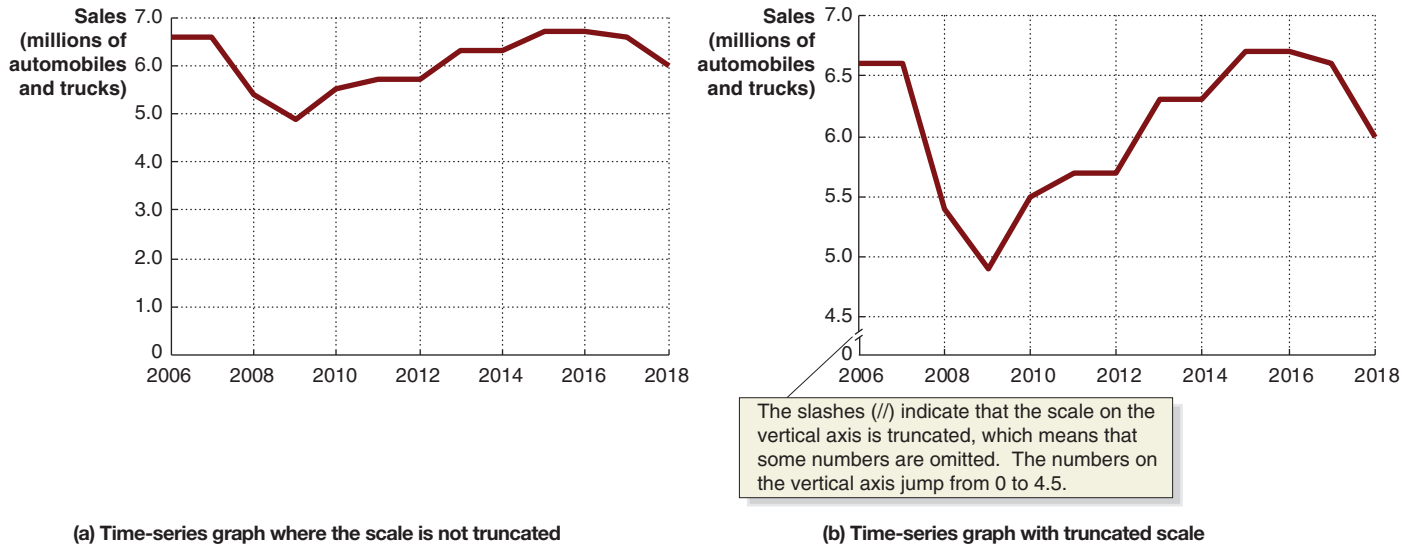


Figure 1A.2 Time-Series Graphs

Both panels present time-series graphs of Ford Motor Company's worldwide sales during each year from 2006 to 2018. In panel (a), the vertical axis starts at 0, and the distance between each pair of values shown is the same. In panel (b), the scale on the vertical axis is truncated, so although it starts at 0, it

then jumps to 4.5 million. As a result, the fluctuations in Ford's sales appear smaller in panel (a) than in panel (b).

Source: Ford Motor Company, *Annual Report*, various years.

illustrates the importance of the scale used in a time-series graph. In panel (a), the vertical axis starts at 0, and the distance between each pair of values shown is the same. In this panel, the decline in Ford's sales during 2008 and 2009 appears relatively small. In panel (b), the scale on the vertical axis is truncated, which means that although it starts at zero, it jumps to 4.5 million. As a result, the distance on the vertical axis from 0 to 4.5 million is much smaller than the distance from 4.5 million to 5.0 million. The slashes (//) near the bottom of the axis indicate that the scale is truncated. The decline in Ford's sales during 2008 and 2009 appears much larger in panel (b) than it appears in panel (a). (Technically, the horizontal axis in both panels is also truncated because we start with 2006, not 0.)

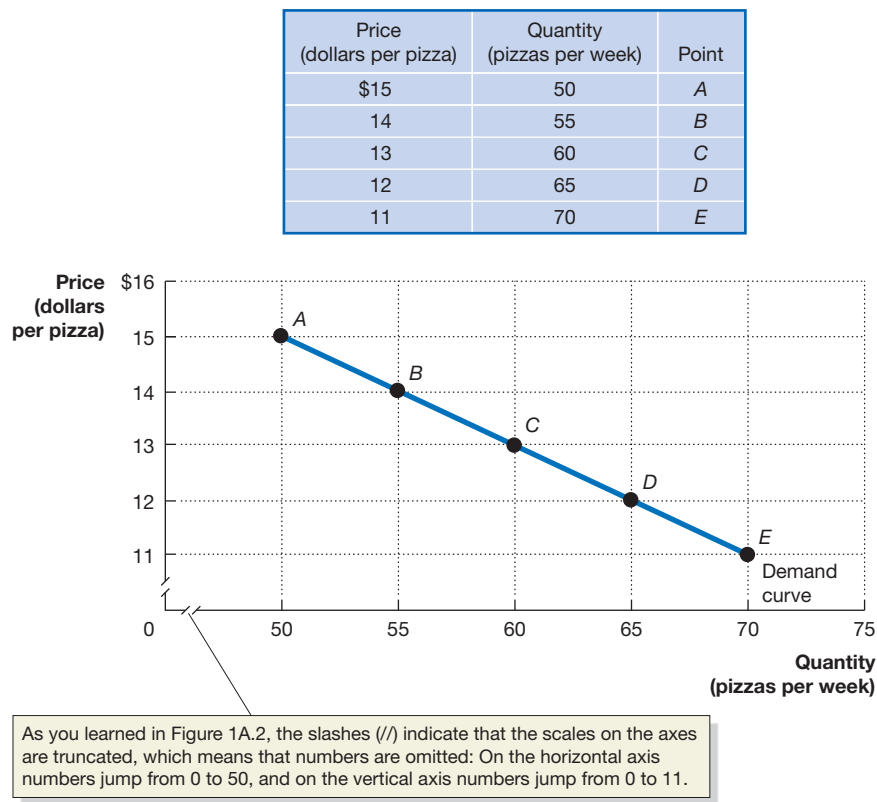
## Graphs of Two Variables

We often use graphs to show the relationship between two variables. Suppose you are interested in the relationship between the price of a cheese pizza and the quantity of pizzas sold per week in your home town. A graph showing the relationship between the price of a good and the quantity of the good demanded at each price is called a *demand curve*. (As we will discuss in Chapter 3, in drawing a demand curve for a good, we have to hold constant any variables other than price that might affect the willingness of consumers to buy the good.) Figure 1A.3 shows the data collected on price and quantity. The figure shows a two-dimensional grid that measures the price of pizza along the y-axis and the quantity of pizzas sold per week along the x-axis. Each point on the grid represents one of the price and quantity combinations listed in the table. We can connect the points to form the demand curve for pizza in your town. Notice that the scales on both axes in the graph are truncated. In this case, truncating the axes allows the graph to illustrate more clearly the relationship between price and quantity by excluding low prices and quantities.

Figure 1A.3

**Plotting Price and Quantity Points in a Graph**

The figure shows a two-dimensional grid that measures the price of pizza along the vertical axis (or y-axis) and the quantity of pizzas sold per week along the horizontal axis (or x-axis). Each point on the grid represents one of the price and quantity combinations listed in the table. By connecting the points with a line, we can better illustrate the relationship between the two variables.



**Slopes of Lines**

Once you have plotted the data in Figure 1A.3, you may be interested in how much the quantity of pizzas sold increases as the price decreases. The *slope* of a line tells us how much the variable we are measuring on the y-axis changes as the variable we are measuring on the x-axis changes. We can use the Greek letter delta ( $\Delta$ ) to stand for the change in a variable. The slope is sometimes called the rise over the run. So, we have several ways of expressing slope:

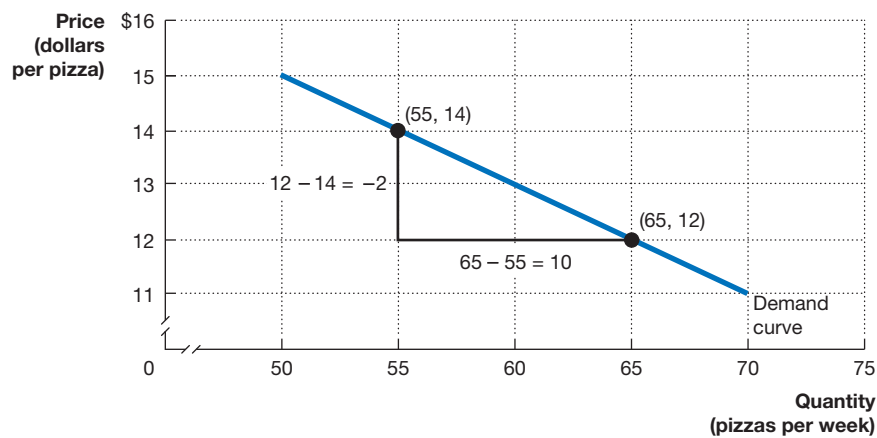
$$\text{Slope} = \frac{\text{Change in value on the vertical axis}}{\text{Change in value on the horizontal axis}} = \frac{\Delta y}{\Delta x} = \frac{\text{Rise}}{\text{Run}}$$

Figure 1A.4 reproduces the graph from Figure 1A.3. Because the slope of a straight line is the same at any point, we can use any two points in the figure to calculate the

Figure 1A.4

**Calculating the Slope of a Line**

We can calculate the slope of a line as the change in the value of the variable on the y-axis divided by the change in the value of the variable on the x-axis. Because the slope of a straight line is constant, we can use any two points in the figure to calculate the slope of the line. For example, when the price of pizza decreases from \$14 to \$12, the quantity of pizzas demanded increases from 55 per week to 65 per week. So, the slope of this line equals  $-2$  divided by  $10$ , or  $-0.2$ .





slope of the line. For example, when the price of pizza decreases from \$14 to \$12, the quantity of pizzas sold increases from 55 per week to 65 per week. Therefore, the slope is:

$$\text{Slope} = \frac{\Delta \text{Price of pizza}}{\Delta \text{Quantity of pizza}} = \frac{(\$12 - \$14)}{(65 - 55)} = \frac{-2}{10} = -0.2.$$

The slope of this line shows us how responsive consumers in your home town are to changes in the price of pizza. The larger the value of the slope (ignoring the negative sign), the steeper the line will be, which indicates that not many additional pizzas are sold when the price falls. The smaller the value of the slope, the flatter the line will be, which indicates a greater increase in pizzas sold when the price falls.

## Taking into Account More Than Two Variables on a Graph

The demand curve in Figure 1A.4 shows the relationship between the price of pizza and the quantity of pizza demanded, but we know that the quantity of any good demanded depends on more than just the price of the good. For example, the quantity of pizzas demanded during a particular week in your town can be affected by other variables, such as the price of hamburgers, whether an advertising campaign by local pizza parlors has begun that week, and so on. Allowing the values of any other variables to change will cause the position of the demand curve in the graph to change.

Suppose that the demand curve in Figure 1A.4 was drawn holding the price of hamburgers constant, at \$1.50. If the price of hamburgers rises to \$2.00, some consumers will switch from buying hamburgers to buying pizza, and more pizzas will be demanded at every price. The result on the graph will be to shift the line representing the demand curve to the right. Similarly, if the price of hamburgers falls from \$1.50 to \$1.00, some consumers will switch from buying pizza to buying hamburgers, and fewer pizzas will be demanded at every price. The result on the graph will be to shift the line representing the demand curve to the left.

The table in Figure 1A.5 shows the effect of a change in the price of hamburgers on the quantity of pizzas demanded. On the graph, suppose that at first we are on the line labeled Demand curve<sub>1</sub>. If the price of pizza is \$14 (point A), an increase in the price of hamburgers from \$1.50 to \$2.00 increases the quantity of pizzas demanded from 55 to 60 per week (point B) and shifts the demand curve to the right, to Demand curve<sub>2</sub>. Or, if we start on Demand curve<sub>1</sub> and the price of pizza is \$12 (point C), a decrease in the price of hamburgers from \$1.50 to \$1.00 decreases the quantity of pizzas demanded from 65 to 60 per week (point D) and shifts the demand curve to the left, to Demand curve<sub>3</sub>. By shifting the demand curve, we have taken into account the effect of changes in the value of a third variable—the price of hamburgers. We will use this technique of shifting curves to allow for the effects of additional variables many times in this book.

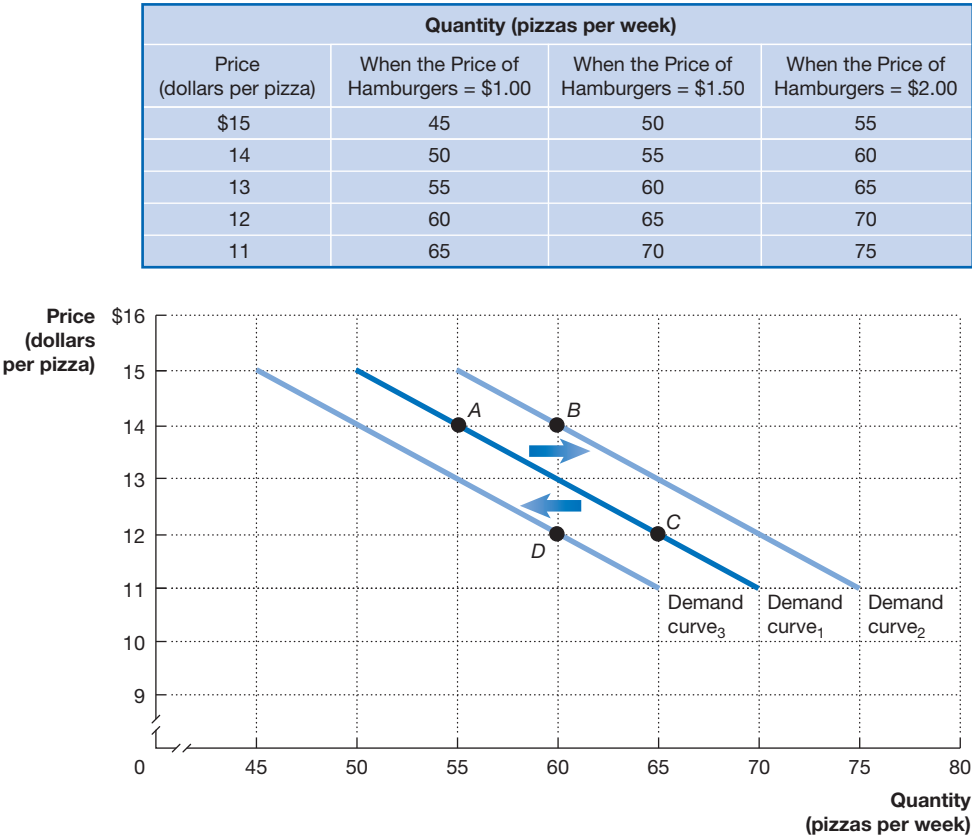
## Positive and Negative Relationships

We can use graphs to show the relationships between any two variables. Sometimes the relationship between the variables is *negative*, meaning that as one variable increases in value, the other variable decreases in value. This was the case with the price of pizza and the quantity of pizzas demanded. The relationship between two variables can also be *positive*, meaning that the values of both variables increase or decrease together. For example, when the level of total income—or *disposable personal income*—received by households in the United States increases, the level of total *consumption spending*, which is spending by households on goods and services, also increases. The table in Figure 1A.6 shows the values (in billions of dollars) for income and consumption spending for 2015–2018.

Figure 1A.5

**Showing Three Variables on a Graph**

The demand curve for pizza shows the relationship between the price of pizzas and the quantity of pizzas demanded, *holding constant other factors that might affect the willingness of consumers to buy pizza*. If the price of pizza is \$14 (point A), an increase in the price of hamburgers from \$1.50 to \$2.00 increases the quantity of pizzas demanded from 55 to 60 per week (point B) and shifts the demand curve to Demand curve<sub>2</sub>. Or, if we start on Demand curve<sub>1</sub> and the price of pizza is \$12 (point C), a decrease in the price of hamburgers from \$1.50 to \$1.00 decreases the quantity of pizzas demanded from 65 to 60 per week (point D) and shifts the demand curve to Demand curve<sub>3</sub>.



The graph plots the data from the table, with disposable personal income measured along the horizontal axis and consumption spending measured along the vertical axis.

**Determining Cause and Effect**

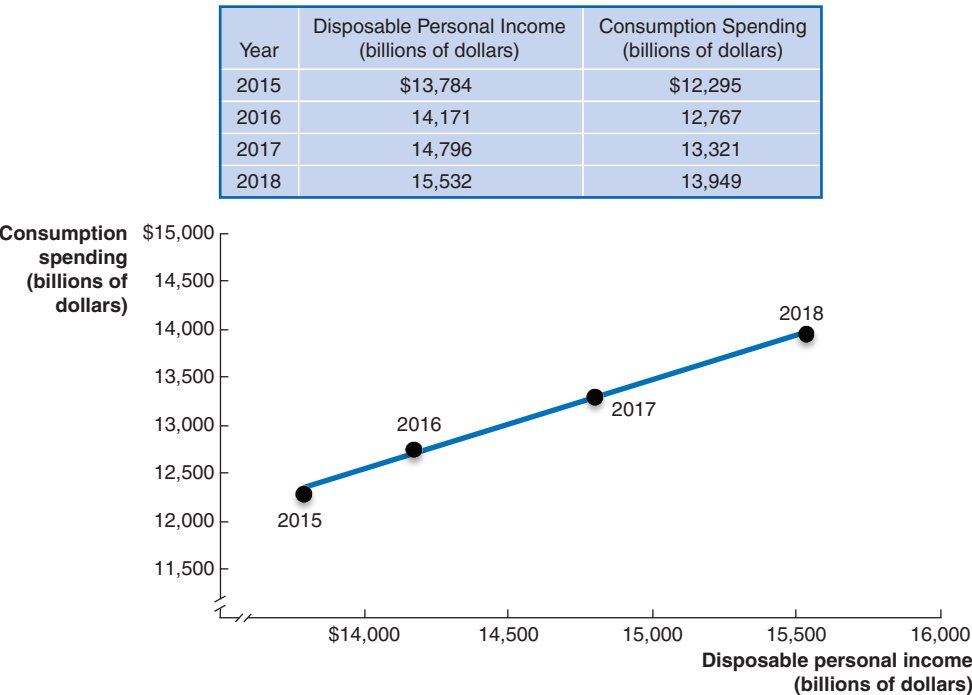
When we graph the relationship between two variables, we usually want to draw conclusions about whether changes in one variable are causing changes in the other variable.

Figure 1A.6

**Graphing the Positive Relationship between Income and Consumption**

In a positive relationship between two economic variables, as one variable increases, the other variable also increases. This figure shows the positive relationship between disposable personal income and consumption spending. As disposable personal income in the United States has increased, so has consumption spending.

**Source:** U.S. Department of Commerce, Bureau of Economic Analysis.



The following three examples highlight why you should be careful about identifying cause and effect.

### Example 1: Does using fireplaces cause leaves to fall from trees?

Suppose that over the course of a year, you graph the number of homes in a neighborhood that have fires burning in their fireplaces and the number of leaves on trees in the neighborhood and you get a relationship like that shown in panel (a) of Figure 1A.7: The more fireplaces in use in the neighborhood, the fewer leaves the trees have. Can we draw the conclusion from this graph that using a fireplace causes trees to lose their leaves? We know, of course, that such a conclusion is incorrect. In spring and summer, there are relatively few fireplaces being used, and the trees are full of leaves. In the fall, as trees begin to lose their leaves, fireplaces are used more frequently. And in winter, many fireplaces are being used and many trees have lost all their leaves. The reason that the graph in Figure 1A.7 is misleading in terms of cause and effect is that there is obviously an *omitted variable* in the analysis—the season of the year. An omitted variable is one that affects the other variables in the analysis, and its omission can lead to false conclusions about cause and effect.

### Example 2: What causes lung cancer?

Although in the first example the omitted variable is obvious, there are many debates about cause and effect where the existence of an omitted variable has not been clear. For instance, it has been known for many years that people who smoke cigarettes suffer from higher rates of lung cancer than do nonsmokers. For some time, tobacco companies and some scientists argued that there was an omitted variable—perhaps failure to exercise or poor diet—that made some people both more likely to smoke and more likely to develop lung cancer. If this omitted variable existed, then the finding that smokers were more likely to develop lung cancer would not have been evidence that smoking *caused* lung cancer. In this case, however, nearly all scientists eventually concluded that the omitted variable did not exist and that, in fact, smoking does cause lung cancer.

### Example 3: Does mowing your lawn cause the grass to grow faster?

A related problem in determining cause and effect is known as *reverse causality*. The error of reverse causality occurs when we conclude that changes in variable *X* cause changes in variable *Y* when, in fact, it is actually changes in variable *Y* that cause changes in variable *X*. For example, panel (b) of Figure 1A.7 plots the number of lawn mowers being used in a neighborhood against the rate at which grass on lawns in the neighborhood is growing. We could conclude from this graph that using lawn mowers *causes* the grass to grow faster. We know, however, that in reality, the causality is in the other direction: Rapidly growing grass during the spring and summer causes the increased use of lawn mowers, and slowly growing grass in the fall or winter or during periods of low rainfall causes the decreased use of lawn mowers.

Once again, in this example, the potential error of reverse causality is obvious. In many economic debates, however, cause and effect can be more difficult to determine. For example, changes in the money supply, or the total amount of money in the economy, tend to occur at the same time as changes in the total amount of income earned by people in the economy. A famous debate in economics was about whether the changes in the money supply caused the changes in total income or whether the changes in total income caused the changes in the money supply. Each side in the debate accused the other side of committing the error of reverse causality.

## Are Graphs of Economic Relationships Always Straight Lines?

The graphs of relationships between two economic variables that we have drawn so far have been straight lines. The relationship between two variables is *linear* when it can be represented by a straight line. Few economic relationships are actually linear. For example, if we carefully plot data on the price of a product and the quantity demanded at each price, holding constant other variables that affect the quantity demanded, we will usually find a curved—or *nonlinear*—relationship

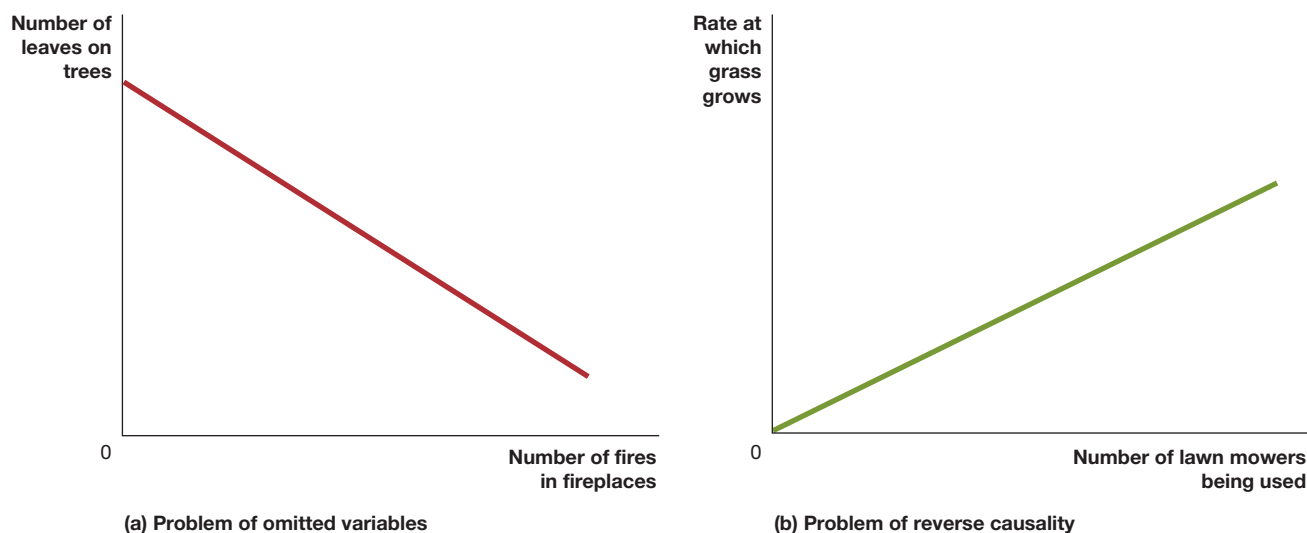


Figure 1A.7 **Determining Cause and Effect**

Using graphs to draw conclusions about cause and effect can be hazardous. In panel (a), we see that there are fewer leaves on the trees in a neighborhood when many homes have fires burning in their fireplaces. We cannot draw the conclusion that using fireplaces causes the leaves to fall because we have an *omitted variable*—the season of the year.

In panel (b), we see that more lawn mowers are used in a neighborhood during times when the grass grows rapidly and fewer lawn mowers are used when the grass grows slowly. Concluding that using lawn mowers *causes* the grass to grow faster would be making the error of *reverse causality*.

rather than a linear relationship. In practice, however, it is often useful to approximate a nonlinear relationship with a linear relationship. If the relationship is reasonably close to being linear, the analysis is not significantly affected. In addition, it is easier to calculate the slope of a straight line, and it is also easier to calculate the area under a straight line. So, in this textbook, we often assume that the relationship between two economic variables is linear, even when we know that this assumption is not precisely correct.

### Slopes of Nonlinear Curves

In some situations, we need to take into account the nonlinear nature of an economic relationship. For example, panel (a) of Figure 1A.8 shows the hypothetical relationship between Apple's total cost of producing iPhones and the quantity of iPhones produced. The relationship is curved rather than linear. In this case, the cost of production is increasing at an increasing rate, which often happens in manufacturing. In other words, as we move up the curve, its slope becomes larger. (Remember that with a straight line, the slope is always constant.) To see why, first remember that we calculate the slope of a curve by dividing the change in the variable on the y-axis by the change in the variable on the x-axis. As we move from point A to point B, the quantity produced increases by 1 million iPhones, while the total cost of production increases by \$50 million. Farther up the curve, as we move from point C to point D, the change in quantity is the same—1 million iPhones—but the change in the total cost of production is now much larger—\$250 million. Because the change in the y variable has increased, while the change in the x variable has remained the same, we know that the slope has increased.

To measure the slope of a nonlinear curve at a particular point, we measure the slope of the line that is tangent to that curve at that point. This tangent line will touch the curve only at that point. We can measure the slope of the tangent line just as we would

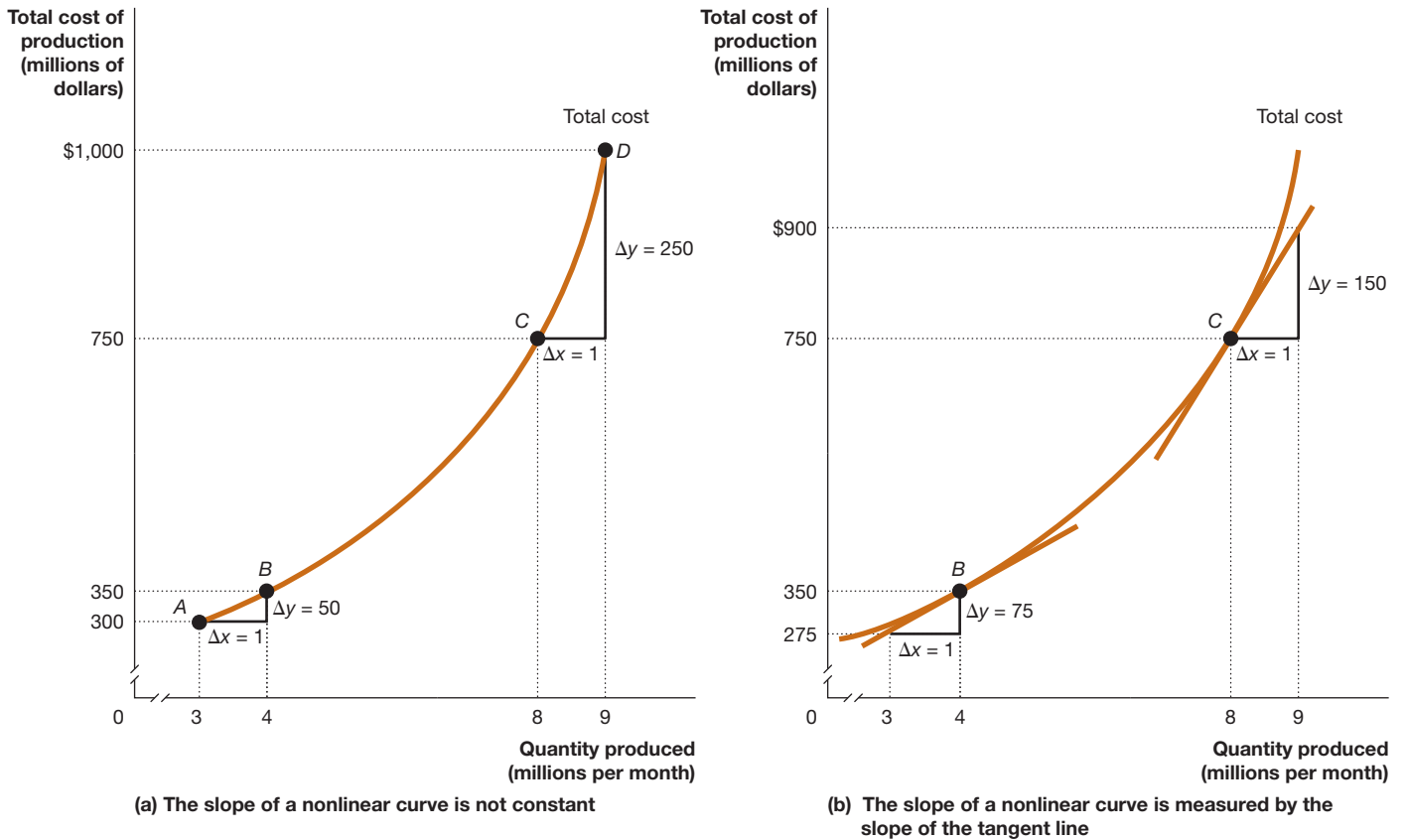


Figure 1A.8 The Slope of a Nonlinear Curve

The relationship between the quantity of Apple iPhones produced and the total cost of production is curved rather than linear. In panel (a), when we move from point A to point B, the quantity produced increases by 1 million iPhones, while the total cost of production increases by \$50 million. Farther up the curve, as we move from point C to point D, the change in quantity is the same—1 million iPhones—but the change in the total cost of production is now much larger—\$250 million.

Because the change in the y variable has increased, while the change in the x variable has remained the same, we know that the slope has increased. In panel (b), we measure the slope of the curve at a particular point by calculating the slope of the tangent line at that point. The slope of the tangent line at point B is 75, and the slope of the tangent line at point C is 150.

measure the slope of any other straight line. In panel (b), the tangent line at point B has a slope equal to:

$$\frac{\Delta \text{Cost}}{\Delta \text{Quantity}} = \frac{75}{1} = 75.$$

The tangent line at point C has a slope equal to:

$$\frac{\Delta \text{Cost}}{\Delta \text{Quantity}} = \frac{150}{1} = 150.$$

Once again, we see that the slope of the curve is larger at point C than at point B.

## Formulas

We have just seen that graphs are an important economic tool. In this section, we will review several useful formulas and show how to use them to summarize data and calculate important relationships.



## Formula for a Percentage Change

The *percentage change* is the change in some economic variable, usually from one period to the next, expressed as a percentage. A key macroeconomic measure is the real gross domestic product (GDP). GDP is the value of all the final goods and services produced in a country during a year. “Real” GDP is corrected for the effects of inflation. When economists say that the U.S. economy grew 2.9 percent during 2018, they mean that real GDP was 2.9 percent higher in 2018 than it was in 2017. The formula for making this calculation is:

$$\left( \frac{\text{GDP}_{2018} - \text{GDP}_{2017}}{\text{GDP}_{2017}} \right) \times 100$$

or, more generally, for any two periods:

$$\text{Percentage change} = \left( \frac{\text{Value in the second period} - \text{Value in the first period}}{\text{Value in the first period}} \right) \times 100.$$

In this case, real GDP was \$18,051 billion in 2017 and \$18,566 billion in 2018. So, the growth rate of the U.S. economy during 2018 was:

$$\left( \frac{\$18,566 - \$18,051}{\$18,051} \right) \times 100 = 2.9\%.$$

Notice that it doesn’t matter that in using the formula, we ignored the fact that GDP is measured in billions of dollars. In fact, when calculating percentage changes, *the units don’t matter*. The percentage increase from \$18,051 billion to \$18,566 billion is exactly the same as the percentage increase from \$18,051 to \$18,566.

## Formulas for the Areas of a Rectangle and a Triangle

Areas that form rectangles and triangles on graphs can have important economic meaning. For example, Figure 1A.9 shows the demand curve for Pepsi. Suppose that the price is currently \$2.00 and that 125,000 bottles of Pepsi are sold at that price. A firm’s *total revenue* is equal to the amount it receives from selling its product, or the quantity sold multiplied by the price. In this case, total revenue will equal 125,000 bottles times \$2.00 per bottle, or \$250,000.

The formula for the area of a rectangle is:

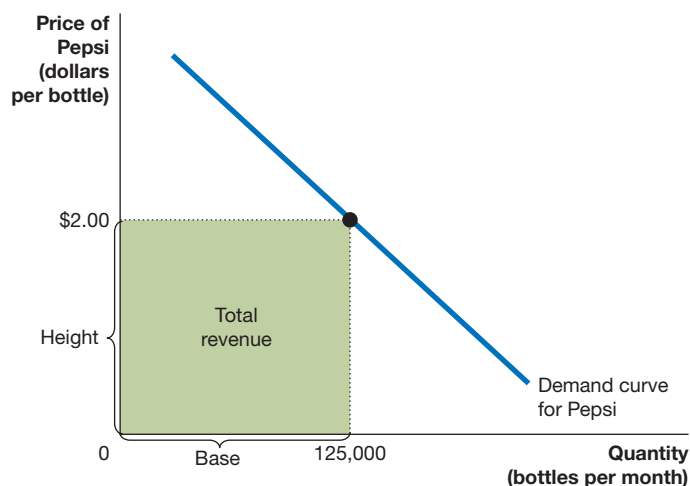
$$\text{Area of a rectangle} = \text{Base} \times \text{Height}.$$

In Figure 1A.9, the shaded rectangle also represents the firm’s total revenue because its area is given by the base of 125,000 bottles multiplied by the price of \$2.00 per bottle.

Figure 1A.9

### Showing a Firm’s Total Revenue on a Graph

The area of a rectangle is equal to its base multiplied by its height. Total revenue is equal to quantity multiplied by price. Here, total revenue is equal to the quantity of 125,000 bottles times the price of \$2.00 per bottle, or \$250,000. The area of the shaded rectangle shows the firm’s total revenue.



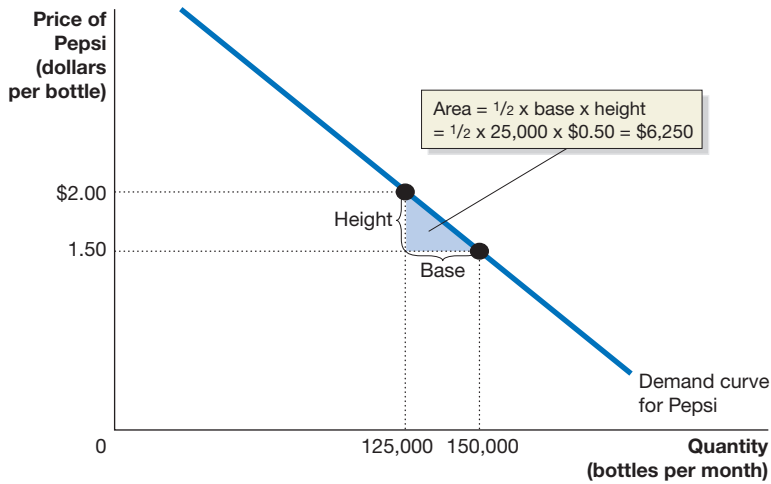


Figure 1A.10

**The Area of a Triangle**

The area of a triangle is equal to  $1/2$  multiplied by its base multiplied by its height. The area of the shaded triangle has a base equal to  $150,000 - 125,000$ , or  $25,000$ , and a height equal to  $\$2.00 - \$1.50$ , or  $\$0.50$ . Therefore, its area is equal to  $1/2 \times 25,000 \times \$0.50$ , or  $\$6,250$ .

We will see in later chapters that areas that are triangles can also have economic significance. The formula for the area of a triangle is:

$$\text{Area of a triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}.$$

The shaded area in Figure 1A.10 is a triangle. The base equals  $150,000 - 125,000$ , or  $25,000$ . Its height equals  $\$2.00 - \$1.50$ , or  $\$0.50$ . Therefore, its area equals  $1/2 \times 25,000 \times \$0.50$ , or  $\$6,250$ . Notice that the shaded area is a triangle only if the demand curve is a straight line, or linear. Not all demand curves are linear. However, the formula for the area of a triangle will usually still give a good approximation, even if the demand curve is not linear.

## Summary of Using Formulas

You will encounter several other formulas in this book. Whenever you use a formula, you should follow these steps:

1. Make sure you understand the economic concept the formula represents.
2. Make sure you are using the correct formula for the problem you are solving.
3. Make sure the number you calculate using the formula is economically reasonable. For example, if you are using a formula to calculate a firm's revenue and your answer is a negative number, you know you made a mistake somewhere.

## 1A

## Using Graphs and Formulas

LEARNING OBJECTIVE: Use graphs and formulas to analyze economic situations.

## Problems and Applications

- 1A.1** The following table shows the relationship between the price of custard pies and the number of pies Jacob buys per week.

| Price (dollars per pie) | Quantity of Pies | Week     |
|-------------------------|------------------|----------|
| \$3.00                  | 6                | July 2   |
| 2.00                    | 7                | July 9   |
| 5.00                    | 4                | July 16  |
| 6.00                    | 3                | July 23  |
| 1.00                    | 8                | July 30  |
| 4.00                    | 5                | August 6 |

- Is the relationship between the price of pies and the number of pies Jacob buys a positive relationship or a negative relationship?
  - Plot the data from the table on a graph similar to Figure 1A.3. Draw a straight line that best fits the points.
  - Calculate the slope of the line.
- 1A.2** The following table gives information about the quantity of glasses of lemonade demanded on sunny and overcast days.

| Price (dollars per glass) | Quantity (glasses of lemonade per day) | Weather  |
|---------------------------|--|----------|
| \$0.80                    | 30                                     | Sunny    |
| 0.80                      | 10                                     | Overcast |
| 0.70                      | 40                                     | Sunny    |
| 0.70                      | 20                                     | Overcast |
| 0.60                      | 50                                     | Sunny    |
| 0.60                      | 30                                     | Overcast |
| 0.50                      | 60                                     | Sunny    |
| 0.50                      | 40                                     | Overcast |

Plot the data from the table on a graph similar to Figure 1A.5. Draw two straight lines representing the two demand curves—one for sunny days and one for overcast days.

- 1A.3** Use the information in the following table to calculate the percentage change in Ford's auto sales from one year to the next. (These are the data that are graphed in Figure 1A.2.) During which year did sales fall at the highest rate?

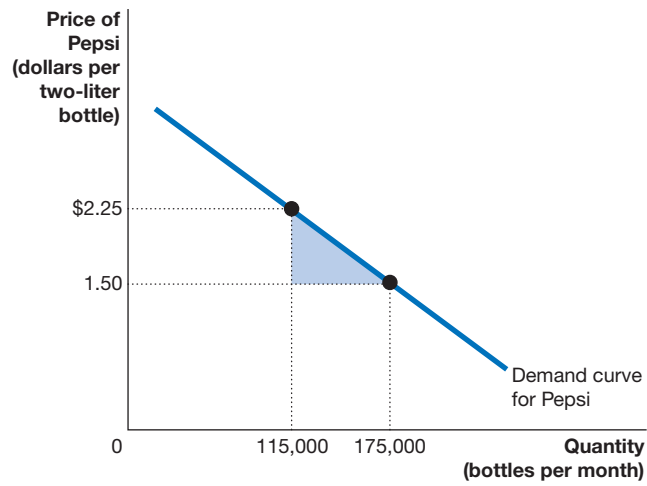
| Year | Ford Worldwide Sales (millions) |
|------|---------------------------------|
| 2006 | 6.6                             |
| 2007 | 6.6                             |
| 2008 | 5.4                             |
| 2009 | 4.9                             |
| 2010 | 5.5                             |
| 2011 | 5.7                             |
| 2012 | 5.7                             |
| 2013 | 6.3                             |
| 2014 | 6.3                             |
| 2015 | 6.7                             |
| 2016 | 6.7                             |
| 2017 | 6.6                             |
| 2018 | 6.0                             |

- 1A.4** Real GDP in 2016 was \$17,659 billion. Real GDP in 2017 was \$18,051 billion. What was the percentage change in real GDP from 2016 to 2017? What do economists call the percentage change in real GDP from one year to the next?
- 1A.5** Assume that the demand curve for Pepsi passes through the following two points:

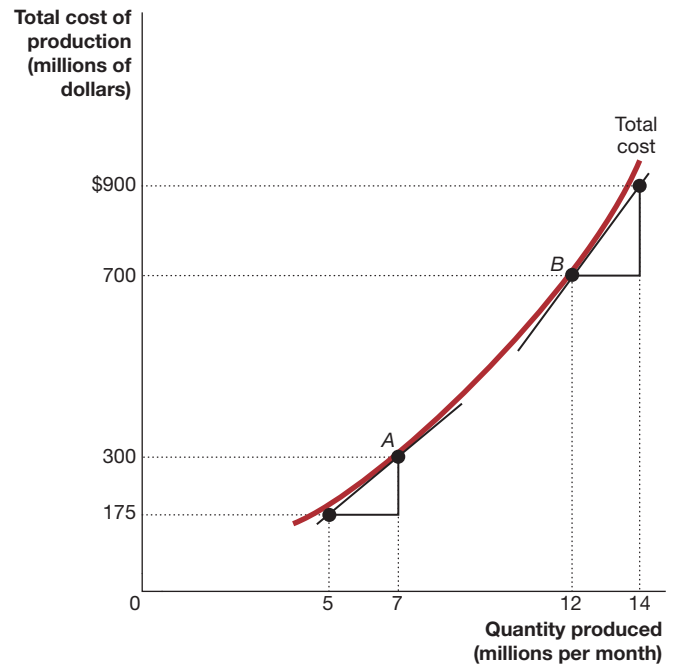
| Price per Bottle of Pepsi (in dollars) | Quantity (bottles) |
|--|--------------------|
| \$2.50                                 | 100,000            |
| 1.25                                   | 200,000            |

- Draw a graph with a linear demand curve that passes through these two points.
- Show on the graph the areas representing total revenue at each price. Give the value for total revenue at each price.

**1A.6** What is the area of the triangle shown in the following figure?



**1A.7** Calculate the slope of the total cost curve at point A and at point B in the following figure.



# 2

## Trade-offs, Comparative Advantage, and the Market System

### Elon Musk and Tesla Motors Face a Trade-off

Elon Musk wanted to make electric cars both cool and affordable to the average car buyer. When he founded Tesla Motors in 2003, there were already some cars, such as the Toyota Prius, with hybrid engines (part electric and part gasoline), and a few all-electric cars, like the General Motors EV1. But U.S. and foreign carmakers were primarily selling cars with conventional gasoline engines.

Tesla's cars, first offered for sale in 2008, were immediately popular. But the only model offered at the time had a starting price of \$109,000. The Model S sedan, introduced in 2012, and the Model X sports utility vehicle, introduced in 2015, have starting prices over \$70,000. Musk's plan to sell a model with a price low enough to compete with mass-produced cars with gasoline engines, such as the Toyota Corolla and Honda Civic, depended on the success of his Model 3, which went on sale in 2017.

Although Musk had hoped to sell the Model 3 for \$35,000, the least-expensive version available in early 2019 was \$39,500. Most buyers wanted options—such as a bigger battery that would allow them to drive farther—that pushed the price above \$50,000. At a price of \$35,000, Tesla would lose several thousand dollars on each Model 3 sold.

Musk and Tesla's managers were facing an important trade-off: Should the firm increase the resources—machinery, workers, and research and development work—devoted to the Model 3 to bring its costs down so the firm could earn a profit at a price of \$35,000? Or should Tesla devote those resources to manufacturing more Model X and Model S cars, which were profitable but whose manufacturing costs could never be reduced enough for the firm to sell them at a price that the average new car buyer would be willing to pay?

Musk said, "Higher volume and manufacturing design improvements are crucial for Tesla [to sell the Model 3 at a price of \$35,000] and still be a viable company. There isn't any other way." In 2019, because investors were



Justin Sullivan/Getty Images

expecting that Musk would succeed, Tesla had a value of about \$50 billion on the stock market. That was more than the Ford Motor Company and nearly as much as General Motors, which both sell millions more cars per year than Tesla. But some industry analysts remained skeptical that Musk could meet his goal of selling 1 million Model 3s per year.

As Tesla dealt with the trade-offs involved in how to allocate its resources among models, it was also dealing with the effects of the federal government phasing out a tax credit. Because electric cars do not emit greenhouse gases, in 2009 the federal government began offering a tax credit of up to \$7,500 on the purchase of a new electric car, with the goal of increasing sales of those cars. The federal government faced a trade-off in offering this tax credit: The tax revenue it gives up as a result of the credit isn't available to fund other programs, including research on clean energy. To deal with this trade-off, the federal government phases out the tax credit once a firm has sold 200,000 electric vehicles. By the end of 2019, buyers of a Tesla would no longer receive the credit, effectively raising the price they would pay.

**AN INSIDE LOOK** at the end of the chapter discusses how Porsche's parent company, Volkswagen, plans to create a full line of electric automobiles by 2025.



## Chapter Outline & Learning Objectives

- 2.1** **Production Possibilities Frontiers and Opportunity Costs**, page 94  
Use a production possibilities frontier to analyze opportunity costs and trade-offs.
- 2.2** **Comparative Advantage and Trade**, page 99  
Describe comparative advantage and explain how it serves as the basis for trade.
- 2.3** **The Market System**, page 106  
Explain the basics of how a market system works.

## Economics in Your Life & Career

### The Trade-offs When You Buy a Car

Although the popularity of electric cars is increasing, most people still buy conventional gasoline-powered cars. When you buy a gasoline-powered car, you probably consider factors such as safety and fuel efficiency. To increase fuel efficiency, automobile manufacturers make some cars that are small and light. However, people are usually safer driving large cars because they absorb more of the impact of an accident than do small

cars. What do these facts tell us about the relationship between safety and fuel efficiency? If you were a manager at an automobile manufacturer, how might you evaluate the relationship between safety and fuel efficiency when designing cars? As you read the chapter, try to answer these questions. You can check your answers against those provided at the end of this chapter.

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

In a market system, managers are continually making decisions like those made by Elon Musk and Tesla's managers. These decisions reflect a key fact of economic life: *Scarcity requires trade-offs*. **Scarcity** exists because we have unlimited wants but limited resources available to fulfill those wants. Goods and services are scarce. So, too, are economic resources, or *factors of production*—workers, capital, natural resources, and entrepreneurial ability—that are used to make goods and services. Your time is scarce, which means you face trade-offs: If you spend an hour studying for an economics exam, you have one hour less to spend studying for a psychology exam or watching shows on Netflix. If your university decides to use some of its scarce budget to buy new computers for the computer labs, those funds will not be available to resurface the student parking lots or install an improved heating and air conditioning system in the dorms. If Tesla decides to devote some of the scarce workers and machinery in its Fremont, California, assembly plant to producing more Model 3s, those resources will not be available to produce more of its other models.

Households and firms make many of their decisions in markets. Trade is a key activity that takes place in markets. Trade results from the decisions of millions of households and firms in markets around the world. By engaging in trade, people can raise their incomes. In this chapter, we provide an overview of how the market system coordinates the independent decisions of these millions of households and firms. We begin our analysis of the economic consequences of scarcity and how a market system works by introducing an important economic model: the *production possibilities frontier*.

## 2.1

## Production Possibilities Frontiers and Opportunity Costs

**LEARNING OBJECTIVE:** Use a production possibilities frontier to analyze opportunity costs and trade-offs.

In 2019, Tesla operated only one automobile factory, located in Fremont, California, where it assembles three vehicle models: Model S and Model 3 sedans and Model X SUVs. Because the firm's resources—workers, machinery, materials, and entrepreneurial ability—are limited, Tesla faces a trade-off: Resources devoted to producing one model are not available for producing the other models. Chapter 1 explained that economic models can be useful in analyzing many questions. We can use a simple model called the *production possibilities frontier* to analyze the trade-offs Tesla faces in its Fremont plant. A **production possibilities frontier (PPF)** is a curve showing the maximum attainable combinations of two goods that can be produced with available resources and current technology. In Tesla's case, the company produces three vehicle models at its Fremont plant, using workers, materials, robots, and other machinery.

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

### Graphing the Production Possibilities Frontier

Figure 2.1 uses a production possibilities frontier to illustrate that the key trade-off Tesla faced in 2019 was allocating resources between its two original models (Model S and Model X) and its newer Model 3. The numbers from the table are plotted in the graph. The line in the graph represents Tesla's production possibilities frontier. If Tesla uses all its resources to produce its original models, it can produce 80 per day—point A at one end of the production possibilities frontier. If Tesla uses all its resources to produce its newer Model 3, it can produce 80 per day—point E at the other end. If Tesla devotes resources to producing both its original models and the Model 3, it could be at a point like B, where it produces 60 of its original models and 20 Model 3s.

All the combinations either on the frontier—like points A, B, C, D, and E—or inside the frontier—like point F—are *attainable* with the resources available. Combinations on

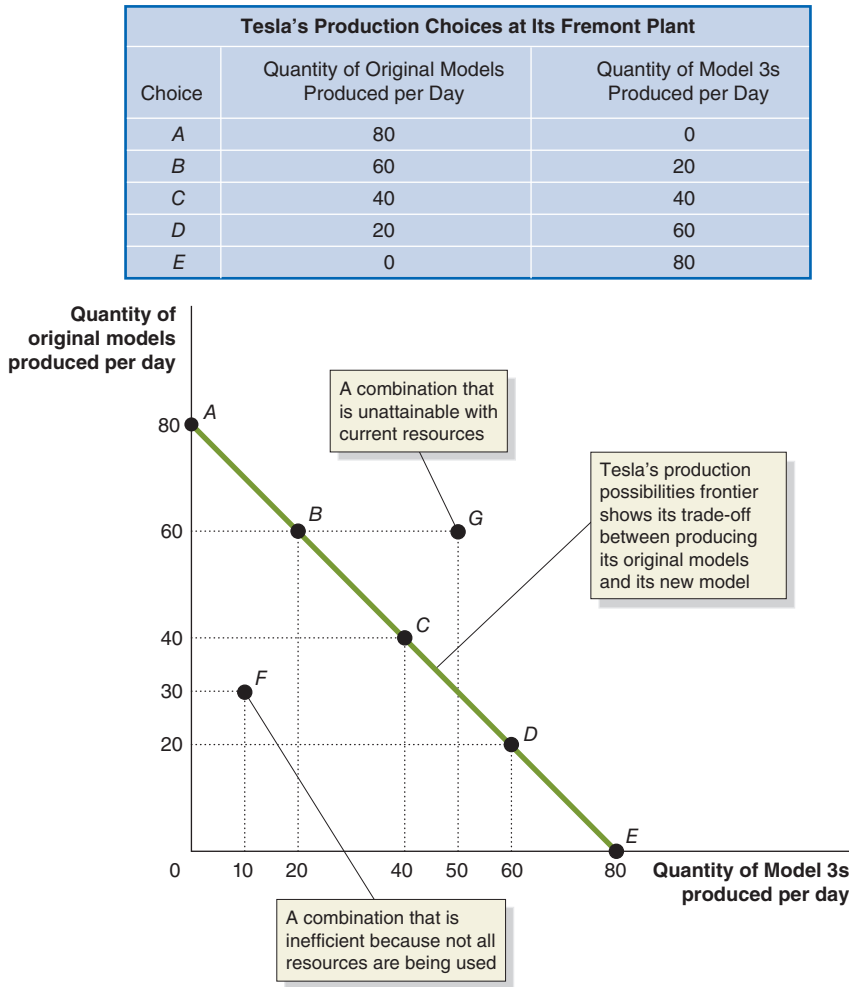


Figure 2.1

Tesla's Production Possibilities Frontier

Tesla faces a trade-off: To build one more of its original Model S and Model X vehicles, it must build one less of its Model 3. The production possibilities frontier illustrates the trade-off Tesla faces. Combinations on the production possibilities frontier—like points A, B, C, D, and E—are *efficient* because the maximum output is being obtained from the available resources. Combinations inside the frontier—like point F—are *inefficient* because some resources are not being used. Combinations outside the frontier—like point G—are *unattainable* with current resources.

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. Combinations inside the frontier—like point F—are *inefficient* because maximum output is not being obtained from the available resources—perhaps because the assembly line is not operating at its capacity. Tesla might like to be beyond the frontier—at a point like G, where it would be producing 60 of its original models and 50 of its Model 3s per day—but points beyond the production possibilities frontier are *unattainable*, given the firm’s current resources. To produce the combination at G, Tesla would need more machines and more workers.

Notice that if Tesla is producing efficiently and is on the production possibilities frontier, the only way to produce one more Model 3 is to produce one less of its original models. Recall from Chapter 1 that the **opportunity cost** of any activity is the highest-valued alternative that must be given up to engage in that activity. For Tesla, the opportunity cost of producing one more Model 3 is the number of original models the company will not be able to produce because it has shifted those resources to producing the additional Model 3. For example, if Tesla moves from point B to point C, the opportunity cost of producing 20 more Model 3s per day is the 20 fewer original models that it can produce.

What point on the production possibilities frontier is best? We can’t tell without further information. As we saw in the chapter opener, Elon Musk was determined to increase the resources the firm was devoting to Model 3s, so the company is likely to choose a point closer to E. If Musk had been more content to focus on producing the original models, the company would have chosen a point closer to A.

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

## Solved Problem 2.1

### Analyzing Trade-offs Using a Production Possibilities Frontier for Tesla Motors

Suppose, for simplicity, that during any given week, the machinery and number of workers at Tesla Motors's Fremont plant cannot be increased. So the number of original models or Model 3s the company can produce during the week depends on how many hours are devoted to assembling each of the different models. Assume that Model 3s are more difficult to assemble, so if Tesla devotes an hour to assembling its original Model S or Model X, it will produce 15 vehicles, but if Tesla devotes an hour to producing Model 3s, it will produce only 10 vehicles. Assume that the plant can run for 8 hours per day.

- a. Use the information given to fill in the missing cells in the following table.

| Choice | Hours Spent Making |          | Quantity Produced per Day |          |
|--------|--------------------|----------|---------------------------|----------|
|        | Original Models    | Model 3s | Original Models           | Model 3s |
| A      | 8                  | 0        |                           |          |
| B      | 7                  | 1        |                           |          |
| C      | 6                  | 2        |                           |          |
| D      | 5                  | 3        |                           |          |
| E      | 4                  | 4        |                           |          |
| F      | 3                  | 5        |                           |          |
| G      | 2                  | 6        |                           |          |
| H      | 1                  | 7        |                           |          |
| I      | 0                  | 8        |                           |          |

- b. Use the data in the table to draw a production possibilities frontier graph illustrating Tesla's trade-off between assembling original models and assembling Model 3s. Label the vertical axis "Quantity of original models produced per day." Label the horizontal axis "Quantity of Model 3s produced per day." Make sure to label the values where Tesla's production possibilities frontier intersects the vertical and horizontal axes.
- c. Label the points representing choice D and choice E. If Tesla is at choice D, what is its opportunity cost of making 10 more Model 3s?

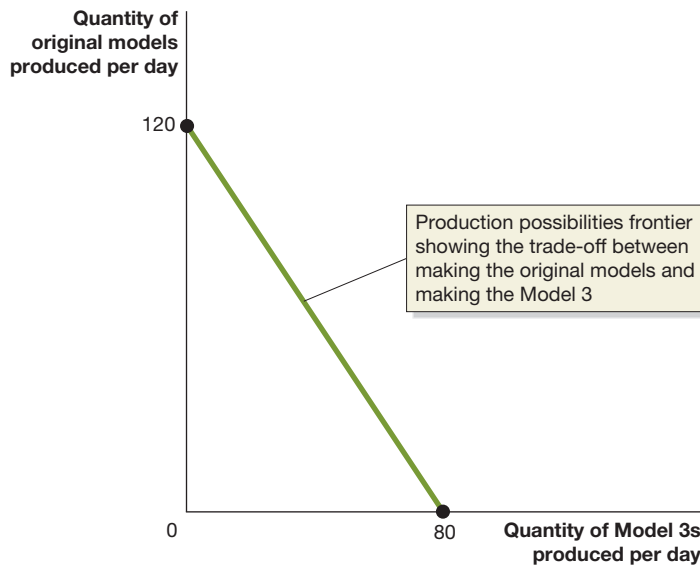
### Solving the Problem

**Step 1: Review the chapter material.** This problem is about using production possibilities frontiers to analyze trade-offs, so you may want to review the section "Graphing the Production Possibilities Frontier."

**Step 2: Answer part (a) by filling in the table.** If Tesla can assemble 15 original models in 1 hour, then with choice A, it can assemble 120 original models and 0 Model 3s. Because Tesla can assemble 10 Model 3s in 1 hour, with choice B, it will produce 105 original models and 10 Model 3s. Using similar reasoning, you can fill in the remaining cells in the table as follows:

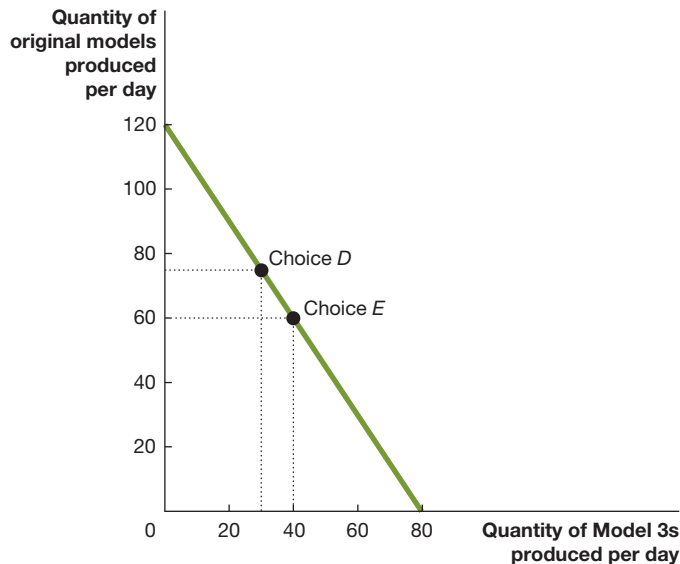
| Choice | Hours Spent Making |          | Quantity Produced per Day |          |
|--------|--------------------|----------|---------------------------|----------|
|        | Original Models    | Model 3s | Original Models           | Model 3s |
| A      | 8                  | 0        | 120                       | 0        |
| B      | 7                  | 1        | 105                       | 10       |
| C      | 6                  | 2        | 90                        | 20       |
| D      | 5                  | 3        | 75                        | 30       |
| E      | 4                  | 4        | 60                        | 40       |
| F      | 3                  | 5        | 45                        | 50       |
| G      | 2                  | 6        | 30                        | 60       |
| H      | 1                  | 7        | 15                        | 70       |
| I      | 0                  | 8        | 0                         | 80       |

**Step 3:** Answer part (b) by drawing the **production possibilities frontier graph**. Using the data from the table in step 2, you should draw a graph that looks like this:



If Tesla devotes all 8 hours to assembling original models, it will produce 120 of them. Therefore, Tesla's production possibilities frontier will intersect the vertical axis at 120 original models produced. If Tesla devotes all 8 hours to assembling Model 3s, it will produce 80 of them. Therefore, Tesla's production possibilities frontier will intersect the horizontal axis at 80 Model 3s produced.

**Step 4:** Answer part (c) by **labeling choices D and E on your graph**. The points for choices D and E can be plotted using the information from the table:



Moving from choice D to choice E increases Tesla's production of Model 3s by 10 but lowers its production of original models by 15. Therefore, Tesla's opportunity cost of producing 10 more Model 3s is producing 15 fewer original models.

**Your Turn:** For more practice, do related problem 1.10 at the end of this chapter.



## Increasing Marginal Opportunity Costs

We can use the production possibilities frontier (PPF) to explore issues concerning the economy as a whole. Suppose we divide all the goods and services produced in the economy into just two types: military goods and civilian goods. In Figure 2.2, tanks represent military goods and automobiles represent civilian goods. If all the country's resources are devoted to producing military goods, 400 tanks can be produced in one year. If all resources are devoted to producing civilian goods, 500 automobiles can be produced in one year. Devoting resources to producing both goods results in the economy being at other points along the PPF.

Notice that this PPF is bowed outward rather than being a straight line. Because the frontier is bowed out, the opportunity cost of automobiles in terms of tanks depends on where the economy currently is on the PPF. For example, to increase automobile production from 0 to 200—moving from point A to point B—the economy has to give up only 50 tanks. But to increase automobile production by another 200 vehicles—moving from point B to point C—the economy has to give up 150 tanks.

As the economy moves down the PPF, it experiences *increasing marginal opportunity costs* because increasing automobile production by a given quantity requires larger and larger decreases in tank production. Increasing marginal opportunity costs occur because some workers, machines, and other resources are better suited to one use than to another. At point A, some resources that are well suited to producing automobiles—such as workers who have years of experience on automobile assembly lines—are now producing tanks. Shifting these resources into producing automobiles by moving from point A to point B allows a substantial increase in automobile production without much loss of tank production. But as the economy moves down the PPF, more and more resources that are better suited to tank production are switched to automobile production. As a result, the increases in automobile production become increasingly smaller, while the decreases in tank production become increasingly larger. We would expect in most situations that PPFs will be bowed outward rather than linear, as we assumed in the Tesla example discussed earlier.

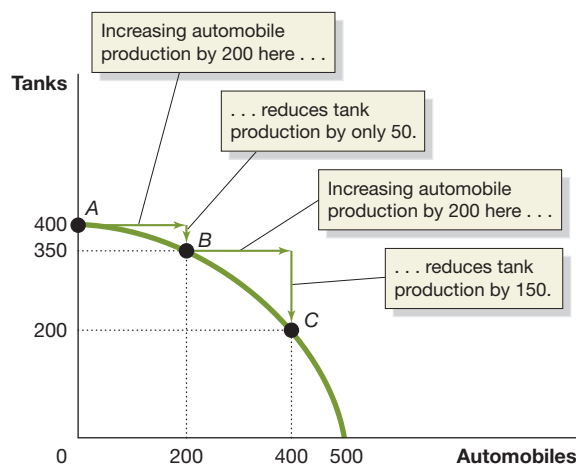
The idea of increasing marginal opportunity costs illustrates an important economic concept: *The more resources already devoted to an activity, the smaller the payoff to devoting additional resources to that activity.* For example:

- The more hours you have already spent studying economics, the smaller the increase in your test grade from each additional hour you spend—and the greater the opportunity cost of using the hour in that way.
- The more funds a firm has devoted to research and development during a given year, the smaller the amount of useful knowledge it receives from each additional dollar spent—and the greater the opportunity cost of using the funds in that way.

Figure 2.2

### Increasing Marginal Opportunity Costs

As the economy moves down the production possibilities frontier, it experiences *increasing marginal opportunity costs* because increasing automobile production by a given quantity requires larger and larger decreases in tank production. For example, to increase automobile production from 0 to 200—moving from point A to point B—the economy has to give up only 50 tanks. But to increase automobile production by another 200 vehicles—moving from point B to point C—the economy has to give up 150 tanks.



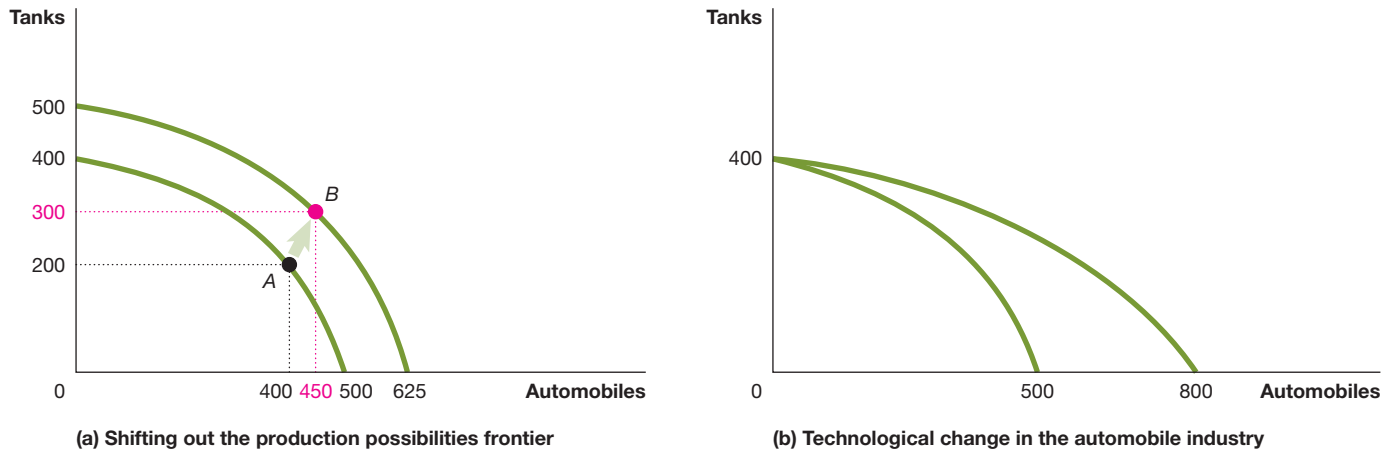


Figure 2.3 **Economic Growth**

Panel (a) shows that as more economic resources become available and technological change occurs, the economy can move from point A to point B, producing more tanks and more automobiles. Panel (b) shows the results of technological change in the automobile industry that increases the quantity

of vehicles workers can produce per year while leaving unchanged the maximum quantity of tanks they can produce. Outward shifts in the production possibilities frontier represent *economic growth*.

- The more funds the federal government spends providing tax breaks to buyers of electric cars during a given year, the smaller the reduction in pollution from each additional dollar spent—and, once again, the greater the opportunity cost of using the funds in that way.

## Economic Growth

At any given time, the total resources available to any economy are fixed. For example, if the United States produces more automobiles, it must produce less of something else—tanks in our example. The *capital stock* is the amount of machinery and other physical capital available in an economy. Over time, the resources available to an economy may increase because both the labor force and the capital stock increase. When the amount of resources increases, the economy's production possibilities frontier shifts outward, making it possible to produce both more automobiles and more tanks. Panel (a) of Figure 2.3 shows that over time, the economy can move from point A to point B, producing more tanks and more automobiles.

Technological change makes it possible to produce more goods with the same number of workers and the same amount of machinery, which also shifts the PPF outward. Technological change may not affect all sectors equally. Panel (b) of Figure 2.3 shows the results of technological change in the automobile industry that increases the quantity of automobiles workers can produce per year while leaving unchanged the quantity of tanks they can produce.

Outward shifts in the PPF represent **economic growth** because they allow the economy to increase the production of goods and services, which ultimately raises the standard of living. In the United States and other high-income countries, the market system has aided the process of economic growth, which over the past 200 years has greatly increased the well-being of the average person.

**Economic growth** The ability of an economy to produce increasing quantities of goods and services.

## 2.2

## Comparative Advantage and Trade

**LEARNING OBJECTIVE:** Describe comparative advantage and explain how it serves as the basis for trade.

We can use the concepts of the production possibilities frontier and opportunity cost to understand the basic economic activity of *trade*. Markets are fundamentally about **trade**, which is the act of buying and selling. Sometimes we trade directly, as when children

**Trade** The act of buying and selling.

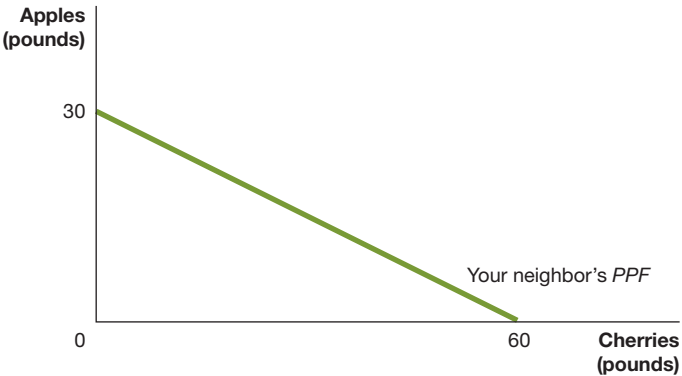
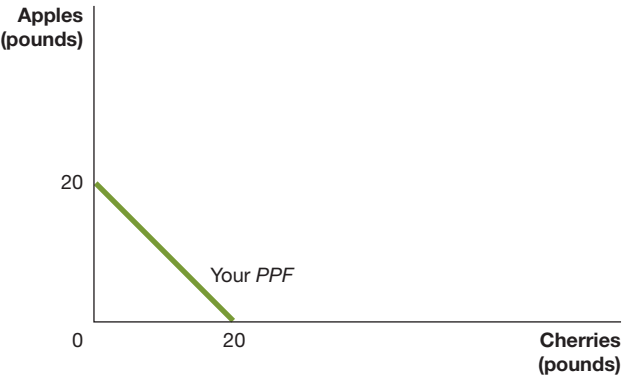
trade one Pokémon card for another one. But often we trade indirectly: We sell our labor services as, say, an accountant, a salesperson, or a nurse for money, and then we use the money earned to buy goods and services. Although in these cases trade takes place indirectly, ultimately the accountant, salesperson, or nurse is trading his or her services for food, clothing, and other goods and services. 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.

**Specialization and Gains from Trade**

Consider the following situation: You and your neighbor both have fruit trees on your properties. Initially, suppose you have only apple trees and your neighbor has only cherry trees. In this situation, if you both like apples and cherries, there is an obvious opportunity for both of you to gain from trade: You trade some of your apples for some of your neighbor’s cherries, and the trade makes you both better off. But what if there are apple and cherry trees growing on both of your properties? In that case, there can still be gains from trade. For example, your neighbor might be very good at picking apples, and you might be very good at picking cherries. It would make sense for your neighbor to concentrate on picking apples and for you to concentrate on picking cherries. You can then trade some of the cherries you pick for some of the apples your neighbor picks. But what if your neighbor is actually better at picking *both* apples and cherries than you are?

We can use production possibilities frontiers (PPFs) to show how your neighbor can benefit from trading with you *even though she is better than you are at picking both apples and cherries*. (For simplicity, and because it will not affect the conclusions we draw, we will assume that the PPFs in this example are straight lines.) The table in Figure 2.4 shows how many pounds of apples and how many pounds of cherries you and your neighbor can pick in one week. We can use the data in the table to construct PPFs for you and your neighbor. Panel (a) shows your PPF. If you devote all your time to picking apples, you can

|                                     | You       |           | Your Neighbor |           |
|-------------------------------------|-----------|-----------|---------------|-----------|
|                                     | Apples    | Cherries  | Apples        | Cherries  |
| Devote all time to picking apples   | 20 pounds | 0 pounds  | 30 pounds     | 0 pounds  |
| Devote all time to picking cherries | 0 pounds  | 20 pounds | 0 pounds      | 60 pounds |



**Figure 2.4    Production Possibilities for You and Your Neighbor, without Trade**

The table shows how many pounds of apples and how many pounds of cherries you and your neighbor can each pick in one week. We can use the data from the table to construct PPFs for you and your neighbor. Panel (a) shows your PPF. If you devote all your time to picking apples and none to picking cherries, you can pick 20 pounds. If you devote all your time to picking cherries, you can pick 20 pounds. Panel (b) shows that if your neighbor devotes all her time to picking apples, she can pick 30 pounds. If she devotes all her time to picking cherries, she can pick 60 pounds.

pick 20 pounds of apples per week. If you devote all your time to picking cherries, you can pick 20 pounds of cherries per week. Panel (b) shows that if your neighbor devotes all her time to picking apples, she can pick 30 pounds. If she devotes all her time to picking cherries, she can pick 60 pounds.

The PPFs in Figure 2.4 show the combinations of apples and cherries you and your neighbor can consume *without trade*. Suppose that when you don't trade with your neighbor, you pick and consume 8 pounds of apples and 12 pounds of cherries per week. This combination of apples and cherries is represented by point A in panel (a) of Figure 2.5. When your neighbor doesn't trade with you, she picks and consumes 9 pounds of apples and 42 pounds of cherries per week. This combination of apples and cherries is represented by point C in panel (b).

After years in which you each pick and consume your own apples and cherries, suppose your neighbor makes the following proposal: Next week she will trade you 15 pounds of her cherries for 10 pounds of your apples. Should you accept this proposal? As we can see in Figure 2.5, you should accept because you will end up with more apples and more cherries to consume. To take advantage of her proposal, you should specialize in picking only apples rather than splitting your time between picking apples and picking cherries. We know specializing will allow you to pick 20 pounds of apples. You can trade 10 pounds of apples to your neighbor for 15 pounds of her cherries. The result is that you will be able to consume 10 pounds of apples and 15 pounds of cherries (point B in panel (a) of Figure 2.5). You are clearly better off as a result of trading with your neighbor: You can now consume 2 more pounds of apples and 3 more pounds of cherries than you were consuming without trading. You have moved beyond your PPF!

Your neighbor has also benefited from the trade. By specializing in picking only cherries, she can pick 60 pounds. She trades 15 pounds of cherries to you for 10 pounds of apples. She can then consume 10 pounds of apples and 45 pounds of cherries (point D in panel (b) of Figure 2.5). This combination is 1 more pound of apples and 3 more pounds of cherries than she was consuming before trading with you. She also has moved beyond her PPF. Table 2.1 summarizes the changes in production and consumption that result from your trade with your neighbor. (In this example, we chose one specific rate of trading cherries for apples—15 pounds of cherries for 10 pounds of apples. There are, however, many other rates of trading cherries for apples that would also make you and your neighbor better off.)

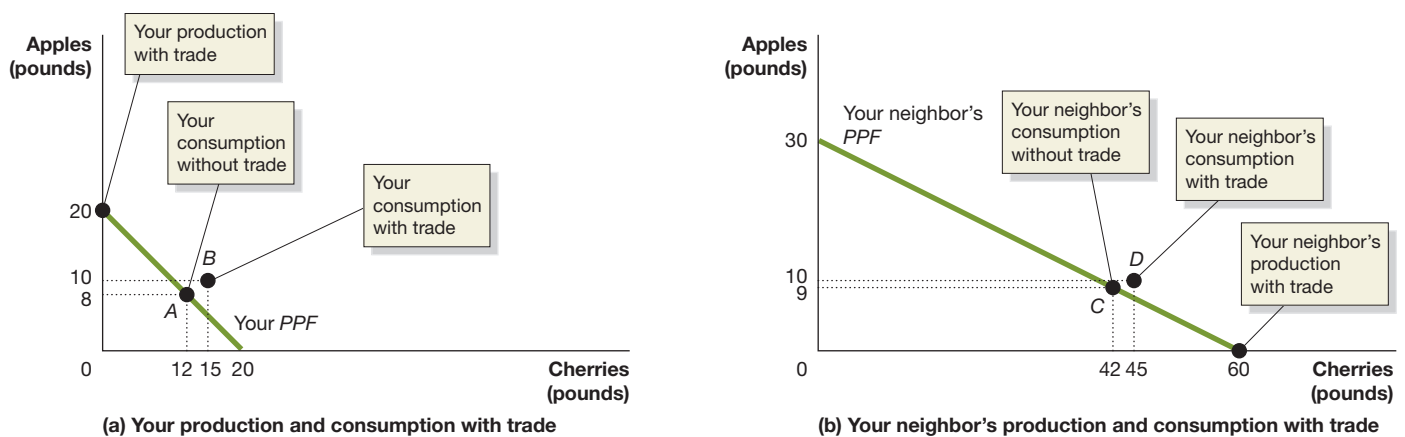


Figure 2.5 **Gains from Trade**

When you don't trade with your neighbor, you pick and consume 8 pounds of apples and 12 pounds of cherries per week—point A in panel (a). When your neighbor doesn't trade with you, she picks and consumes 9 pounds of apples and 42 pounds of cherries per week—point C in panel (b). If you specialize in picking apples, you can pick 20 pounds. If your neighbor specializes in picking cherries, she can pick 60 pounds. If you trade 10 pounds

of your apples for 15 pounds of your neighbor's cherries, you will be able to consume 10 pounds of apples and 15 pounds of cherries—point B in panel (a). Your neighbor can now consume 10 pounds of apples and 45 pounds of cherries—point D in panel (b). You and your neighbor are both better off as a result of the trade.

Table 2.1

A Summary of the Gains from Trade

|  | You                   |                         | Your Neighbor         |                         |
|--|-----------------------|-------------------------|-----------------------|-------------------------|
|  | Apples<br>(in pounds) | Cherries<br>(in pounds) | Apples<br>(in pounds) | Cherries<br>(in pounds) |
| Production and consumption without trade | 8                     | 12                      | 9                     | 42                      |
| Production with trade                    | 20                    | 0                       | 0                     | 60                      |
| Consumption with trade                   | 10                    | 15                      | 10                    | 45                      |
| Gains from trade (increased consumption) | 2                     | 3                       | 1                     | 3                       |

**Absolute advantage** 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.

Absolute Advantage versus Comparative Advantage

It may be surprising that in the preceding example, your neighbor benefits from trading with you even though she is better than you at picking both apples and cherries. **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. Your neighbor has an absolute advantage over you in picking both apples and cherries because she can pick more of each fruit than you can in the same amount of time. Although it seems that your neighbor should pick her own apples and her own cherries, we have just seen that she is better off specializing in picking cherries and leaving picking apples to you.

We can consider further why both you and your neighbor benefit from specializing in picking only one fruit. First, think about the opportunity cost to each of you of picking the two fruits. We saw from the PPF in Figure 2.4 that if you devoted all your time to picking apples, you would be able to pick 20 pounds of apples per week. As you move down your PPF and shift time away from picking apples to picking cherries, you have to give up 1 pound of apples for each pound of cherries you pick; the slope of your PPF is  $-1$ . (For a review of calculating slopes, see the appendix to Chapter 1.) Therefore, your opportunity cost of picking 1 pound of cherries is 1 pound of apples. By the same reasoning, your opportunity cost of picking 1 pound of apples is 1 pound of cherries. Your neighbor's PPF has a different slope, so she faces a different trade-off: As she shifts time from picking apples to picking cherries, she has to give up 0.5 pound of apples for every 1 pound of cherries she picks; the slope of your neighbor's PPF is  $-0.5$ . As she shifts time from picking cherries to picking apples, she gives up 2 pounds of cherries for every 1 pound of apples she picks. Therefore, her opportunity cost of picking 1 pound of apples is 2 pounds of cherries, and her opportunity cost of picking 1 pound of cherries is 0.5 pound of apples.

Table 2.2 summarizes the opportunity costs for you and your neighbor of picking apples and cherries. Note that even though your neighbor can pick more apples in a week than you can, the *opportunity cost* of picking apples is higher for her than for you because when she picks apples, she gives up more cherries than you do. So, even though she has an absolute advantage over you in picking apples, it is more costly for her to pick apples than it is for you. The table also shows that her opportunity cost of picking cherries is lower than yours. **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. In picking apples, your neighbor has an *absolute advantage* over you, while you have a *comparative advantage* over her. Your neighbor has both an absolute advantage and a comparative advantage over you in picking cherries. As we have seen, you are better off specializing in picking apples, and your neighbor is better off specializing in picking cherries.

Table 2.2

Opportunity Costs of Picking Apples and Cherries

|               | Opportunity Cost of Picking 1 Pound of Apples | Opportunity Cost of Picking 1 Pound of Cherries |
|---------------|---|---|
| You           | 1 pound of cherries                           | 1 pound of apples                               |
| Your neighbor | 2 pounds of cherries                          | 0.5 pound of apples                             |



Comparative Advantage and the Gains from Trade

We have just arrived at an important economic principle: *The basis for trade is comparative advantage, not absolute advantage.* The fastest apple pickers do not necessarily do the most apple picking. If the fastest apple pickers have a comparative advantage in some other activity—picking cherries, playing professional football, or being industrial engineers—they are better off specializing in that activity. Individuals, firms, and countries are better off if they specialize in producing goods and services for which they have a comparative advantage and obtain the other goods and services they need by trading. We will return to the important concept of comparative advantage in Chapter 9, which is devoted to the subject of international trade.

Don't Let This Happen to You

Don't Confuse Absolute Advantage and Comparative Advantage

First, make sure you know the definitions:

- **Absolute advantage.** 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. In our example, your neighbor has an absolute advantage over you in both picking apples and picking cherries.
- **Comparative advantage.** The ability of an individual, a firm, or a country to produce a good or service at a lower opportunity cost than competitors. In our example, your neighbor has a comparative advantage in picking

cherries, but you have a comparative advantage in picking apples.

Keep these two key points in mind:

1. It is possible to have an absolute advantage in producing a good or service without having a comparative advantage. This is the case with your neighbor picking apples.
2. It is possible to have a comparative advantage in producing a good or service without having an absolute advantage. This is the case with your picking apples.

**Your Turn:** Test your understanding by doing related problem 2.6 at the end of this chapter.

Solved Problem 2.2  
Comparative Advantage and the Gains from Trade

Suppose that Canada and the United States both produce maple syrup and honey, which are sold for the same price in both countries. These are the combinations of the two goods that each country can produce in one day, using the same amounts of capital and labor:

| Canada          |                       | United States   |                       |
|-----------------|-----------------------|-----------------|-----------------------|
| Honey (in tons) | Maple Syrup (in tons) | Honey (in tons) | Maple Syrup (in tons) |
| 0               | 60                    | 0               | 50                    |
| 10              | 45                    | 10              | 40                    |
| 20              | 30                    | 20              | 30                    |
| 30              | 15                    | 30              | 20                    |
| 40              | 0                     | 40              | 10                    |
|                 |                       | 50              | 0                     |

- a. Which country has a comparative advantage in producing maple syrup? Which country has a comparative advantage in producing honey?
- b. Suppose that Canada is currently producing 30 tons of honey and 15 tons of maple syrup per day, and the United States is currently producing 10 tons of honey and 40 tons of maple syrup per day. Demonstrate that Canada and the United States can both be better off if they specialize in producing only one good and trade for the other.
- c. Illustrate your answer to part (b) by drawing a PPF for Canada and a PPF for the United States. Show on your PPFs the combinations of honey and maple syrup produced and consumed in each country before and after trade.

## Solving the Problem

**Step 1: Review the chapter material.** This problem is about comparative advantage, so you may want to review the section “Absolute Advantage versus Comparative Advantage.”

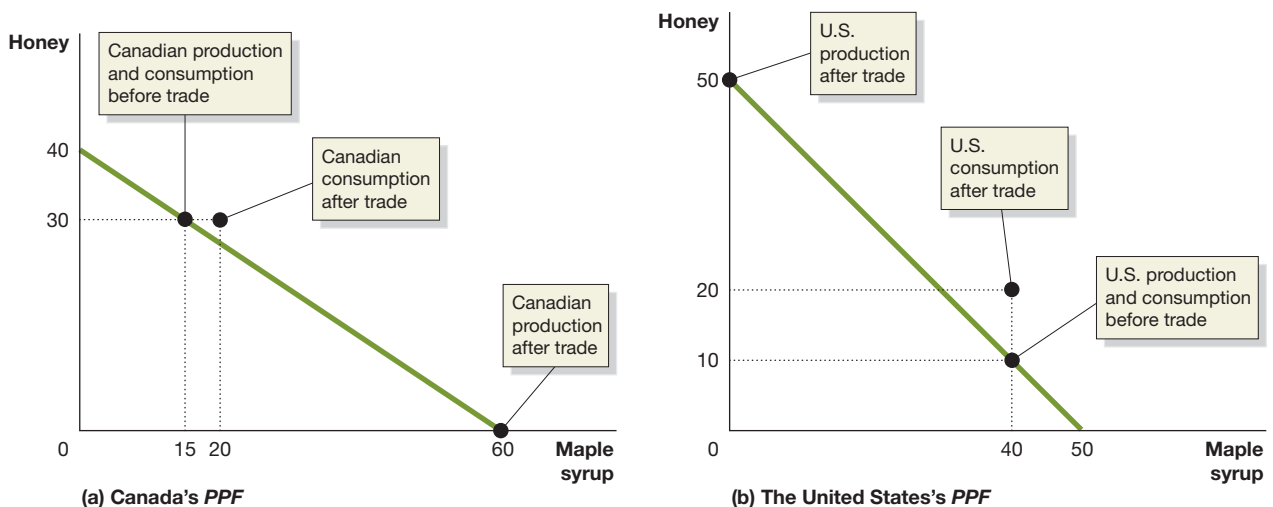
**Step 2: Answer part (a) by calculating which country has a comparative advantage in each activity.** Remember that a country has a comparative advantage in producing a good if it can produce the good at the lowest opportunity cost. When Canada produces 1 more ton of honey, it produces 1.5 tons less of maple syrup. When the United States produces 1 more ton of honey, it produces 1 ton less of maple syrup. Therefore, for the United States, the opportunity cost of producing honey—1 ton of maple syrup—is lower than for Canada—1.5 tons of maple syrup. When Canada produces 1 more ton of maple syrup, it produces 0.67 ton less of honey. When the United States produces 1 more ton of maple syrup, it produces 1 ton less of honey. Therefore, Canada’s opportunity cost of producing maple syrup—0.67 ton of honey—is lower than that of the United States—1 ton of honey. We can conclude that the United States has a comparative advantage in the production of honey, and Canada has a comparative advantage in the production of maple syrup.

**Step 3: Answer part (b) by showing that specialization makes Canada and the United States better off.** We know that Canada and the United States should each specialize where it has a comparative advantage. If both countries specialize, Canada will produce 60 tons of maple syrup and 0 tons of honey, and the United States will produce 0 tons of maple syrup and 50 tons of honey. After both countries specialize, the United States could then trade 30 tons of honey to Canada for 40 tons of maple syrup. (Other mutually beneficial trades are possible as well.) We can summarize the results in a table:

|               | Before Trade    |                       | After Trade     |                       |
|---------------|-----------------|-----------------------|-----------------|-----------------------|
|               | Honey (in tons) | Maple Syrup (in tons) | Honey (in tons) | Maple Syrup (in tons) |
| Canada        | 30              | 15                    | 30              | 20                    |
| United States | 10              | 40                    | 20              | 40                    |

The United States is better off after trade because it can consume the same amount of maple syrup and 10 more tons of honey. Canada is better off after trade because it can consume the same amount of honey and 5 more tons of maple syrup.

**Step 4: Answer part (c) by drawing the PPFs.**

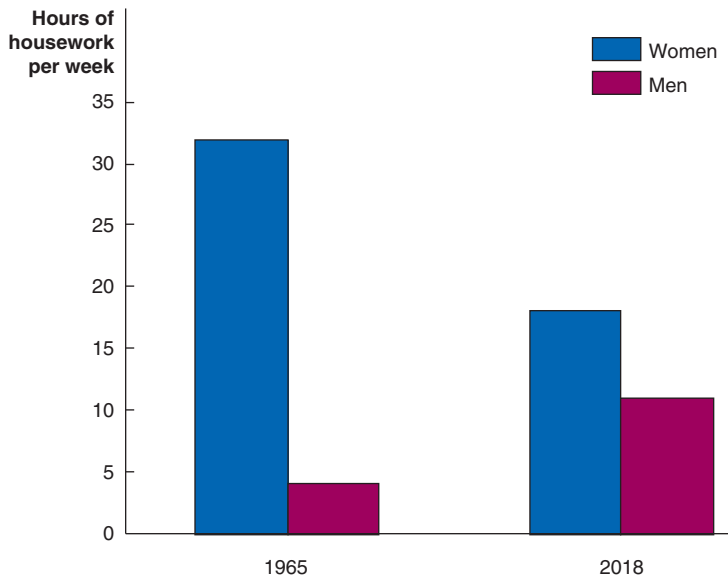


**Your Turn:** For more practice, do related problems 2.7 and 2.8 at the end of this chapter.

## Apply the Concept

### Comparative Advantage, Opportunity Cost, and Housework

Among roommates, married couples, and other people living together, dividing up the household chores can be a source of stress. Traditionally with married couples, women did most of the housework, such as preparing meals, cleaning, and doing laundry. As the bar graph shows, in 1965, married women with children averaged about 32 hours of housework per week, while married men averaged only 4 hours. In 2018, married women averaged about 18 hours of housework, while married men averaged about 11 hours.



Chris Clinton/Photodisc/Getty Images

*What's the most efficient way to divide up household chores?*

Housework doesn't seem to be part of buying, selling, and the usual topics of business and economics. In fact, we can use basic economic concepts to analyze housework. Consider first the most efficient way to divide up household chores. Suppose Jack and Jill need to decide how they will get the cooking and laundry done. Assume that Jack has an absolute advantage over Jill in both chores, but he has a big advantage over Jill in cooking—he takes much less time to prepare very tasty meals—but is only a little faster than Jill in doing laundry. In other words, assuming that they have the same amount of time available to do housework, Jack has a comparative advantage in cooking, while Jill has a comparative advantage in doing laundry. So rather than Jack and Jill both doing some of the cooking and some of the laundry, they would be better off if Jack follows his comparative advantage and does all the cooking, while Jill follows her comparative advantage and does all the laundry.

Economics can also provide some insight into the decline in the number of hours spent on housework since the 1960s. Combined, men and women now spend more than 15 percent fewer hours on housework. This decline has been partly driven by technology, particularly improvements in household appliances, such as dishwashers and microwave ovens. The decline in the number of hours women devote to housework also reflects the greater job opportunities available to women today than in the 1960s. The opportunity cost to a woman of spending time on housework and childcare is the wage she gives up by not spending that time in paid work. If a woman could work for an hour at a wage of \$20 but spends that hour doing household chores, the opportunity cost of the time spent on chores is \$20. As job opportunities for women and the wages those jobs pay have increased, so has the opportunity cost of doing housework. So in addition to taking advantage of improved appliances, many families have found that the cost of hiring specialists in household chores, such as cleaning services and lawn care services, is lower than the opportunity cost of the wife (or husband) performing those chores.

As women's wages have risen relative to men's wages, the opportunity cost to women of doing housework has increased more than has the opportunity cost to men. So we would expect that in addition to women devoting fewer hours to housework, the gap between the hours women and men devote would narrow. In fact, while women are devoting fewer hours to housework than they did in 1965, they now average more than twice as many hours of paid work: an average of 21 hours per week in 2018 compared with an average of only 8 hours per week in 1965.

Of course, changes in social attitudes also help explain changes in how men and women allocate their time. But we have seen that the basic economic concepts of comparative advantage and opportunity cost provide important insights into the not-so-wonderful world of household chores.

**Your Turn:** Test your understanding by doing related problems 2.14 and 2.15 at the end of this chapter.

## 2.3

## The Market System

**LEARNING OBJECTIVE:** Explain the basics of how a market system works.

We have seen that households, firms, and the government face trade-offs and incur opportunity costs because resources are scarce. We have also seen that trade allows people to specialize according to their comparative advantage. By engaging in trade, people can raise their incomes and their standard of living. Of course, trade in the modern world is much more complex than the examples we have considered so far. Trade today involves the decisions of millions of people around the world. How are all of these decisions coordinated? In the United States and most other countries, trade is carried out in markets. Markets also determine the answers to the three fundamental questions discussed in Chapter 1:

1. What goods and services will be produced?
2. How will the goods and services be produced?
3. Who will receive the goods and services produced?

Recall that 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. Markets take many forms: They can be physical places, such as the pizza parlors in your city or the New York Stock Exchange, or virtual places, such as eBay. In a market, the buyers are demanders of goods or services, and the sellers are suppliers of goods or services. Households and firms interact in two types of markets: product markets and factor markets. **Product markets** are markets for goods—such as smartphones—and services—such as medical treatment. In product markets, households are demanders, and firms are suppliers. **Factor markets** are markets for the *factors of production*. **Factors of production** are the inputs used to make goods and services. Factors of production are divided into four broad categories:

1. *Labor* includes all types of work, from the part-time labor of teenagers working at McDonald's to the work of senior managers at Tesla.
2. *Capital* refers to physical capital, such as computers, office buildings, and machine tools, used to produce other goods.
3. *Natural resources* include land, water, oil, iron ore, and other raw materials (or “gifts of nature”) that are used in producing goods.
4. An *entrepreneur* is someone who operates a business. *Entrepreneurial ability* is the ability to bring together the other factors of production to successfully produce and sell goods and services.

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

**Product market** A market for goods—such as computers—or services—such as medical treatment.

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

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



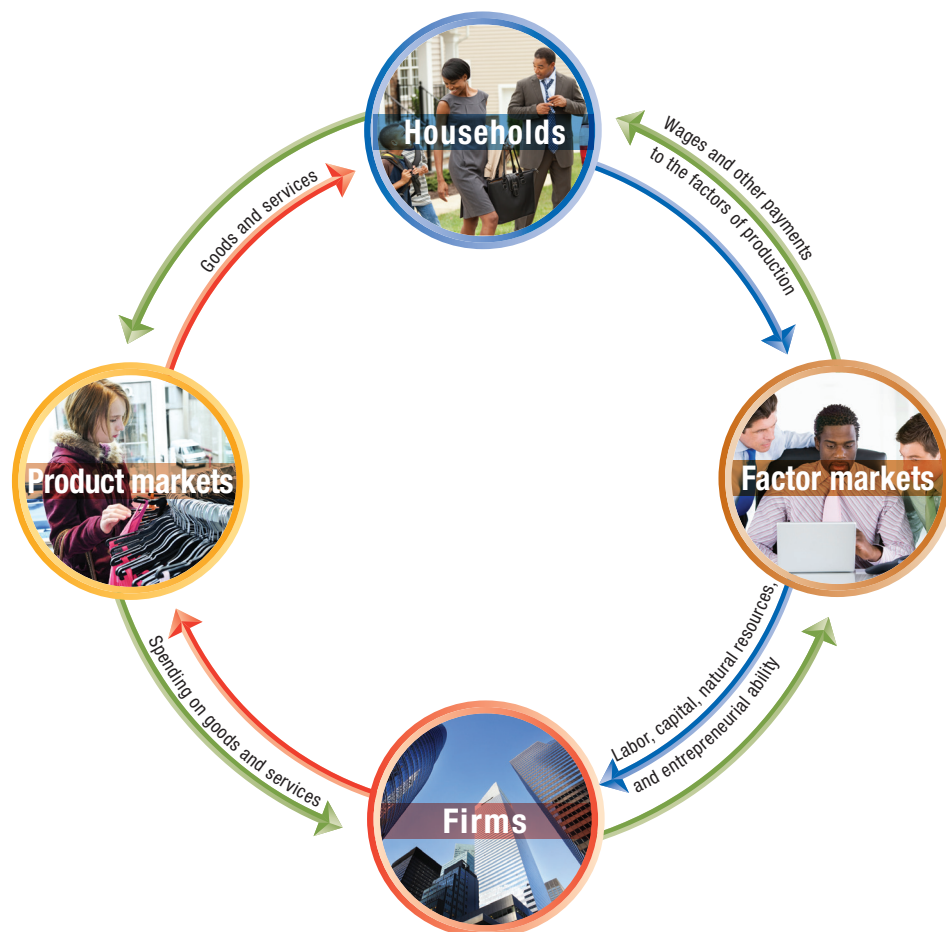
## The Circular Flow of Income

Two key groups participate in markets:

1. **Households** are all the individuals in a home. A household may consist of one person or several persons. Households are suppliers of factors of production—particularly labor—employed by firms to make goods and services. Households use the income they receive from selling the factors of production to purchase the goods and services supplied by firms. We are familiar with households as suppliers of labor because most people earn most of their income by going to work, meaning they are selling their labor services to firms in the labor market. But households own the other factors of production as well, either directly or indirectly, by owning the firms that own these resources. All firms are owned by households. A small firm, such as a neighborhood restaurant, might be owned by one person. A large firm, such as Apple, is owned by millions of households that buy shares of stock in it. When firms pay profits to the people who own them, the firms are paying for using the capital and natural resources that are supplied to them by those owners. So, we can generalize by saying that in factor markets, households are suppliers and firms are demanders.
2. **Firms** are suppliers of goods and services. Firms use the funds they receive from selling goods and services to buy or hire the factors of production needed to make the goods and services.

We can use a simple economic model called the **circular-flow diagram** to see how participants in markets are linked. Figure 2.6 shows that in factor markets, households supply labor and other factors of 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 supplied by firms. Firms produce these goods and services

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



top: Ariel Skelley/Digital Vision/Getty Images; left: Elena Elisseeva/Shutterstock; right: MBI/Alamy Stock Photo; bottom: Mikael Damkier/Shutterstock

Figure 2.6

### The Circular-Flow Diagram

Households and firms are linked together in a circular flow of production, income, and spending. The blue arrows show the flow of the factors of production. In factor markets, households supply labor, entrepreneurial ability, and other factors of production to firms. Firms use these factors of production to make goods and services that they supply to households in product markets. The red arrows show the flow of goods and services from firms to households. The green arrows show the flow of funds. In factor markets, households receive wages and other payments from firms in exchange for supplying the factors of production. Households use these wages and other payments to purchase goods and services from firms in product markets. Firms sell goods and services to households in product markets, and they use the funds to purchase the factors of production from households in factor markets.



using the factors of production supplied by households. In the figure, the blue arrows show the flow of factors of production from households through factor markets to firms. The red arrows show the flow of goods and services from firms through product markets to households. The green arrows show the flow of funds from firms through factor markets to households and the flow of spending from households through product markets to firms.

Like all other economic models, the circular-flow diagram is a simplified version of reality. Figure 2.6 leaves out (1) the role of government, (2) the role of the *financial system*, including banks, and (3) the role of international trade. We will cover these aspects of the circular flow in later chapters. Despite these simplifications, the circular-flow diagram in Figure 2.6 helps us see how product markets, factor markets, and their participants are linked together. One of the great wonders of the market system is that it manages to successfully coordinate the independent activities of so many households and firms.

## The Gains from Free Markets

**Free market** 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.

A **free market** exists when the government places few restrictions on how goods and services can be produced or sold or on how factors of production can be employed. Governments in all modern economies intervene more than is consistent with a fully free market. In that sense, we can think of the free market as a benchmark against which we can judge actual economies. There are relatively few government restrictions on economic activities in the United States, Canada, the countries of Western Europe, Hong Kong, Singapore, and South Korea. So these countries come close to the free market benchmark. In countries such as Cuba, Venezuela, and North Korea, the free market system has been rejected in favor of centrally planned economies with extensive government control over product and factor markets. Countries that come closest to the free market benchmark have been more successful than countries with centrally planned economies in providing their people with rising living standards.

The Scottish philosopher Adam Smith is considered the father of modern economics because his book *An Inquiry into the Nature and Causes of the Wealth of Nations*, published in 1776, was an early and very influential argument for the free market system. Smith was writing at a time when extensive government restrictions on markets were common. In many parts of Europe, the *guild system* prevailed. Under this system, governments would give guilds, or organizations of producers, the authority to control the production of a good. For example, the shoemakers' guild controlled who was allowed to produce shoes, how many shoes they could produce, and what price they could charge. In France, the cloth makers' guild even dictated the number of threads in the weave of the cloth.

Smith argued that such restrictions reduced the income and wealth of a country and its people by restricting the quantity of goods produced. Some people at the time supported the restrictions of the guild system because it was in their financial interest to do so. If you were a member of a guild, the restrictions served to reduce the competition you faced. But other people believed that the alternative to the guild system was economic disorder. Smith argued that these people were wrong and that a country could enjoy a smoothly functioning economic system if firms were freed from restrictions placed on their operations either by guilds or directly by governments.



Claudine Klodien/Alamy Stock Photo

This statue of Adam Smith, the father of modern economics, is located in the Royal Mile market square in Edinburgh, Scotland, in front of Saint Giles Cathedral.

## The Market Mechanism

In Smith's day, defenders of restrictions on how firms operate argued that if, for example, the shoemakers' guild did not control shoe production, either too many or too few shoes would be produced. In contrast, Smith maintained that prices would do a better job of coordinating the activities of buyers and sellers than the guilds could. A key to understanding Smith's argument is the assumption that *individuals usually act in a rational, self-interested way*. In particular, individuals take the actions that are most likely to make themselves better off financially. This assumption of rational, self-interested behavior underlies nearly all economic analysis. In fact, economics can be distinguished from other disciplines that study human behavior—such as sociology and psychology—by its emphasis on the assumption of self-interested behavior. Adam Smith understood—as

economists today understand—that people’s motives can be complex. But when we analyze people in the act of buying and selling, the motivation of financial reward usually provides the best explanation for the actions people take.

For example, suppose that a significant number of consumers switch from buying conventional gasoline-powered cars to buying either gasoline/electric-powered hybrid cars, such as the Toyota Prius, or all-electric cars, such as the Tesla Model 3. Firms will find that they can charge relatively higher prices for hybrid cars and electric cars than they can for gasoline-powered cars. The self-interest of these firms will lead them to respond to consumers’ wishes by producing more hybrid and electric cars and fewer gasoline-powered cars. Or suppose that consumers decide that they want to eat less food containing gluten. Then the prices firms can charge for gluten-free bread and pasta will increase. The self-interest of firms will lead them to produce more of those foods and less regular bread and pasta, which, in fact, is what has happened over the past 10 years.

Note that for the market mechanism to work in response to changes in consumers’ wants, *prices must be flexible*. The *relative price* is the price of one good or service relative to the prices of other goods or services. Changes in relative prices provide information, or a signal, to both consumers and firms. For example:

- Consumers worldwide have increased their demand for cattle and poultry. Because corn is fed to cattle and poultry, prices for corn have increased relative to prices for other crops. Many farmers in the United States received this price signal and responded by increasing the amount of corn they planted and decreasing the amount of soybeans and wheat. One Kansas farmer was quoted as saying, “It seemed to me there was \$100 to \$150 per acre more money in the corn than there was in the beans. That’s the kind of math that a lot of guys were using.” In 2019, the U.S. corn crop was more than 30 percent higher than it had been in 2012.
- Falling prices for DVDs and music CDs were a signal to movie studios and record companies to devote fewer resources to these products and more resources to making movies and music available to stream online.

In the United States today, governments at the federal, state, and local levels set or regulate the prices of only about 10 to 20 percent of goods and services. The prices of other goods and services are free to adjust as consumer preferences change and as costs of production change.

In the case where consumers want more of a product, and in the case where they want less of a product, the market system responds without a guild or the government giving orders about how much to produce or what price to charge. Economists have used Adam Smith’s metaphor of the *invisible hand* to describe how the market leads firms to provide consumers with the goods they want:

It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. . . . [The businessman] intends only his own gain, and he is in this . . . led by an invisible hand to promote an end which was no part of his intention.

Firms respond *individually* to changes in prices by making decisions that *collectively* end up satisfying the preferences of consumers.

## Apply the Concept

### A Story of the Market System in Action: How Do You Make an iPad?

Apple produces the iPad. Because Apple’s headquarters is in Cupertino, California, it seems reasonable to assume that iPads are also manufactured in that state. A poll by the *New York Times* showed that, in fact, a majority of people interviewed believed that iPads are manufactured in the United States, if not specifically in California. Although



Qilai Shen/Bloomberg/Getty Images

*The market coordinates the activities of many people spread around the world who contribute to making an iPad.*

engineers at Apple designed the iPad, the company produces none of the components of the iPad, and it doesn’t assemble the components into finished products. Far from being produced entirely by one company in one country, the iPad requires the coordinated activities of thousands of workers and dozens of firms spread around the world.

Foxconn, which is based in Taiwan, assembles most iPads in factories in China and Brazil and ships them to Apple for sale in the United States. Pegatron, another Taiwanese firm with factories in China, also assembles some iPads. Although Foxconn and Pegatron do the final assembly, they don’t make any of the components and, in fact, charge Apple only about \$6 for assembling each iPad.

Multiple firms can supply a particular component for an iPad model. The following table lists just *some* of the firms that have supplied Apple with iPad components.

| Firm                   | Location of the Firm          | iPad Component Supplied                           |
|------------------------|-------------------------------|---|
| AKM                    | Japan                         | Motion sensor                                     |
| AU Optronics           | Taiwan                        | Display   |
| Avago Technologies     | United States (Pennsylvania)  | Wireless technology                               |
| Bosch Sensortec        | Germany                       | Accelerometer                                     |
| Broadcom               | United States (California)    | Touchscreen controller and wireless chip          |
| Cirrus Logic           | United States (Texas)         | Audio chip  |
| Corning                | United States (New York)      | Glass screen cover                                |
| Dialog Semiconductor   | Germany                       | Power management chip                             |
| Elpida                 | United States (Idaho)         | System memory                                     |
| Infineon Technologies  | Germany                       | Semiconductors                                    |
| LG Electronics         | South Korea                   | Display   |
| NXP                    | Netherlands                   | NFC controller                                    |
| Parade Technologies    | Taiwan                        | Timing controller                                 |
| Qualcomm               | United Kingdom                | Wireless section                                  |
| Samsung                | South Korea                   | Display, flash memory, and applications processor |
| Sharp                  | Japan                         | Display   |
| Skyworks Solutions     | United States (Massachusetts) | Wireless technology                               |
| STMicroelectronics     | France/Italy                  | Motion sensors                                    |
| Texas Instruments      | United States (Texas)         | Touchscreen controller                            |
| Toshiba                | Japan                         | Flash memory                                      |
| TriQuint Semiconductor | United States (Oregon)        | Wireless technology                               |

But even more firms are involved because each of these suppliers in turn relies on its own suppliers. For example, Broadcom designs the touchscreen controller for the iPad and supplies it to Apple, but it does not manufacture the components of the controller or assemble them. To manufacture the components, Broadcom relies on SilTerra, based in Malaysia; SMIC, based in mainland China; and Taiwan Semiconductor Manufacturing Corporation (TSMC) and UMC, based in Taiwan. TSMC’s factories are for the most part not in Taiwan but in mainland China and Eastern Europe. To assemble the components, Broadcom uses several companies, including Amkor Technology, based in Chandler, Arizona, and STATS ChipPAC, based in Singapore.

All told, an iPad contains hundreds of parts that are designed, manufactured, and assembled by firms around the world. Many of these firms are not even aware of which other firms are also producing components for the iPad. Few of the managers of these

firms have met managers of the other firms or shared knowledge of how their particular components are produced. In fact, no one person—from Tim Cook, the chief executive officer of Apple, on down—possesses the knowledge of how to produce all the components that are assembled into an iPad. Instead, the invisible hand of the market has led these firms to contribute their knowledge and resources to the process that ultimately results in an iPad available for sale in a store in the United States. Apple has so efficiently organized the production process that you can order a custom iPad with a personal engraving and have it delivered from an assembly plant in China or Brazil to your doorstep in the United States in as little as three days.

**Your Turn:** Test your understanding by doing related problems 3.8 and 3.9 at the end of this chapter.

## The Role of the Entrepreneur in the Market System

*Entrepreneurs* are central to a market system. An **entrepreneur** is someone who operates a business. Entrepreneurs first determine what goods and services they believe consumers want and then decide how to produce those goods and services most profitably, using the available factors of production—labor, capital, and natural resources. Successful entrepreneurs effectively search out opportunities to provide new goods and services. New technology frequently creates these opportunities. Consumers and existing businesses often do not at first realize that the new technology makes new products feasible. For example, even after the development of the internal combustion engine had made automobiles practicable, Henry Ford remarked: “If I had asked my customers what they wanted, they would have said a faster horse.” Because consumers often cannot evaluate a new product before it exists, some of the most successful entrepreneurs, such as the late Steve Jobs of Apple, rarely use *focus groups*, or meetings with consumers in which the consumers are asked what new products they would like to see. Instead, entrepreneurs think of products that consumers may not even realize they need (in Jobs’s case, an MP3 player—the iPod—or a tablet computer—the iPad). Entrepreneurs are important to the economy because they are often responsible for making new products widely available to consumers, as Henry Ford did with the automobile and Steve Jobs did with the iPod.

The firms that entrepreneurs found are typically small at first, as Apple and Ford were. Entrepreneurs put their own funds at risk when they start businesses. If they are wrong about what consumers want or about the best way to produce goods and services, they can lose those funds. In fact, it is not unusual for entrepreneurs who eventually achieve great success to fail at first. For instance, early in their careers, both Henry Ford and Sakichi Toyoda, who eventually founded the Toyota Motor Corporation, started companies that quickly failed. Research by Richard Freeman of Harvard University has shown that a typical entrepreneur earns less than an employee at a large firm who has the same education and other characteristics. Few entrepreneurs become billionaires like Marian Ilitch (cofounder of Little Caesars Pizza), Bill Gates (cofounder of Microsoft), or Judy Faulkner (founder of Epic, the leading provider of medical records software).

Entrepreneurs make vital contributions to economic growth through their roles in responding to consumer wants and introducing new products. Government policies that encourage entrepreneurship are also likely to increase economic growth and raise the standard of living. In the next section, we consider the legal framework required for a successful market in which entrepreneurs can succeed.

## The Legal Basis of a Successful Market System

In a free market, government does not restrict how firms produce and sell goods and services or how they employ factors of production. But the absence of such government restrictions is not enough for the market system to succeed in providing people with a

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



high standard of living. Government has to take active steps to provide a *legal environment* that will allow markets to operate efficiently.

**Protection of Private Property** For the market system to work well, individuals must be willing to take risks. Someone with \$250,000 can be cautious and keep it safely in a bank—or even in cash, if the person doesn’t trust banks. But the market system won’t work unless a significant number of people are willing to risk their funds by investing them in businesses. Investing in businesses is risky in any country. Many businesses fail every year in the United States and other high-income countries. But in high-income countries, someone who starts a new business or invests in an existing business doesn’t have to worry that the government, the military, or criminal gangs might decide to seize the business or demand payments for not destroying it. Unfortunately, in many low-income countries, business owners are not well protected from having their businesses seized by the government or from having their profits taken by criminals. Where these problems exist, opening a business can be extremely risky. Cash can be concealed easily, but a business is difficult to conceal or move.

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

**Property rights** are the rights individuals or businesses have to the exclusive use of their property, including the right to buy or sell it. Property can be physical property, such as a store or factory. Property can also be intangible, such as the right to an idea. Two amendments to the U.S. Constitution guarantee property rights: The Fifth Amendment states that the federal government shall not deprive any person “of life, liberty, or property, without due process of law.” The Fourteenth Amendment extends this guarantee to the actions of state governments: “No state . . . shall deprive any person of life, liberty, or property, without due process of law.” Similar guarantees exist in every high-income country. Unfortunately, in many developing countries, such guarantees do not exist or are poorly enforced.

In any modern economy, *intellectual property rights* are very important. Intellectual property includes books, films, software, and ideas for new products or new ways of producing products. To protect intellectual property, the federal government grants a *patent* that gives an inventor—often a firm—the exclusive right to produce and sell a new product for a period of 20 years from the date the patent was filed. For instance, because Apple has a patent on its operating system (iOS) for smartphones and other devices, other firms cannot sell their own versions of Apple’s iOS. The government grants patents to encourage firms to spend money on the research and development necessary to create new products. If other companies could freely use Apple’s iOS, Apple would not have spent the funds necessary to develop it. Just as a new product or a new method of making a product receives patent protection, new 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 exclusive right for 70 years after the death of the creator.

In providing copyright protection for only a limited time, Congress provides economic incentives to creators while eventually—after the period of copyright has ended—allowing the creators’ works to be freely available to others. The longer the period of copyright, the longer the creator (or the creators’ family) can restrict others from using the work.

**Enforcement of Contracts and Property Rights** Business activity often involves someone agreeing to carry out some action in the future. For example, you might borrow \$20,000 to buy a car and promise the bank—by signing a loan contract—that you will pay back the money over the next five years. Or Facebook might sign a licensing agreement with a small technology company, agreeing to use that company’s technology for a period of several years in return for a fee. Usually these agreements take the form of legal contracts. For the market system to work, businesses and individuals have to rely on these contracts being carried out. If one party to a legal contract does not fulfill its obligations—perhaps a small company that promised Facebook exclusive use of its technology begins licensing it to other companies—the other party can go to court to have the agreement enforced. Similarly, if you believe that the federal or state government



has violated your property rights under the Fifth or Fourteenth Amendments, you can go to court to have your rights enforced.

But going to court to enforce a contract or property rights will be successful only if the court system is independent and judges are able to make impartial decisions on the basis of the law. In the United States and other high-income countries, the court systems are able to make their decisions based on the law because they have enough independence from other parts of the government and enough protection from intimidation by outside forces—such as criminal gangs. In many developing countries, the court systems lack this independence and will not provide a remedy if the government violates property rights or if a person with powerful political connections decides to violate a business contract.

If property rights are not well enforced, fewer goods and services will be produced. This reduces economic efficiency, leaving the economy inside its production possibilities frontier.

## Apply the Concept

### What Is Socialism?

For the past 200 years, the main alternative to the market system has been socialism. But what is socialism? One influential version of socialism is associated with the writings of the German philosopher and economist Karl Marx. In his book *Das Kapital*, the first volume of which was published in 1867, Marx argued that the market system, or *capitalism*, would eventually be replaced by a communist economy in which workers would control production. Communist revolutions in Russia in 1917 and China in 1949 brought to power governments that claimed to be implementing Marx's ideas. As we saw in Chapter 1, Section 1.2, however, these countries became centrally planned economies, with the Communist Party, rather than workers, in control.

Centrally planned economies eliminated the market mechanism in favor of government bureaucrats allocating resources. They also greatly reduced property rights and left no role for individual entrepreneurs. As a result, these economies were neither allocatively nor productively efficient (see Chapter 1, Section 1.2), and they were unable to deliver a high standard of living to their populations. These countries were also political dictatorships. Today, only North Korea and Cuba are socialist in the Marxist sense. Both Russia and China now allow private businesses to operate and rely on the market to allocate resources, although in both countries the government plays a larger role in the economy than it does in the United States.

After the end of World War II in 1945, *social democratic parties* came to power in some Western Europe countries. Although their economic programs differed, they typically favored a large role for the government in the economy, including government ownership, or *nationalization*, of certain large industries. For instance, after coming to power in 1945, the British Labour Party nationalized the iron and steel and coal industries, as well as the railroads, while allowing most other businesses to remain privately owned.

In recent decades, European governments have *privatized* many industries that they had previously nationalized. As a result, apart from freight railroads, today most industries that are privately owned in the United States are also privately owned in Europe. So, although most countries in Western Europe have larger government sectors, have higher income tax rates, and provide more social services compared with the United States, they are *not* socialist in the earlier Marxist sense.

Several prominent socialist politicians, including Vermont Senator Bernie Sanders and New York Congresswoman Alexandria Ocasio-Cortez, have increased interest in socialism in the United States. These politicians advocate a larger role for government



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Some politicians, such as Congresswoman Alexandria Ocasio-Cortez, support a larger role for government in the economy.

in the economy, including (1) “Medicare for All,” under which the federal government would provide medical insurance to the whole population, eliminating private medical insurance; (2) government-paid tuition at two-year and four-year colleges; (3) the “Green New Deal,” which would commit the federal government to a variety of steps to ensure that within 10 years energy generation in the United States would involve zero carbon emissions; and (4) higher tax rates on individuals and corporations. These policies resemble those of the social democratic parties of Western Europe, although the Green New Deal might involve greater government involvement in the energy sector than those parties typically advocate. It’s unclear whether Congress will enact these policies and what their effect would be on how well the market system works. Even if enacted, the policies would fall short of Marxist socialism, under which the government directly owns most businesses.

**Your Turn:** Test your understanding by doing related problem 3.15 at the end of this chapter.

Continued from chapter opener

## Economics in Your Life & Career

### The Trade-offs When You Buy a Car

At the beginning of the chapter, we asked you to think about two questions: What is the relationship between safety and fuel efficiency for gasoline-powered cars? and If you were a manager at an automobile company, how might you evaluate the relationship between safety and fuel efficiency when designing cars?

To answer the first question, you have to recognize that there is a trade-off between safety and fuel efficiency. With the technology available at any particular time, an automobile manufacturer can increase fuel efficiency by making a car smaller and lighter. But driving a lighter car increases your chances of being injured if you have an accident. The trade-off between safety and

fuel efficiency would look much like the relationship in Figure 2.1.

To answer the second question, to increase both safety and fuel efficiency, automobile makers would have to discover new technologies that allow them to make cars lighter and safer at the same time. Such new technologies would make points like G in Figure 2.1 attainable. As a manager at an automobile company, you would need to take into account federal regulations that require certain levels of safety and fuel efficiency. Assuming that you had met those regulatory requirements, consumer preferences would determine how you would trade off safety versus fuel efficiency in designing cars.