

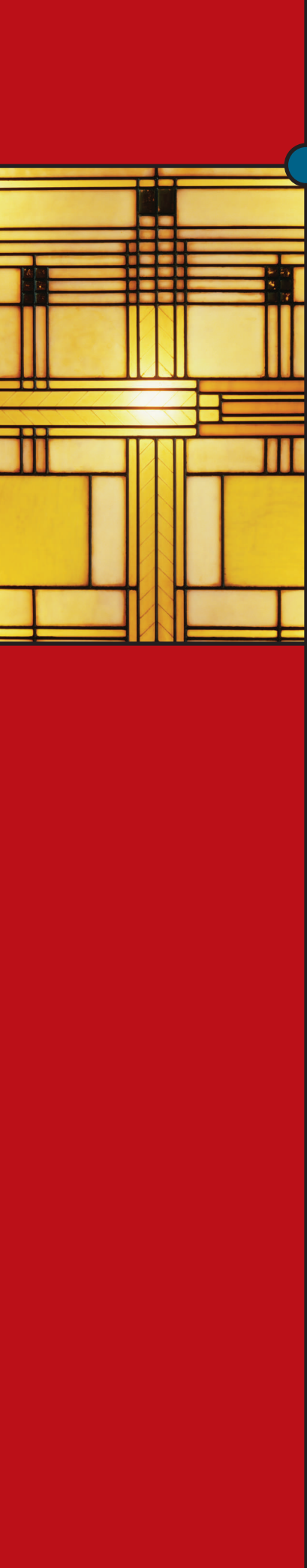


PRINCIPLES OF  
**ECONOMICS**

Sixth Edition

Robert H. Frank  
Ben S. Bernanke  
Kate Antonovics  
Ori Heffetz

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PRINCIPLES OF  
ECONOMICS

Sixth Edition

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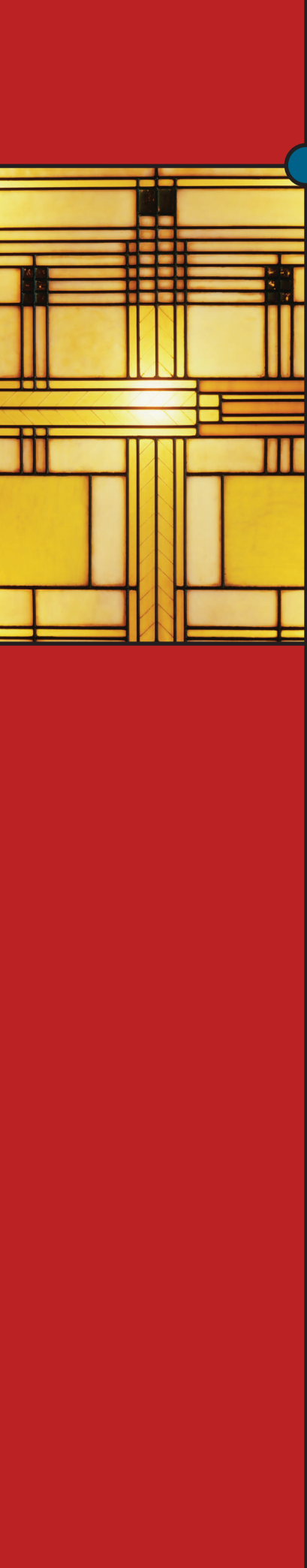
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# PRINCIPLES OF ECONOMICS

Sixth Edition

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# DEDICATION

For Ellen

**R. H. F.**

For Anna

**B. S. B.**

For Fiona and Henry

**K. A.**

For Katrina, Eleanor, and Daniel

**O. H.**

# ABOUT THE AUTHORS

## ROBERT H. FRANK



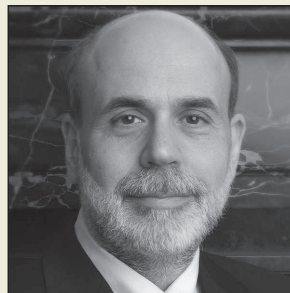
Robert H. Frank is the H. J. Louis Professor of Management and Professor of Economics at Cornell's Johnson School of Management, where he has taught since 1972. His "Economic View" column appears regularly in *The New York Times*. He is a Distinguished Senior Fellow at Demos. After receiving his B.S. from Georgia

Tech in 1966, he taught math and science for two years as a Peace Corps Volunteer in rural Nepal. He received his M.A. in statistics in 1971 and his Ph.D. in economics in 1972 from The University of California at Berkeley. During leaves of absence from Cornell, he has served as chief economist for the Civil Aeronautics Board (1978–1980), a Fellow at the Center for Advanced Study in the Behavioral Sciences (1992–93), Professor of American Civilization at l'École des Hautes Études en Sciences Sociales in Paris (2000–01), and the Peter and Charlotte Schoenfeld Visiting Faculty Fellow at the NYU Stern School of Business in 2008–09. His papers have appeared in the *American Economic Review*, *Econometrica*, the *Journal of Political Economy*, and other leading professional journals.

Professor Frank is the author of a best-selling intermediate economics textbook—*Microeconomics and Behavior*, Ninth Edition (Irwin/McGraw-Hill, 2015). His research has focused on rivalry and cooperation in economic and social behavior. His books on these themes include *Choosing the Right Pond* (Oxford, 1995), *Passions Within Reason* (W. W. Norton, 1988), *What Price the Moral High Ground?* (Princeton, 2004), *Falling Behind* (University of California Press, 2007), *The Economic Naturalist* (Basic Books, 2007), *The Economic Naturalist's Field Guide* (Basic Books, 2009), and *The Darwin Economy* (Princeton, 2011), which have been translated into 22 languages. *The Winner-Take-All Society* (The Free Press, 1995), co-authored with Philip Cook, received a Critic's Choice Award, was named a Notable Book of the Year by *The New York Times*, and was included in *BusinessWeek's* list of the 10 best books of 1995. *Luxury Fever* (The Free Press, 1999) was named to the *Knight-Ridder* Best Books list for 1999.

Professor Frank has been awarded an Andrew W. Mellon Professorship (1987–1990), a Kenan Enterprise Award (1993), and a Merrill Scholars Program Outstanding Educator Citation (1991). He is a co-recipient of the 2004 Leontief Prize for Advancing the Frontiers of Economic Thought. He was awarded the Johnson School's Stephen Russell Distinguished Teaching Award in 2004, 2010, and 2012, and the School's Apple Distinguished Teaching Award in 2005. His introductory microeconomics course has graduated more than 7,000 enthusiastic economic naturalists over the years.

## BEN S. BERNANKE



Professor Bernanke received his B.A. in economics from Harvard University in 1975 and his Ph.D. in economics from MIT in 1979. He taught at the Stanford Graduate School of Business from 1979 to 1985 and moved to Princeton University in 1985, where he was named the Howard Harrison and

Gabrielle Snyder Beck Professor of Economics and Public Affairs, and where he served as Chairman of the Economics Department.

Professor Bernanke was sworn in on February 1, 2006, as Chairman and a member of the Board of Governors of the Federal Reserve System—his second term expired January 31, 2014. Professor Bernanke also serves as Chairman of the Federal Open Market Committee, the Fed's principal monetary policymaking body. He was appointed as a member of the Board to a full 14-year term, which expires January 31, 2020. Before his appointment as Chairman, Professor Bernanke was Chairman of the President's Council of Economic Advisers, from June 2005 to January 2006.

Professor Bernanke's intermediate textbook, with Andrew Abel and Dean Croushore, *Macroeconomics*, Eighth Edition (Addison-Wesley, 2011), is a best seller in its field. He has authored more than 50 scholarly publications in macroeconomics, macroeconomic history, and finance. He has done significant research on the causes of the Great Depression, the role of financial markets and institutions in the business cycle, and measurement of the effects of monetary policy on the economy.

Professor Bernanke has held a Guggenheim Fellowship and a Sloan Fellowship, and he is a Fellow of the Econometric Society and of the American Academy of Arts and Sciences. He served as the Director of the Monetary Economics Program of the National Bureau of Economic Research (NBER) and as a member of the NBER's Business Cycle Dating Committee. In July 2001, he was appointed editor of the *American Economic Review*. Professor Bernanke's work with civic and professional groups includes having served two terms as a member of the Montgomery Township (N.J.) Board of Education.

## KATE ANTONOVICS



Professor Antonovics received her B.A. from Brown University in 1993 and her Ph.D. in economics from the University of Wisconsin in 2000. Shortly thereafter, she joined the faculty in the Economics Department at the University of California, San Diego, where she has been ever since.

Professor Antonovics is known for her superb teaching and her innovative use of technology in the classroom. Her highly popular introductory-level microeconomics course regularly enrolls over 450 students each fall. She also teaches labor economics at both the undergraduate and graduate level. In 2012, she received the UCSD Department of Economics award for best undergraduate teaching.

Professor Antonovics's research has focused on racial discrimination, gender discrimination, affirmative action, intergenerational income mobility, learning, and wage dynamics. Her papers have appeared in the *American Economic Review*, the *Review of Economics and Statistics*, the *Journal of Labor Economics*, and the *Journal of Human Resources*. She is a member of both the American Economic Association and the Society of Labor Economists.

## ORI HEFFETZ



Professor Heffetz received his B.A. in physics and philosophy from Tel Aviv University in 1999 and his Ph.D. in economics from Princeton University in 2005. He is an Associate Professor of Economics at the Samuel Curtis Johnson Graduate School of Management at Cornell University, where he has taught since 2005.

Bringing the real world into the classroom, Professor Heffetz has created a unique macroeconomics course that introduces basic concepts and tools from economic theory and applies them to current news and global events. His popular classes are taken by hundreds of students every year, on the Cornell Ithaca campus and, via live videoconferencing, in dozens of cities across the U.S., Canada, and beyond.

Professor Heffetz's research studies the social and cultural aspects of economic behavior, focusing on the mechanisms that drive consumers' choices and on the links between economic choices, individual well-being, and policymaking. He has published scholarly work on household consumption patterns, individual economic decision making, and survey methodology and measurement. He was a visiting researcher at the Bank of Israel during 2011, is currently a Faculty Research Fellow at the National Bureau of Economic Research (NBER), and serves on the editorial board of *Social Choice and Welfare*.

**A**lthough many millions of dollars are spent each year on introductory economics instruction in American colleges and universities, the return on this investment has been disturbingly low. Studies have shown, for example, that several months after having taken a principles of economics course, former students are no better able to answer simple economic questions than others who never even took the course. Most students, it seems, leave our introductory courses without having learned even the most important basic economic principles.

The problem, in our view, is that these courses almost always try to teach students far too much. In the process, really important ideas get little more coverage than minor ones, and everything ends up going by in a blur. Many instructors ask themselves, "How much can I cover today?" when instead they should be asking, "How much can my students absorb?"

Our textbook grew out of our conviction that students will learn far more if we attempt to cover much less. Our basic premise is that a small number of basic principles do most of the heavy lifting in economics, and that if we focus narrowly and repeatedly on those principles, students can actually master them in just a single semester.

The enthusiastic reactions of users of previous editions of our textbook affirm the validity of this premise. Avoiding excessive reliance on formal mathematical derivations, we present concepts intuitively through examples drawn from familiar contexts. We rely throughout on a well-articulated list of seven Core Principles, which we reinforce repeatedly by illustrating and applying each principle in numerous contexts. We ask students periodically to apply these principles themselves to answer related questions, exercises, and problems.

Throughout this process, we encourage students to become "economic naturalists," people who employ basic economic principles to understand and explain what they observe in the world around them. An economic naturalist understands, for example, that infant safety seats are required in cars but not in airplanes because the marginal cost of space to accommodate these seats is typically zero in cars but often hundreds of dollars in airplanes. Scores of such examples are sprinkled throughout the book. Each one, we believe, poses a question that should make any curious person eager to learn the answer. These examples stimulate interest while teaching students to see each feature of their economic landscape as the reflection of one or more of the Core Principles. Students talk about these examples with their friends and families. Learning economics is like learning a language. In each case, there is no substitute for actually speaking. By inducing students to speak economics, the Economic Naturalist examples serve this purpose.



For those who would like to learn more about the role of examples in learning economics, Bob Frank's lecture on this topic is posted on YouTube's "Authors@Google" series ([www.youtube.com/watch?v=QalNVxeIKKE](http://www.youtube.com/watch?v=QalNVxeIKKE) or search "Authors@Google: Robert Frank").

## KEY THEMES AND FEATURES

### An Emphasis on Seven Core Principles

As noted, a few Core Principles do most of the work in economics. By focusing almost exclusively on these principles, the text ensures that students leave the course with a deep mastery of them. In contrast, traditional encyclopedic texts so overwhelm students with detail that they often leave the course with little useful working knowledge at all.

- **The Scarcity Principle:** Having more of one good thing usually means having less of another.
- **The Cost-Benefit Principle:** Take no action unless its marginal benefit is at least as great as its marginal cost.
- **The Incentive Principle:** Cost-benefit comparisons are relevant not only for identifying the decisions that rational people should make, but also for predicting the actual decisions they do make.
- **The Principle of Comparative Advantage:** Everyone does best when each concentrates on the activity for which he or she is relatively most productive.
- **The Principle of Increasing Opportunity Cost:** Use the resources with the lowest opportunity cost before turning to those with higher opportunity costs.
- **The Efficiency Principle:** Efficiency is an important social goal because when the economic pie grows larger, everyone can have a larger slice.
- **The Equilibrium Principle:** A market in equilibrium leaves no unexploited opportunities for individuals but may not exploit all gains achievable through collective action.

### Economic Naturalism

Our ultimate goal is to produce economic naturalists—people who see each human action as the result of an implicit or explicit cost-benefit calculation. The economic naturalist sees mundane details of ordinary existence in a new light and becomes actively engaged in the attempt to understand them. Some representative examples:

#### In Micro:

- Why do movie theaters offer discount tickets to students?
- Why do we often see convenience stores located on adjacent street corners?

- Why do supermarket checkout lines all tend to be roughly the same length?

#### In Macro:

- Why has investment in computers increased so much in recent decades?
- Why does news of inflation hurt the stock market?
- Why do almost all countries provide free public education?

### Active Learning Stressed

The only way to learn to hit an overhead smash in tennis is through repeated practice. The same is true for learning economics. Accordingly, we consistently introduce new ideas in the context of simple examples and then follow them with applications showing how they work in familiar settings. At frequent intervals, we pose concept checks that both test and reinforce the understanding of these ideas. The end-of-chapter questions and problems are carefully crafted to help students internalize and extend core concepts. Experience with earlier editions confirms that this approach really does prepare students to apply basic economic principles to solve economic puzzles drawn from the real world.

### Modern Microeconomics

- *Economic surplus*, introduced in Chapter 1 and employed repeatedly thereafter, is more fully developed here than in any other text. This concept underlies the argument for economic efficiency as an important social goal. Rather than speak of trade-offs between efficiency and other goals, we stress that maximizing economic surplus facilitates the achievement of *all* goals.
- *Common decision pitfalls* identified by 2002 Nobel Laureate Daniel Kahneman and others—such as the tendency to ignore implicit costs, the tendency not to ignore sunk costs, and the tendency to confuse average and marginal costs and benefits—are introduced early in Chapter 1 and invoked repeatedly in subsequent chapters.
- There is perhaps no more exciting toolkit for the economic naturalist than a few *principles of elementary game theory*. In Chapter 9, we show how these principles enable students to answer a variety of strategic questions that arise in the marketplace and everyday life. We believe that the insights of the Nobel Laureate Ronald Coase are indispensable for understanding a host of familiar laws, customs, and social norms. In Chapter 10 we show how such devices function to minimize misallocations that result from externalities.

## Modern Macroeconomics

The *severe economic downturn* that began in late 2007 has renewed interest in cyclical fluctuations without challenging the importance of such long-run issues as growth, productivity, the evolution of real wages, and capital formation. Our treatment of these issues is organized as follows:

- A three-chapter treatment of *long-run issues*, followed by a modern treatment of *short-term fluctuations and stabilization policy*, emphasizes the important distinction between short- and long-run behavior of the economy.
- *Designed to allow for flexible treatment of topics*, these chapters are written so that short-run material (Chapters 10–14) can be used before long-run material (Chapters 7–9) with no loss of continuity.
- This book places a heavy emphasis on *globalization*, starting with an analysis of its effects on real wage inequality and progressing to such issues as the benefits of trade, the role of capital flows in domestic capital formation, and the links between exchange rates and monetary policy.

## ORGANIZATION OF THE SIXTH EDITION

### In Microeconomics

- **More and clearer emphasis on the Core Principles:** If we asked a thousand economists to provide their own versions of the most important economic principles, we'd get a thousand different lists. Yet to dwell on their differences would be to miss their essential similarities. It is less important to have exactly the best short list of principles than it is to use some well-thought-out list of this sort.
- **Outsourcing discussion supports comparative advantage material:** In Chapter 2, students will see a full-spectrum view of production possibilities and the realities economies face considering outsourcing decisions.
- **Strong connection drawn between core concepts:** Chapter 7 makes strong connections among market equilibrium and efficiency, the cost of preventing price adjustments, economic profit, and the invisible hand theory.
- **Using economics to help make policy decisions:** Chapters 12 and 13 feature important policy decisions and use economics to sort out the best options. Health care, environmental regulation, international trade, and income redistribution are all discussed.

### In Macroeconomics

- **Flexible presentation:** Chapters 15–17 are a self-contained group of chapters that cover measurement issues. This allows instructors to proceed to a discussion of either long-run concepts as discussed in Chapters 18–20 or short-run concepts as covered in Chapters 21–25 with no loss of continuity.
- **Thorough discussion of labor markets:** Trends in employment, wages, and unemployment are covered together in Chapter 17 to help students understand and distinguish between long-term trends and short-term fluctuations in the labor market.
- **Capital formation through financial markets:** Chapter 19 now presents a complete discussion of financial markets, focusing on the part these markets play in capital formation. This will help students better understand the important distinction between financial investment and physical investment in economics.
- **The simple Keynesian model:** We present the simple Keynesian model through examples that are developed both graphically and numerically.
- **Modular presentation of money and monetary policy:** Chapter 20 introduces students to the concepts of money and financial intermediaries, which can be covered separately or in direct conjunction with the discussion of monetary policy in Chapter 23.
- **The presentation of aggregate demand and aggregate supply:** Chapters 24 and 25 work together to give students a thorough understanding of the *AD-AS* model.
  - In Chapter 24, we focus on the nuts and bolts of the *AD-AS* model itself. Coherent, intuitive derivations of the *AD* curve and *AS* curve are presented, with an emphasis on connecting each side of the model to concepts the students learned in previous chapters. The model is then applied to business cycles, with an emphasis on the 2007–2009 recession.
  - In Chapter 25, we apply the *AD-AS* model to macroeconomic policy. First, we focus on how fiscal and monetary policy should be conducted in the face of shocks to aggregate demand and aggregate supply. We then examine the role of inflation expectations and credibility in policymaking, and link this to a discussion of inflation targeting. Finally, we analyze the effects of fiscal policy on long-run growth with an emphasis on how changes in marginal tax rates can affect labor supply and hence potential output.

- **Flexible coverage of international economics:** Chapter 26 is a self-contained discussion of exchange rates that can be used whenever an instructor thinks it best to introduce this important subject. This chapter also integrates the discussion of trade and capital flows so that students see that the balance of trade and net capital inflows are two sides of the same issue.

## CHANGES IN THE SIXTH EDITION

### Changes Common to All Chapters

In all chapters, the narrative has been tightened and shortened slightly. Many of the examples have been updated, with a focus on examples that connect to current events such as the financial crisis of 2008 and the Great Recession of 2007–2009. The examples and exercises from the previous edition have been redesigned to provide more clarity and ease of use. Data have been updated throughout.

### Chapter-by-Chapter Changes

- **Chapters 1–16:** Content and data updates have been made as needed.
- **Chapter 17:** Improved and timely coverage of the falling labor participation rate in the United States since 2000 has been added. The discussion on unemployment data has been updated to account for the contentious reduction in the official unemployment rate seen since the end of the last recession.
- **Chapter 18:** Content and data updates have been added as needed.
- **Chapter 19:** The discussion on how financial markets connect savers and borrowers, thereby allocating funds to the most productive uses, has been augmented to include a discussion on the most commonly used types of financial investments, such as bonds and stocks. This section was previously covered in Chapter 20.
- **Chapter 20:** This chapter is now solely focused on money and commercial banks, allowing it to be covered independently or in direct conjunction with Chapter 23. It is now titled *Money, Prices, and Financial Intermediaries*.
- **Chapters 21–22:** Content and data updates have been added as needed.
- **Chapter 23:** Payment of interest on reserves has been added as a separate monetary policy tool; this is important since this is a tool author Ben Bernanke has identified as crucial to keeping inflation in check. A section on unconventional monetary policy (such as quantitative easing) has also been added to this section of the chapter.
- **Chapters 24–25:** Content and data updates have been added as needed.
- **Chapter 26:** The section on international capital flows and the balance of trade has been reworked to more clearly present the relationships between national savings, private investment, and net capital flows. The connections between Chapter 19 and Chapter 26 have also been tightened through this reorganization.

## ORGANIZED LEARNING IN THE SIXTH EDITION

### Chapter Learning Objectives

Students and professors can be confident that the organization of each chapter surrounds common themes outlined by four to seven learning objectives listed on the first page of each chapter. These objectives, along with AACSB and Bloom's Taxonomy Learning Categories, are connected to all test bank questions and end-of-chapter material to offer a comprehensive, thorough teaching and learning experience.

### Assurance of Learning Ready

Many educational institutions today are focused on the notion of assurance of learning, an important element of some accreditation standards. *Principles of Economics, 6/e*, is designed specifically to support your assurance of learning initiatives with a simple, yet powerful, solution.

You can use our test bank software, EZ Test, to easily query for learning objectives that directly relate to the objectives for your course. You can then use the reporting features of EZ Test to aggregate student results in a similar fashion, making the collection and presentation of assurance of learning data simple and easy.

### AACSB Statement

The McGraw-Hill Companies is a proud corporate member of AACSB International. Recognizing the importance and value of AACSB accreditation, the authors of *Principles of Economics, 6/e*, have sought to recognize the curricula guidelines detailed in AACSB standards for business accreditation by connecting questions in the test bank and end-of-chapter material to the general knowledge and skill guidelines found in AACSB standards. It is important to note that the statements contained in *Principles of Economics, 6/e*, are provided only as a guide for the users of this text.

## AN EXPANDED TEAM OF AUTHORS

Also, starting with this sixth edition, we are pleased to announce that we have expanded the list of authors, in addition to Robert Frank and Ben Bernanke, to include Kate Antonovics

and Ori Heffetz. These two younger-generation authors bring with them a fresh touch, side by side with many years of classroom experience using previous editions of *Principles of Economics* in their microeconomics (Kate) and macroeconomics (Ori) classes. Our expanded team of authors has enabled us to increase the quality and range of digital materials that accompany the textbook, keeping us at the forefront of the latest developments in educational technology.

## A NOTE ON THE WRITING OF THIS EDITION

Ben Bernanke was sworn in on February 1, 2006, as Chairman and a member of the Board of Governors of the Federal Reserve System, a position to which he was reappointed in January 2010. From June 2005 until January 2006, he served as chairman of the President's Council of Economic Advisers. These positions have allowed him to play an active role in making U.S. economic policy, but the rules of government service have restricted his ability to participate in the preparation of the sixth edition.

Fortunately, we were able to enlist the aid of Per J. Norander of Missouri State University to take the lead in creating the macro portion of the sixth edition. The authors express their deep gratitude to Per for the energy and creativity he has brought to his work on the book. He has created a great tool for students and professors.

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## CHAPTER OPENER


Each chapter begins with a brief narrative of a realistic scenario illustrating the concepts to be learned in that chapter.

## LEARNING OBJECTIVES

Approximately four to seven learning objectives are presented at the beginning of each chapter and are referenced again in the summary, the end-of-chapter review questions, and problems to which they relate. The learning objectives (LOs) serve as a quick introduction to the material and concepts to be mastered before moving to the next chapter.

## CHAPTER 2

# Comparative Advantage



ALWAYS PICK THE LOW-HANGING FRUIT FIRST

**D**uring a stint as a Peace Corps volunteer in rural Nepal, a young economic naturalist employed a cook named Birkhaman, who came from a remote Himalayan village in neighboring Bhutan. Although Birkhaman had virtually no formal education, he was spectacularly resourceful. His primary duties, to prepare food and maintain the kitchen,

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- LO1 Explain and apply the Principle of Comparative Advantage.
- LO2 Explain and apply the Principle of Increasing Opportunity Cost (also called the Low-Hanging-Fruit Principle). Use a production possibilities curve to illustrate opportunity cost and comparative advantage.
- LO3 Identify factors that shift the menu of production possibilities.
- LO4 Explain the role of comparative advantage in international trade and describe why some jobs

**average cost** the total cost of undertaking  $n$  units of an activity divided by  $n$

**average benefit** the total benefit of undertaking  $n$  units of an activity divided by  $n$

To discover whether the advice makes economic sense, we must compare the marginal cost of a launch to its marginal benefit. The professor's estimates, however, tell us only the **average cost** and **average benefit** of the program. These are, respectively, the total cost of the program divided by the number of launches and the total benefit divided by the number of launches. Knowing the average benefit and average cost per launch for all shuttles launched thus far is simply not useful for deciding whether to expand the program. Of course, the average cost of the launches undertaken so far *might* be the same as the cost of adding another launch. But it also might be either higher or lower than the marginal cost of a launch. The same holds true regarding average and marginal benefits.

## KEY TERMS

Key terms are indicated in bold and defined in the margin the first time each term is used. They are also listed among the end-of-chapter material. A glossary is available at the back of the book for quick reference.

## CONCEPT CHECKS

These self-test questions in the body of the chapter enable students to determine whether the preceding material has been understood and reinforce understanding before reading further. Detailed Answers to Concept Checks are found at the end of each chapter.

### CONCEPT CHECK 1.5

Should a basketball team's best player take all the team's shots?

A professional basketball team has a new assistant coach. The assistant notices that one player scores on a higher percentage of his shots than other players. Based on this information, the assistant suggests to the head coach that the star player should take *all* the shots. That way, the assistant reasons, the team will score more points and win more games.

On hearing this suggestion, the head coach fires his assistant for incompetence. What was wrong with the assistant's idea?

## SEVEN CORE PRINCIPLES REFERENCES

There are seven Core Principles that this text focuses on almost exclusively to ensure student mastery. Throughout the text, these principles are called out and are denoted by an icon in the margin. Again, the seven Core Principles are: Scarcity, Cost-Benefit, Incentive, Comparative Advantage, Increasing Opportunity Cost, Efficiency, and Equilibrium.

Incentive

If the housing market were completely unregulated, the immediate response to such a high level of excess demand would be for rents to rise sharply. But here the law prevents them from rising above \$800. Many other ways exist, however, in which market participants can respond to the pressures of excess demand. For instance, owners will quickly learn that they are free to spend less on maintaining their rental units. After all, if there are scores of renters knocking at the door of each vacant apartment, a landlord has considerable room to maneuver. Leaking pipes, peeling paint, broken furnaces, and other problems are less likely to receive prompt attention—or, indeed, any attention at all—when rents are set well below market-clearing levels.

Nor are reduced availability of apartments and poorer maintenance of existing apartments the only difficulties. With an offering of only 1 million apartments per month, we see in Figure 3.8 that there are renters who'd be willing to pay as much as \$2,400 per month for an apartment. As the Incentive Principle suggests, this pressure will almost always find ways, legal or illegal, of expressing itself. In New York City, for example, it is not uncommon to see "finder's fees" or "key deposits" as high as several thousand dollars. Owners who cannot charge a market-clearing rent for their apartments also have the option of converting them to condominiums or co-ops, which enables them to sell their assets for prices much closer to their true economic value.

### The Economic Naturalist 1.1



**Why do many hardware manufacturers include more than \$1,000 worth of "free" software with a computer selling for only slightly more than that?**

The software industry is different from many others in the sense that its customers care a great deal about product compatibility. When you and your classmates are working on a project together, for example, your task will be much simpler if you all use the same word-processing program. Likewise, an executive's life will be easier at tax time if her financial software is the same as her accountant's.

The implication is that the benefit of owning and using any given software program increases with the number of other people who use that same product. This unusual relationship gives the producers of the most popular programs an enormous advantage and often makes it hard for new programs to break into the market.

## ECONOMIC NATURALIST EXAMPLES

Each Economic Naturalist example starts with a question to spark interest in learning an answer. These examples fuel interest while teaching students to see each feature of their economic landscape as the reflection of one or more of the Core Principles.

## NUMBERED EXAMPLES

Throughout the text, numbered and titled examples are referenced and called out to further illustrate concepts. With our use of engaging questions and examples from everyday life to apply economic concepts, the ultimate goal is to see that each human action is a result of an implicit or explicit cost-benefit calculation.

### Specialization

### EXAMPLE 2.5

**How costly is failure to specialize?**

Suppose that in Example 2.4 Susan and Tom had divided their time so that each person's output consisted of half nuts and half coffee. How much of each good would Tom and Susan have been able to consume? How much could they have consumed if each had specialized in the activity for which he or she enjoyed a comparative advantage?

### RECAP

### MARKET EQUILIBRIUM

*Market equilibrium*, the situation in which all buyers and sellers are satisfied with their respective quantities at the market price, occurs at the intersection of the supply and demand curves. The corresponding price and quantity are called the *equilibrium price* and the *equilibrium quantity*.

Unless prevented by regulation, prices and quantities are driven toward their equilibrium values by the actions of buyers and sellers. If the price is initially too high, so that there is excess supply, frustrated sellers will cut their price in order to sell more. If the price is initially too low, so that there is excess demand, competition among buyers drives the price upward. This process continues until equilibrium is reached.

## RECAP

Sprinkled throughout each chapter are Recap boxes that underscore and summarize the importance of the preceding material and key concept takeaways.



# END-OF-CHAPTER FEATURES

## SUMMARY

Each chapter ends with a summary that reviews the key points and learning objectives to provide closure to the chapter.

### SUMMARY

- The demand curve is a downward-sloping line that tells what quantity buyers will demand at any given price. The supply curve is an upward-sloping line that tells what quantity sellers will offer at any given price. (LO1)
- Alfred Marshall's model of supply and demand explains why neither cost of production nor value to the purchaser (as measured by willingness to pay) is, by itself, sufficient to explain why some goods are cheap and others are expensive. To explain variations in price, we must examine the interaction of cost and willingness to pay. As we've seen in this chapter, goods differ in price because of differences in their respective supply and demand curves. (LO2)
- Market equilibrium occurs when the quantity buyers demand at the market price is exactly the same as the quantity that sellers offer. The equilibrium price–quantity pair is the one at which the demand and supply curves intersect. In equilibrium, market price measures both the value of the last unit sold to buyers and the cost of the resources required to produce it. (LO2)
- When the price of a good lies above its equilibrium value, there is an excess supply of that good. Excess
- 3. An increase in supply will lead to a reduction in equilibrium price and an increase in equilibrium quantity.
- 4. A decrease in supply will lead to an increase in equilibrium price and a reduction in equilibrium quantity. (LO3)
- Incomes, tastes, population, expectations, and the prices of substitutes and complements are among the factors that shift demand schedules. Supply schedules, in turn, are primarily governed by such factors as technology, input prices, expectations, the number of sellers, and, especially for agricultural products, the weather. (LO3)
- The efficiency of markets in allocating resources does not eliminate social concerns about how goods and services are distributed among different people. For example, we often lament the fact many buyers enter the market with too little income to buy even the most basic goods and services. Concern for the well-being of the poor has motivated many governments to intervene in a variety of ways to alter the outcomes of market forces. Sometimes these interventions take the form of laws that peg prices below their equilibrium levels. Such laws almost invariably generate harmful, if unintended, consequences. Pro-

### REVIEW QUESTIONS

1. Explain the distinction between the horizontal and vertical interpretations of the demand curve. (LO1)
2. Why isn't knowing the cost of producing a good sufficient to predict its market price? (LO2)
3. In recent years, a government official proposed that gasoline price controls be imposed to protect the poor from rising gasoline prices. What evidence could you consult to discover whether this proposal was enacted? (LO2)
4. Distinguish between the meaning of the expressions "change in demand" and "change in the quantity demanded." (LO3)
5. Give an example of behavior you have observed that could be described as "smart for one but dumb for all." (LO4)

### PROBLEMS

1. How would each of the following affect the U.S. market supply curve for corn? (LO1)
  - a. A new and improved crop rotation technique is discovered.
  - b. The price of fertilizer falls.
  - c. The government offers new tax breaks to farmers.
  - d. A tornado sweeps through Iowa.



## REVIEW QUESTIONS AND PROBLEMS

Approximately five review questions appear at the end of each chapter to test understanding of the logic behind economic concepts. The problems are crafted to help students internalize and extend core concepts. Learning objectives are also referenced at the end of each question and problem to reiterate the particular learning goal that is being examined.

## SUPPLEMENTS FOR THE INSTRUCTOR

The following ancillaries are available for quick download and convenient access via the Instructor Resource material available through McGraw-Hill *Connect Plus*<sup>®</sup>.

### Solutions Manual

Prepared by Per Norander, this manual provides detailed answers to the end-of-chapter questions.

### Test Banks

Prepared by Richard Hansen of Hillsborough Community College (micro) and Mark Wilson of West Virginia University (macro), and carefully reviewed by author Kate Antonovics, each manual contains nearly 4,000 newly revised questions categorized by chapter learning objectives, AACSB learning categories, Bloom's Taxonomy objectives, and level of difficulty.

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# BRIEF CONTENTS

- 1** Thinking Like an Economist 1
- 2** Comparative Advantage 33
- 3** Supply and Demand 59
- 4** Elasticity 93
- 5** Demand 121
- 6** Perfectly Competitive Supply 147
- 7** Efficiency, Exchange, and the Invisible Hand in Action 175
- 8** Monopoly, Oligopoly, and Monopolistic Competition 209
- 9** Games and Strategic Behavior 245
- 10** Externalities and Property Rights 273
- 11** The Economics of Information 301
- 12** Labor Markets, Poverty, and Income Distribution 325
- 13** The Environment, Health, and Safety 353
- 14** Public Goods and Tax Policy 379
- 15** Spending, Income, and GDP 405
- 16** Inflation and the Price Level 429
- 17** Wages and Unemployment 457
- 18** Economic Growth 489
- 19** Saving, Capital Formation, and Financial Markets 519
- 20** Money, Prices, and Financial Intermediaries 555
- 21** Short-Term Economic Fluctuations 575
- 22** Spending, Output, and Fiscal Policy 595
- 23** Monetary Policy and the Federal Reserve 631
- 24** Aggregate Demand, Aggregate Supply, and Business Cycles 663
- 25** Macroeconomic Policy 689
- 26** Exchange Rates, International Trade, and Capital Flows 711

# CONTENTS

## Chapter 1 Thinking Like an Economist 1

### Economics: Studying Choice in a World of Scarcity 2

#### Applying the Cost-Benefit Principle 3

Economic Surplus 4

Opportunity Cost 4

The Role of Economic Models 5

#### Three Important Decision Pitfalls 6

Pitfall 1: Measuring Costs and Benefits as Proportions rather than Absolute Dollar Amounts 6

Pitfall 2: Ignoring Implicit Costs 7

Pitfall 3: Failure to Think at the Margin 8

#### Normative Economics versus Positive Economics 13

#### Economics: Micro and Macro 13

#### The Approach of This Text 14

#### Economic Naturalism 14

#### THE ECONOMIC NATURALIST 1.1 15

#### THE ECONOMIC NATURALIST 1.2 16

#### THE ECONOMIC NATURALIST 1.3 16

*Summary* 17 • *Core Principles* 17 • *Key Terms* 18

*Review Questions* 18 • *Problems* 18 • *Answers to*

*Concept Checks* 20 • *Appendix: Working with Equations, Graphs, and Tables* 21

## Chapter 2 Comparative Advantage 33

### Exchange and Opportunity Cost 34

The Principle of Comparative Advantage 35

#### THE ECONOMIC NATURALIST 2.1 37

Sources of Comparative Advantage 38

#### THE ECONOMIC NATURALIST 2.2 39

### Comparative Advantage and Production

#### Possibilities 39

The Production Possibilities Curve 39

How Individual Productivity Affects the Slope and Position of the PPC 42

The Gains from Specialization and Exchange 44

A Production Possibilities Curve for a Many-Person Economy 45

*A Note on the Logic of the Fruit Picker's Rule* 47

### Factors That Shift the Economy's Production

#### Possibilities Curve 47

Why Have Some Countries Been Slow to Specialize? 49

Can We Have Too Much Specialization? 50

### Comparative Advantage and International Trade 51

#### THE ECONOMIC NATURALIST 2.3 51

Outsourcing 51

#### THE ECONOMIC NATURALIST 2.4 52

*Summary* 54 • *Core Principles* 54 • *Key Terms* 54

*Review Questions* 55 • *Problems* 55 • *Answers to*

*Concept Checks* 56

## Chapter 3 Supply and Demand 59

### What, How, and for Whom? Central Planning versus the Market 61

#### Buyers and Sellers in Markets 62

The Demand Curve 63

The Supply Curve 64

#### Market Equilibrium 66

Rent Controls Reconsidered 69

Pizza Price Controls? 71

### Predicting and Explaining Changes in Prices and Quantities 72

Shifts in Demand 73

#### THE ECONOMIC NATURALIST 3.1 75

Shifts in the Supply Curve 76

#### THE ECONOMIC NATURALIST 3.2 79

Four Simple Rules 80

#### THE ECONOMIC NATURALIST 3.3 82

### Efficiency and Equilibrium 83

Cash on the Table 83

Smart for One, Dumb for All 84

*Summary* 86 • *Core Principles* 87 • *Key Terms* 87

*Review Questions* 87 • *Problems* 87 • *Answers to*

*Concept Checks* 89 • *Appendix: The Algebra of Supply and Demand* 91

## Chapter 4 Elasticity 93

### Price Elasticity of Demand 94

Price Elasticity Defined 94

Determinants of Price Elasticity of Demand 96

*Substitution Possibilities* 96

*Budget Share* 96

*Time* 96

Some Representative Elasticity Estimates 97

Using Price Elasticity of Demand 98

#### THE ECONOMIC NATURALIST 4.1 98

#### THE ECONOMIC NATURALIST 4.2 98

### A Graphical Interpretation of Price Elasticity 99

Price Elasticity Changes along a Straight-Line

Demand Curve 101

Two Special Cases 102

### Elasticity and Total Expenditure 103

### Income Elasticity and Cross-Price Elasticity of Demand 107

**The Price Elasticity of Supply 108**

Determinants of Supply Elasticity 110

*Flexibility of Inputs 111**Mobility of Inputs 111**Ability to Produce Substitute Inputs 111**Time 111***THE ECONOMIC NATURALIST 4.3 112**

Unique and Essential Inputs: The Ultimate Supply

Bottleneck 114

*Summary 114 • Key Terms 115 • Review**Questions 115 • Problems 116 • Answers to Concept**Checks 118 • Appendix: The Midpoint Formula 119***Chapter 5 Demand 121****The Law of Demand 122**

The Origins of Demand 122

Needs versus Wants 123

**THE ECONOMIC NATURALIST 5.1 123****Translating Wants into Demand 124**

Measuring Wants: The Concept of Utility 124

Allocating a Fixed Income between Two Goods 127

**The Rational Spending Rule 131**

Income and Substitution Effects Revisited 131

Applying the Rational Spending Rule 133

*Substitution at Work 134***THE ECONOMIC NATURALIST 5.2 134****THE ECONOMIC NATURALIST 5.3 134****THE ECONOMIC NATURALIST 5.4 136***The Importance of Income Differences 136***THE ECONOMIC NATURALIST 5.5 136****Individual and Market Demand Curves 137**

Horizontal Addition 137

**Demand and Consumer Surplus 138**

Calculating Consumer Surplus 138

*Summary 141 • Key Terms 142**Review Questions 142 • Problems 142**Answers to Concept Checks 144***Chapter 6 Perfectly Competitive Supply 147****Thinking about Supply: The Importance of Opportunity Cost 148****Individual and Market Supply Curves 150****Profit-Maximizing Firms in Perfectly Competitive Markets 151**

Profit Maximization 152

The Demand Curve Facing a Perfectly Competitive Firm 152

Production in the Short Run 153

Some Important Cost Concepts 154

Choosing Output to Maximize Profit 155

A Note on the Firm's Shutdown Condition 157

Average Variable Cost and Average Total Cost 157

A Graphical Approach to Profit Maximization 157

Price = Marginal Cost: The Maximum-Profit Condition 159

The "Law" of Supply 161

**Determinants of Supply Revisited 162**

Technology 162

Input Prices 162

The Number of Suppliers 163

Expectations 163

Changes in Prices of Other Products 163

Applying the Theory of Supply 163

**THE ECONOMIC NATURALIST 6.1 163****Supply and Producer Surplus 166**

Calculating Producer Surplus 166

*Summary 168 • Key Terms 169**Review Questions 169 • Problems 169**Answers to Concept Checks 172***Chapter 7 Efficiency, Exchange, and the Invisible Hand in Action 175****The Central Role of Economic Profit 176**

Three Types of Profit 176

**The Invisible Hand Theory 180**

Two Functions of Price 180

Responses to Profits and Losses 180

The Importance of Free Entry and Exit 186

**Economic Rent versus Economic Profit 187**

The Invisible Hand in Action 189

*The Invisible Hand at the Supermarket and on the Freeway 189***THE ECONOMIC NATURALIST 7.1 189***The Invisible Hand and Cost-Saving Innovations 190***The Distinction between an Equilibrium and a Social Optimum 191**

Smart for One, Dumb for All 191

**THE ECONOMIC NATURALIST 7.2 192**

Market Equilibrium and Efficiency 192

*Efficiency Is Not the Only Goal 195**Why Efficiency Should Be the First Goal 196***The Cost of Preventing Price Adjustments 196**

Price Ceilings 196

Price Subsidies 200

*Summary 202 • Key Terms 203**Review Questions 203 • Problems 204**Answers to Concept Checks 206***Chapter 8 Monopoly, Oligopoly, and Monopolistic Competition 209****Imperfect Competition 210**

Different Forms of Imperfect Competition 210

*Monopolistic Competition 210**Oligopoly 211*

The Essential Difference between Perfectly and Imperfectly Competitive Firms 212

<b>Five Sources of Market Power</b>	<b>213</b>
Exclusive Control over Important Inputs	213
Patents and Copyrights	213
Government Licenses or Franchises	213
Economies of Scale and Natural Monopolies	214
Network Economies	214
Economies of Scale and the Importance of Start-Up Costs	215
<b>THE ECONOMIC NATURALIST 8.1</b>	<b>217</b>
<b>Profit Maximization for the Monopolist</b>	<b>218</b>
Marginal Revenue for the Monopolist	219
The Monopolist's Profit-Maximizing Decision Rule	221
Being a Monopolist Doesn't Guarantee an Economic Profit	222
<b>Why the Invisible Hand Breaks Down under Monopoly</b>	<b>223</b>
<b>Using Discounts to Expand the Market</b>	<b>225</b>
Price Discrimination Defined	225
<b>THE ECONOMIC NATURALIST 8.2</b>	<b>226</b>
How Price Discrimination Affects Output	226
The Hurdle Method of Price Discrimination	229
Is Price Discrimination a Bad Thing?	231
Examples of Price Discrimination	232
<b>THE ECONOMIC NATURALIST 8.3</b>	<b>233</b>
<b>Public Policy toward Natural Monopoly</b>	<b>234</b>
State Ownership and Management	234
State Regulation of Private Monopolies	235
Exclusive Contracting for Natural Monopoly	235
Vigorous Enforcement of Antitrust Laws	236
<i>Summary</i>	237
<i>Key Terms</i>	238
<i>Review Questions</i>	238
<i>Problems</i>	238
<i>Answers to Concept Checks</i>	241
<i>Appendix: The Algebra of Monopoly Profit Maximization</i>	243
<b>Chapter 9 Games and Strategic Behavior</b>	<b>245</b>
<b>Using Game Theory to Analyze Strategic Decisions</b>	<b>246</b>
The Three Elements of a Game	246
Nash Equilibrium	248
<b>The Prisoner's Dilemma</b>	<b>250</b>
The Original Prisoner's Dilemma	250
The Economics of Cartels	251
<b>THE ECONOMIC NATURALIST 9.1</b>	<b>251</b>
Tit-for-Tat and the Repeated Prisoner's Dilemma	254
<b>THE ECONOMIC NATURALIST 9.2</b>	<b>255</b>
<b>THE ECONOMIC NATURALIST 9.3</b>	<b>256</b>
<b>Games in Which Timing Matters</b>	<b>257</b>
Credible Threats and Promises	259
Monopolistic Competition When Location Matters	260
<b>THE ECONOMIC NATURALIST 9.4</b>	<b>261</b>
<b>Commitment Problems</b>	<b>262</b>
Solving Commitment Problems with Psychological Incentives	264
<i>Are People Fundamentally Selfish?</i>	265
<i>Preferences as Solutions to Commitment Problems</i>	265
<i>Summary</i>	267
<i>Key Terms</i>	267
<i>Review Questions</i>	267
<i>Problems</i>	268
<i>Answers to Concept Checks</i>	271
<b>Chapter 10 Externalities and Property Rights</b>	<b>273</b>
<b>External Costs and Benefits</b>	<b>273</b>
How Externalities Affect Resource Allocation	274
How Do Externalities Affect Supply and Demand?	275
<b>The Coase Theorem</b>	<b>277</b>
<b>Remedies for Externalities</b>	<b>281</b>
Laws and Regulations	281
<b>THE ECONOMIC NATURALIST 10.1</b>	<b>282</b>
<b>THE ECONOMIC NATURALIST 10.2</b>	<b>283</b>
The Optimal Amount of Negative Externalities Is Not Zero	283
Compensatory Taxes and Subsidies	283
<b>Property Rights and the Tragedy of the Commons</b>	<b>285</b>
The Problem of Unpriced Resources	286
The Effect of Private Ownership	288
When Private Ownership Is Impractical	289
<b>THE ECONOMIC NATURALIST 10.3</b>	<b>289</b>
<b>THE ECONOMIC NATURALIST 10.4</b>	<b>290</b>
<i>Harvesting Timber on Remote Public Land</i>	290
<i>Harvesting Whales in International Waters</i>	290
<i>Controlling Multinational Environmental Pollution</i>	290
<b>Positional Externalities</b>	<b>291</b>
Payoffs That Depend on Relative Performance	291
<b>THE ECONOMIC NATURALIST 10.5</b>	<b>291</b>
Positional Arms Races and Positional Arms Control Agreements	292
<i>Campaign Spending Limits</i>	293
<i>Roster Limits</i>	293
<i>Arbitration Agreements</i>	293
<i>Mandatory Starting Dates for Kindergarten</i>	293
Social Norms as Positional Arms Control Agreements	293
<i>Nerd Norms</i>	294
<i>Fashion Norms</i>	294
<i>Norms of Taste</i>	294
<i>Norms against Vanity</i>	295
<i>Summary</i>	296
<i>Key Terms</i>	297
<i>Review Questions</i>	297
<i>Problems</i>	297
<i>Answers to Concept Checks</i>	300



**Chapter 11 The Economics of Information 301****How the Middleman Adds Value 302****The Optimal Amount of Information 304**

The Cost-Benefit Test 304

The Free-Rider Problem 305

**THE ECONOMIC NATURALIST 11.1 305****THE ECONOMIC NATURALIST 11.2 305**

Two Guidelines for Rational Search 306

The Gamble Inherent in Search 307

The Commitment Problem When Search  
Is Costly 308**Asymmetric Information 309**

The Lemons Model 310

**The Credibility Problem in Trading 312**

The Costly-to-Fake Principle 313

**THE ECONOMIC NATURALIST 11.3 313****THE ECONOMIC NATURALIST 11.4 314**Conspicuous Consumption as a Signal  
of Ability 314**THE ECONOMIC NATURALIST 11.5 315**

Statistical Discrimination 315

**THE ECONOMIC NATURALIST 11.6 316**

Adverse Selection 317

Moral Hazard 317

Disappearing Political Discourse 318

**THE ECONOMIC NATURALIST 11.7 318****THE ECONOMIC NATURALIST 11.8 319***Summary 321 • Key Terms 321**Review Questions 321 • Problems 322**Answers to Concept Checks 323***Chapter 12 Labor Markets, Poverty, and Income  
Distribution 325****The Economic Value of Work 326****The Equilibrium Wage and Employment****Levels 329**

The Demand Curve for Labor 329

The Supply Curve of Labor 329

Market Shifts 330

**Explaining Differences in Earnings 331**

Human Capital Theory 331

Labor Unions 332

**THE ECONOMIC NATURALIST 12.1 333**

Compensating Wage Differentials 334

**THE ECONOMIC NATURALIST 12.2 334**

Discrimination in the Labor Market 335

*Discrimination by Employers 335**Discrimination by Others 335**Other Sources of the Wage Gap 336*

Winner-Take-All Markets 337

**THE ECONOMIC NATURALIST 12.3 337****Recent Trends in Inequality 338**

Is Income Inequality a Moral Problem? 339

**Methods of Income Redistribution 341**

Welfare Payments and In-Kind Transfers 341

Means-Tested Benefit Programs 341

The Negative Income Tax 342

Minimum Wages 343

The Earned-Income Tax Credit 344

Public Employment for the Poor 346

A Combination of Methods 346

*Summary 347 • Key Terms 348**Review Questions 348 • Problems 348**Answers to Concept Checks 351***Chapter 13 The Environment, Health, and  
Safety 353****The Economics of Health Care Delivery 354**

Applying the Cost-Benefit Criterion 354

Designing a Solution 356

The HMO Revolution 357

**THE ECONOMIC NATURALIST 13.1 358**The Problem with Health Care Provision through  
Private Insurance 359

The Affordable Care Act of 2010 360

**Using Price Incentives in Environmental Regulation 361**

Taxing Pollution 361

Auctioning Pollution Permits 363

Climate Change and Carbon Taxes 364

**Workplace Safety Regulation 366****THE ECONOMIC NATURALIST 13.2 370****Public Health and Security 370****THE ECONOMIC NATURALIST 13.3 371****THE ECONOMIC NATURALIST 13.4 372***Summary 373 • Key Terms 374**Review Questions 374 • Problems 374**Answers to Concept Checks 376***Chapter 14 Public Goods and Tax Policy 379****Government Provision of Public Goods 380**

Public Goods versus Private Goods 380

Paying for Public Goods 382

**THE ECONOMIC NATURALIST 14.1 384****The Optimal Quantity of a Public Good 385**

The Demand Curve for a Public Good 385

Private Provision of Public Goods 387

*Funding by Donation 388**Development of New Means to Exclude**Nonpayers 388**Private Contracting 388**Sale of By-Products 388***THE ECONOMIC NATURALIST 14.2 388****Laws, Regulations, and the Question of****Centralization 391**

Externalities and Property Rights 391

Local, State, or Federal? 391

Sources of Inefficiency in the Political Process	392	<i>Pork Barrel Legislation</i>	392	<i>Unexpected Redistributions of Wealth</i>	444
<b>THE ECONOMIC NATURALIST 14.3</b>	<b>393</b>			<i>Interference with Long-Term Planning</i>	445
<b>THE ECONOMIC NATURALIST 14.4</b>	<b>393</b>	<i>Rent-Seeking</i>	394	Hyperinflation	446
		<i>Starve the Government?</i>	396	<b>Inflation and Interest Rates</b>	<b>447</b>
<b>What Should We Tax?</b>	<b>397</b>			Inflation and the Real Interest Rate	447
<i>Summary</i>	399			The Fisher Effect	450
• <i>Key Terms</i>	399			<i>Summary</i>	451
<i>Review Questions</i>	400			• <i>Key Terms</i>	451
• <i>Problems</i>	400			<i>Review Questions</i>	452
<i>Answers to Concept Checks</i>	402			• <i>Problems</i>	452
				<i>Answers to Concept Checks</i>	454
<b>Chapter 15 Spending, Income, and GDP</b>	<b>405</b>			<b>Chapter 17 Wages and Unemployment</b>	<b>457</b>
<b>Gross Domestic Product: Measuring the Nation's Output</b>	<b>406</b>			<b>Three Important Labor Market Trends</b>	<b>458</b>
Market Value	406			<b>Supply and Demand in the Labor Market</b>	<b>459</b>
Final Goods and Services	407			Wages and the Demand for Labor	459
Produced within a Country during a Given Period	410			Shifts in the Demand for Labor	462
<b>The Expenditure Method for Measuring GDP</b>	<b>411</b>			The Supply of Labor	465
GDP and the Incomes of Capital and Labor	415			Shifts in the Supply of Labor	466
<b>Nominal GDP versus Real GDP</b>	<b>416</b>			<b>Explaining the Trends in Real Wages and Employment</b>	<b>467</b>
<b>THE ECONOMIC NATURALIST 15.1</b>	<b>418</b>			Why Have Real Wages Increased by So Much in the Industrialized Countries?	467
<b>Real GDP and Economic Well-Being</b>	<b>419</b>			Since the 1970s, Real Wage Growth in the United States Has Stagnated, Even Though Employment Growth Has Been Rapid	468
Why Real GDP Isn't the Same as Economic Well-Being	419			Increasing Wage Inequality: The Effects of Globalization	469
<i>Leisure Time</i>	419			Increasing Wage Inequality: Technological Change	471
<b>THE ECONOMIC NATURALIST 15.2</b>	<b>420</b>			<b>Unemployment and the Unemployment Rate</b>	<b>474</b>
<i>Nonmarket Economic Activities</i>	420			Measuring Unemployment	476
<i>Environmental Quality and Resource Depletion</i>	421			The Costs of Unemployment	476
<i>Quality of Life</i>	421			The Duration of Unemployment	477
<i>Poverty and Economic Inequality</i>	421			The Unemployment Rate versus "True" Unemployment	478
But GDP Is Related to Economic Well-Being	422			<b>Types of Unemployment and Their Costs</b>	<b>478</b>
<i>Availability of Goods and Services</i>	422			Frictional Unemployment	478
<i>Health and Education</i>	422			Structural Unemployment	479
<b>THE ECONOMIC NATURALIST 15.3</b>	<b>423</b>			Cyclical Unemployment	480
<i>Summary</i>	424			Impediments to Full Employment	480
• <i>Key Terms</i>	425			<i>Minimum Wage Laws</i>	480
<i>Review Questions</i>	425			<i>Labor Unions</i>	481
• <i>Problems</i>	425			<i>Unemployment Insurance</i>	482
<i>Answers to Concept Checks</i>	427			<i>Other Government Regulations</i>	482
				<i>Summary</i>	483
<b>Chapter 16 Inflation and the Price Level</b>	<b>429</b>			• <i>Key Terms</i>	484
<b>The Consumer Price Index and Inflation</b>	<b>430</b>			<i>Review Questions</i>	484
Inflation	432			• <i>Problems</i>	484
<b>THE ECONOMIC NATURALIST 16.1</b>	<b>434</b>			<i>Answers to Concept Checks</i>	486
<b>Adjusting for Inflation</b>	<b>434</b>			<b>Chapter 18 Economic Growth</b>	<b>489</b>
Deflating a Nominal Quantity	435			<b>The Remarkable Rise in Living Standards: The Record</b>	<b>490</b>
Indexing to Maintain Buying Power	437			Why "Small" Differences in Growth Rates Matter	493
<b>Does the CPI Measure "True" Inflation?</b>	<b>438</b>			<b>Why Nations Become Rich: The Crucial Role of Average Labor Productivity</b>	<b>494</b>
<b>The Costs of Inflation: Not What You Think</b>	<b>441</b>				
The True Costs of Inflation	442				
<i>"Noise" in the Price System</i>	442				
<i>Distortions of the Tax System</i>	443				
<i>"Shoe-Leather" Costs</i>	444				

<b>The Determinants of Average Labor Productivity</b>	<b>496</b>	<b>Commercial Banks and the Creation of Money</b>	<b>562</b>
Human Capital	496	The Money Supply with Both Currency and	
Physical Capital	498	Deposits	565
Land and Other Natural Resources	501	<b>Central Banks, the Money Supply, and Prices</b>	<b>567</b>
Technology	501	Controlling the Money Supply with Open-Market	
Entrepreneurship and Management	502	Operations	567
<b>THE ECONOMIC NATURALIST 18.1</b>	<b>503</b>	Money and Prices	568
The Political and Legal Environment	504	Velocity	569
<b>Promoting Economic Growth</b>	<b>506</b>	Money and Inflation in the Long Run	570
Policies to Increase Human Capital	507	<i>Summary</i>	572 • <i>Key Terms</i> 572
<b>THE ECONOMIC NATURALIST 18.2</b>	<b>507</b>	<i>Review Questions</i>	572 • <i>Problems</i> 573
Policies That Promote Saving and Investment	507	<i>Answers to Concept Checks</i>	574
Policies That Support Research and			
Development	508	<b>Chapter 21 Short-Term Economic Fluctuations</b>	<b>575</b>
The Legal and Political Framework	508	<b>Recessions and Expansions</b>	<b>576</b>
The Poorest Countries: A Special Case?	508	Some Facts about Short-Term Economic	
<b>Thinking about the Costs of Economic Growth</b>	<b>509</b>	Fluctuations	579
Are There Limits to Growth?	510	<b>Output Gaps and Cyclical Unemployment</b>	<b>581</b>
<i>Summary</i>	513 • <i>Key Terms</i> 513	Potential Output	581
<i>Review Questions</i>	513 • <i>Problems</i> 514	The Output Gap	583
<i>Answers to Concept Checks</i>	516	<b>The Natural Rate of Unemployment and Cyclical</b>	
		Unemployment	584
<b>Chapter 19 Saving, Capital Formation, and</b>		<b>Okun's Law</b>	<b>586</b>
<b>Financial Markets</b>	<b>519</b>	<b>Why Do Short-Term Fluctuations Occur? A Preview</b>	
<b>Saving and Wealth</b>	<b>520</b>	and a Parable	588
Stocks and Flows	521	Al's Ice Cream Store: A Tale about Short-Run	
Capital Gains and Losses	522	Fluctuations	589
<b>National Saving and Its Components</b>	<b>525</b>	<b>THE ECONOMIC NATURALIST 21.1</b>	<b>590</b>
The Measurement of National Saving	525	<i>Summary</i>	591 • <i>Key Terms</i> 592
Private and Public Components of National Saving	526	<i>Review Questions</i>	592 • <i>Problems</i> 592
Public Saving and the Government Budget	527	<i>Answer to Concept Check</i>	593
<b>Why Do People Save?</b>	<b>529</b>		
Saving and the Real Interest Rate	531	<b>Chapter 22 Spending, Output, and Fiscal</b>	
Saving, Self-Control, and Demonstration Effects	532	<b>Policy</b>	<b>595</b>
<b>Investment and Capital Formation</b>	<b>534</b>	<b>The Keynesian Model's Crucial Assumption: Firms</b>	
<b>THE ECONOMIC NATURALIST 19.1</b>	<b>537</b>	Meet Demand at Preset Prices	596
<b>Bonds, Stocks, and the Allocation of Savings</b>	<b>538</b>	<b>Planned Aggregate Expenditure</b>	<b>598</b>
Bonds	538	Planned Spending versus Actual Spending	598
Stocks	540	Consumer Spending and the Economy	600
The Informational Role of Bond and Stock Markets	542	Planned Aggregate Expenditure and Output	602
Risk Sharing and Diversification	543	<b>Short-Run Equilibrium Output</b>	<b>605</b>
<b>Saving, Investment, and Financial Markets</b>	<b>543</b>	Finding Short-Run Equilibrium Output:	
<i>Summary</i>	549 • <i>Key Terms</i> 550	Numerical Approach	606
<i>Review Questions</i>	550 • <i>Problems</i> 550	Finding Short-Run Equilibrium Output:	
<i>Answers to Concept Checks</i>	554	Graphical Approach	607
		<b>Planned Spending and the Output Gap</b>	<b>608</b>
<b>Chapter 20 Money, Prices, and Financial</b>		The Multiplier	613
<b>Intermediaries</b>	<b>555</b>	<b>Fiscal Policy and Recessions</b>	<b>614</b>
<b>The Banking System and the Allocation of Saving to</b>		Government Purchases and Planned	
Productive Uses	556	Spending	614
<b>Money and Its Uses</b>	<b>558</b>	Taxes, Transfers, and Aggregate Spending	617
Measuring Money	560	Fiscal Policy and the Recession of 2007–2009	620

Fiscal Policy as a Stabilization Tool: Three Qualifications	620
<i>Fiscal Policy and the Supply Side</i>	620
<i>The Problem of Deficits</i>	621
<i>The Relative Inflexibility of Fiscal Policy</i>	621
<i>Summary</i>	622 • <i>Key Terms</i> 623
<i>Review Questions</i>	623 • <i>Problems</i> 624
<i>Answers to Concept Checks</i>	626
<i>Appendix: The Multiplier in the Basic Keynesian Model</i>	629

## **Chapter 23 Monetary Policy and the Federal Reserve 631**

### **The Federal Reserve 632**

The History and Structure of the Federal Reserve System	632
The Fed's Role in Stabilizing Financial Markets: Banking Panics	633

### **Monetary Policy and Economic Fluctuations 636**

Can the Fed Control the Real Interest Rate?	636
The Role of the Federal Funds Rate in Monetary Policy	637
Planned Aggregate Expenditure and the Real Interest Rate	638
The Fed Fights a Recession	641
The Fed Fights Inflation	643

### **THE ECONOMIC NATURALIST 23.1 645**

Should the Federal Reserve Respond to Changes in Asset Prices?	646
--	-----

### **The Federal Reserve and Interest Rates 647**

The Demand for Money	648
Macroeconomic Factors That Affect the Demand for Money	649
The Money Demand Curve	650

### **THE ECONOMIC NATURALIST 23.2 651**

The Supply of Money and Money Market Equilibrium	652
--	-----

### **How the Fed Controls the Nominal Interest Rate 654**

Open-Market Operations	654
Discount Window Lending	656
Reserve Requirements	656
Interest Paid on Reserves	657
Unconventional Monetary Policy	657

*Summary* 658 • *Key Terms* 659

*Review Questions* 659 • *Problems* 659

*Answers to Concept Checks* 661

## **Chapter 24 Aggregate Demand, Aggregate Supply, and Business Cycles 663**

### **The Aggregate Demand–Aggregate Supply Model: A Brief Overview 664**

### **The Aggregate Demand Curve 665**

Why Does the AD Curve Slope Downward?	666
<i>The Fed's Monetary Policy Rule</i>	666
What Factors Shift the AD Curve?	667
<i>Demand Shocks</i>	667
<i>Stabilization Policy</i>	669

### **The Aggregate Supply Curve 670**

Why Does the AS Curve Slope Upward?	671
<i>Inflation Inertia</i>	671
<i>Output Gaps and Inflation</i>	674
Deriving the AS Curve: Graphical Analysis	674
What Causes the AS Curve to Shift?	675
<i>Changes in Available Resources and Technology</i>	675
<i>Changes in Inflation Expectations</i>	676
<i>Inflation Shocks</i>	677

### **Understanding Business Cycles 678**

Demand Shocks: Shifts in the AD Curve	678
Inflation Shocks: Shifts in the AS Curve	679
Using the AD-AS Model to Study Business Cycles	680
<i>Five Steps for Using the AD-AS Model to Study Business Cycles</i>	680
<i>Using AD-AS to Analyze the Great Recession</i>	680

### **The Self-Correcting Economy and Stabilization Policy 682**

The Self-Correcting Economy	682
<i>An Expansionary Gap</i>	683
<i>A Recessionary Gap</i>	683
A Role for Stabilization Policy?	684
<i>Summary</i>	685 • <i>Key Terms</i> 685
<i>Review Questions</i>	685 • <i>Problems</i> 686
<i>Answers to Concept Checks</i>	686

## **Chapter 25 Macroeconomic Policy 689**

### **What Is the Role of Stabilization Policy? 690**

Stabilization Policy and Demand Shocks	691
Stabilization Policy and Inflation Shocks	692

### **THE ECONOMIC NATURALIST 25.1 694**

### **THE ECONOMIC NATURALIST 25.2 695**

### **Inflationary Expectations and Credibility 696**

Central Bank Independence	697
Announcing a Numerical Inflation Target	698
Central Bank Reputation	700

### **Fiscal Policy and the Supply Side 700**

### **THE ECONOMIC NATURALIST 25.3 703**

### **Policymaking: Art or Science? 705**

*Summary* 707 • *Key Terms* 707

*Review Questions* 707 • *Problems* 708

*Answer to Concept Check* 709

**Chapter 26 Exchange Rates, International Trade, and Capital Flows 711**

**Exchange Rates 712**

- Nominal Exchange Rates 713
- Flexible versus Fixed Exchange Rates 715
- Should Exchange Rates Be Fixed or Flexible? 715
  - The Euro: A Common Currency for Europe* 716

**Exchange Rate Determination in the Short Run 717**

- A Supply and Demand Analysis 717
  - The Supply of Dollars* 718
  - The Demand for Dollars* 719
  - The Market Equilibrium Value of the Dollar* 720
- Changes in the Supply of Dollars 720
- Changes in the Demand for Dollars 721
- Does a Strong Currency Imply a Strong Economy? 721
- Monetary Policy and the Exchange Rate 722
  - The Exchange Rate as a Tool of Monetary Policy* 723

**Exchange Rate Determination in the Long Run 724**

- The Real Exchange Rate 724
- A Simple Theory of Exchange Rates: Purchasing Power Parity (PPP) 726
- Shortcomings of the PPP Theory 729

**International Capital Flows and the Balance of Trade 730**

- International Capital Flows 731
- The Determinants of International Capital Flows 732
- Saving, Investment, and Capital Inflows 733
- The Saving Rate and the Trade Deficit 736
- Summary* 739 • *Key Terms* 740
- Review Questions* 740 • *Problems* 740
- Answers to Concept Checks* 742

*Glossary* G-1

*Index* I-1

# SEVEN CORE PRINCIPLES

## CORE PRINCIPLE 1

### The Scarcity Principle

(also called the “No-Free-Lunch Principle”)

Although we have boundless needs and wants, the resources available to us are limited. So having more of one good thing usually means having less of another.

Scarcity

## CORE PRINCIPLE 2

### The Cost-Benefit Principle

An individual (or a firm or a society) should take an action if, and only if, the extra benefits from taking the action are at least as great as the extra costs.

Cost-Benefit

## CORE PRINCIPLE 3

### The Incentive Principle

A person (or a firm or a society) is more likely to take an action if its benefit rises, and less likely to take it if its cost rises. In short, incentives matter.

Incentive

## CORE PRINCIPLE 4

### The Principle of Comparative Advantage

Everyone does best when each person (or each country) concentrates on the activities for which his or her opportunity cost is lowest.

Comparative Advantage

## CORE PRINCIPLE 5

### The Principle of Increasing Opportunity Cost

(also called the “Low-Hanging-Fruit Principle”)

In expanding the production of any good, first employ those resources with the lowest opportunity cost, and only afterward turn to resources with higher opportunity costs.

Increasing Opportunity Cost

## CORE PRINCIPLE 6

### The Efficiency Principle

Efficiency is an important social goal because when the economic pie grows larger, everyone can have a larger slice.

Efficiency

## CORE PRINCIPLE 7

### The Equilibrium Principle

(also called the “No-Cash-on-the-Table Principle”)

A market in equilibrium leaves no unexploited opportunities for individuals but may not exploit all gains achievable through collective action.

Equilibrium



# ECONOMIC NATURALIST EXAMPLES

- 1.1 Why do many hardware manufacturers include more than \$1,000 of “free” software with a computer selling for only slightly more than that?
- 1.2 Why don't auto manufacturers make cars without heaters?
- 1.3 Why do the keypad buttons on drive-up automatic teller machines have Braille dots?
- 2.1 Where have all the .400 hitters gone?
- 2.2 What happened to the U.S. lead in the TV and digital video markets?
- 2.3 If trade between nations is so beneficial, why are free-trade agreements so controversial?
- 2.4 Is PBS economics reporter Paul Solman's job a likely candidate for outsourcing?
- 3.1 Who gets the most conveniently located apartments?
- 3.2 Why do major term papers go through so many more revisions today than in the 1970s?
- 3.3 Why do the prices of some goods, like airline tickets to Europe, go up during the months of heaviest consumption, while others, like sweet corn, go down?
- 4.1 Will a higher tax on cigarettes curb teenage smoking?
- 4.2 Why was the luxury tax on yachts such a disaster?
- 4.3 Why are gasoline prices so much more volatile than car prices?
- 5.1 Why does California experience chronic water shortages?
- 5.2 Why do the wealthy in Manhattan live in smaller houses than the wealthy in Seattle?
- 5.3 Why did people turn to four-cylinder cars in the 1970s, only to shift back to six- and eight-cylinder cars in the 1990s?
- 5.4 Why are the automobile engines smaller in England than in the United States?
- 5.5 Why are waiting lines longer in poorer neighborhoods?
- 6.1 When recycling is left to private market forces, why are many more aluminum beverage containers recycled than glass ones?
- 7.1 Why do supermarket checkout lines all tend to be roughly the same length?
- 7.2 Are there “too many” smart people working as corporate earnings forecasters?
- 8.1 Why does Intel sell the overwhelming majority of all microprocessors used in personal computers?
- 8.2 Why do many movie theaters offer discount tickets to students?
- 8.3 Why might an appliance retailer instruct its clerks to hammer dents into the sides of its stoves and refrigerators?
- 9.1 Why are cartel agreements notoriously unstable?
- 9.2 How did Congress unwittingly solve the television advertising dilemma confronting cigarette producers?
- 9.3 Why do people shout at parties?
- 9.4 Why do we often see convenience stores located on adjacent street corners?
- 10.1 What is the purpose of free speech laws?
- 10.2 Why does the government subsidize private property owners to plant trees on their hillsides?
- 10.3 Why do blackberries in public parks get picked too soon?
- 10.4 Why are shared milkshakes consumed too quickly?
- 10.5 Why do football players take anabolic steroids?
- 11.1 Why is finding a knowledgeable salesclerk often difficult?
- 11.2 Why did Rivergate books, the last bookstore in Lambertville, New Jersey, go out of business?
- 11.3 Why do firms insert the phrase “As advertised on TV” when they advertise their products in magazines and newspapers?
- 11.4 Why do many companies care so much about elite educational credentials?
- 11.5 Why do many clients seem to prefer lawyers who wear expensive suits?
- 11.6 Why do males under 25 years of age pay more than other drivers for auto insurance?
- 11.7 Why do opponents of the death penalty often remain silent?
- 11.8 Why do proponents of legalized drugs remain silent?
- 12.1 If unionized firms have to pay more, how do they manage to survive in the face of competition from their nonunionized counterparts?
- 12.2 Why do some ad copy writers earn more than others?
- 12.3 Why does Renée Fleming earn millions more than sopranos of only slightly lesser ability?
- 13.1 Why is a patient with a sore knee more likely to receive an MRI exam if he has conventional health insurance than if he belongs to a health maintenance organization?
- 13.2 Why does the government require safety seats for infants who travel in cars but not for infants who travel in airplanes?
- 13.3 Why do many states have laws requiring students to be vaccinated against childhood illnesses?
- 13.4 Why do more Secret Service agents guard the president than the vice president, and why do no Secret Service agents guard college professors?
- 14.1 Why don't most married couples contribute equally to joint purchases?
- 14.2 Why do television networks favor the *Kardashians* over *Masterpiece Theatre*?
- 14.3 Why does check-splitting make the total restaurant bill higher?
- 14.4 Why do legislators often support one another's pork barrel spending programs?
- 15.1 Can nominal and real GDP ever move in different directions?
- 15.2 Why do people work fewer hours today than their great-grandparents did?
- 15.3 Why do far fewer children complete high school in poor countries than in rich countries?
- 16.1 What is core inflation?
- 18.1 Why did medieval China stagnate economically?
- 18.2 Why do almost all countries provide free public education?
- 19.1 Why has investment in computers increased so much in recent decades?
- 21.1 Why did Coca-Cola Co. test a vending machine that “knows” when the weather is hot?
- 23.1 Why does news of inflation hurt the stock market?
- 23.2 Why does the average Argentine hold more U.S. dollars than the average U.S. citizen?
- 25.1 How was inflation conquered in the 1980s?
- 25.2 What caused the Great Moderation?
- 25.3 Why do Americans work more hours than Europeans?

# Thinking Like an Economist



Nick Doiding/cultura/Corbis

## PEOPLE OFTEN MAKE BAD DECISIONS BECAUSE THEY FAIL TO COMPARE THE RELEVANT COSTS AND BENEFITS

**H**ow many students are in your introductory economics class? Some classes have just 20 or so. Others average 35, 100, or 200 students. At some schools, introductory economics classes may have as many as 2,000 students. What size is best?

If cost were no object, the best size might be a single student. Think about it: the whole course, all term long, with just you and your professor! Everything could be custom-tailored to your own background and ability. You could cover the material at just the right pace. The tutorial format also would promote close communication and personal trust between you and your professor. And your grade would depend more heavily on what you actually learned than on your luck when taking multiple-choice exams. Let's suppose, for the sake of discussion, that students have been shown to learn best in the tutorial format.

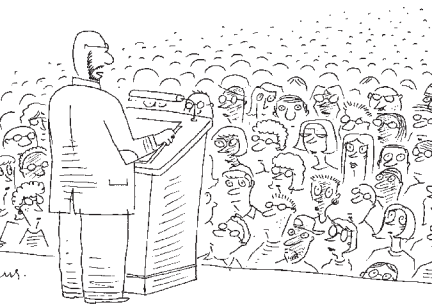
Why, then, do so many introductory classes still have hundreds of students? The simple reason is that costs *do* matter. They matter not just to the university administrators who must build classrooms and pay faculty salaries, but also to *you*. The direct cost of providing you with your own personal introductory economics course might easily top \$50,000. *Someone* has to pay these costs. In private universities, a large share of the cost would be recovered directly from higher tuition payments. In state universities, the

### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- LO1 Explain and apply the Scarcity Principle, which says that having more of any good thing necessarily requires having less of something else.
- LO2 Explain and apply the Cost-Benefit Principle, which says that an action should be taken if, but only if, its benefit is at least as great as its cost.
- LO3 Discuss three important pitfalls that occur when applying the Cost-Benefit Principle inconsistently.
- LO4 Explain and apply the Incentive Principle, which says that if you want to predict people's behavior, a good place to start is by examining their incentives.





Are small classes “better” than large ones?

**economics** the study of how people make choices under conditions of scarcity and of the results of those choices for society

### Scarcity

burden would be split between higher tuition payments and higher tax payments. But, in either case, the course would be unaffordable for most students.

With larger classes, of course, the cost per student goes down. For example, an introductory economics course with 300 students might cost as little as \$200 per student. But a class that large would surely compromise the quality of the learning environment. Compared to the custom tutorial format, however, it would be dramatically more affordable.

In choosing what size introductory economics course to offer, then, university administrators confront a classic economic trade-off. In making the class larger, they lower the quality of instruction—a bad thing. At the same time, they reduce costs and hence the tuition students must pay—a good thing.

In this chapter, we’ll introduce three simple principles that will help you understand and explain patterns of behavior you observe in the world around you. These principles also will help you avoid three pitfalls that plague decision makers in everyday life.

## ECONOMICS: STUDYING CHOICE IN A WORLD OF SCARCITY

Even in rich societies like the United States, *scarcity* is a fundamental fact of life. There is never enough time, money, or energy to do everything we want to do or have everything we’d like to have. **Economics** is the study of how people make choices under conditions of scarcity and of the results of those choices for society.

In the class-size example just discussed, a motivated economics student might definitely prefer to be in a class of 20 rather than a class of 100, everything else being equal. But other things, of course, are not equal. Students can enjoy the benefits of having smaller classes, but only at the price of having less money for other activities. The student’s choice inevitably will come down to the relative importance of competing activities.

That such trade-offs are widespread and important is one of the Core Principles of economics. We call it the *Scarcity Principle* because the simple fact of scarcity makes trade-offs necessary. Another name for the Scarcity Principle is the *No-Free-Lunch Principle* (which comes from the observation that even lunches that are given to you are never really free—somebody, somehow, always has to pay for them).

**The Scarcity Principle (also called the No-Free-Lunch Principle):** Although we have boundless needs and wants, the resources available to us are limited. So having more of one good thing usually means having less of another.

Inherent in the idea of a trade-off is the fact that choice involves compromise between competing interests. Economists resolve such trade-offs by using cost-benefit analysis, which is based on the disarmingly simple principle that an action should be taken if, and only if, its benefits exceed its costs. We call this statement the *Cost-Benefit Principle*, and it, too, is one of the Core Principles of economics:

### Cost-Benefit

**The Cost-Benefit Principle:** An individual (or a firm or a society) should take an action if, and only if, the extra benefits from taking the action are at least as great as the extra costs.

With the Cost-Benefit Principle in mind, let’s think about our class-size question again. Imagine that classrooms come in only two sizes—100-seat lecture halls and 20-seat classrooms—and that your university currently offers introductory economics courses to classes of 100 students. Question: Should administrators reduce the class size to 20 students? Answer: Reduce if, and only if, the value of the improvement in instruction outweighs its additional cost.

This rule sounds simple. But to apply it we need some way to measure the relevant costs and benefits, a task that’s often difficult in practice. If we make a few

simplifying assumptions, however, we can see how the analysis might work. On the cost side, the primary expense of reducing class size from 100 to 20 is that we'll now need five professors instead of just one. We'll also need five smaller classrooms rather than a single big one, and this too may add slightly to the expense of the move. Let's suppose that classes with 20 cost \$1,000 per student more than those with 100. Should administrators switch to the smaller class size? If they apply the Cost-Benefit Principle, they will realize that *doing so makes sense only if the value of attending the smaller class is at least \$1,000 per student greater than the value of attending the larger class.*

Would you (or your family) be willing to pay an extra \$1,000 for a smaller class? If not, and if other students feel the same way, then sticking with the larger class size makes sense. But if you and others would be willing to pay the extra tuition, then reducing the class size makes good economic sense.

*Notice that the "best" class size, from an economic point of view, will generally not be the same as the "best" size from the point of view of an educational psychologist.* That's because the economic definition of "best" takes into account both the benefits *and* the costs of different class sizes. The psychologist ignores costs and looks only at the learning benefits of different class sizes.

In practice, of course, different people feel differently about the value of smaller classes. People with high incomes, for example, tend to be willing to pay more for the advantage. That helps to explain why average class size is smaller, and tuition higher, at private schools whose students come predominantly from high-income families.

The cost-benefit framework for thinking about the class-size problem also suggests a possible reason for the gradual increase in average class size that has been taking place in American colleges and universities. During the last 30 years, professors' salaries have risen sharply, making smaller classes more costly. During the same period, median family income—and hence the willingness to pay for smaller classes—has remained roughly constant. When the cost of offering smaller classes goes up but willingness to pay for smaller classes does not, universities shift to larger class sizes.

Scarcity and the trade-offs that result also apply to resources other than money. Bill Gates is one of the richest men on Earth. His wealth was once estimated at over \$100 billion. That's more than the combined wealth of the poorest 40 percent of Americans. Gates could buy more houses, cars, vacations, and other consumer goods than he could possibly use. Yet he, like the rest of us, has only 24 hours each day and a limited amount of energy. So even he confronts trade-offs. Any activity he pursues—whether it be building his business empire or redecorating his mansion or tending to his charitable foundation—uses up time and energy that he could otherwise spend on other things. Indeed, someone once calculated that the value of Gates's time is so great that pausing to pick up a \$100 bill from the sidewalk simply wouldn't be worth his while.

## APPLYING THE COST-BENEFIT PRINCIPLE

In studying choice under scarcity, we'll usually begin with the premise that people are **rational**, which means they have well-defined goals and try to fulfill them as best they can. The Cost-Benefit Principle is a fundamental tool for the study of how rational people make choices.

As in the class-size example, often the only real difficulty in applying the cost-benefit rule is to come up with reasonable measures of the relevant benefits and costs. Only in rare instances will exact dollar measures be conveniently available. But the cost-benefit framework can lend structure to your thinking even when no relevant market data are available.

To illustrate how we proceed in such cases, the following example asks you to decide whether to perform an action whose cost is described only in vague, qualitative terms.

### Cost-Benefit



IAN LANGSDON/EPA /landov

If Bill Gates saw a \$100 bill lying on the sidewalk, would it be worth his time to pick it up?

**rational person** someone with well-defined goals who tries to fulfill those goals as best he or she can

## Comparing Costs and Benefits

## EXAMPLE 1.1

**Should you walk downtown to save \$10 on a \$25 computer game?**

Imagine you are about to buy a \$25 computer game at the nearby campus store when a friend tells you that the same game is on sale at a downtown store for only \$15. If the downtown store is a 30-minute walk away, where should you buy the game?

## Cost-Benefit

The Cost-Benefit Principle tells us that you should buy it downtown if the benefit of doing so exceeds the cost. The benefit of taking any action is the dollar value of everything you gain by taking it. Here, the benefit of buying downtown is exactly \$10, since that's the amount you'll save on the price of the game. The cost of taking any action is the dollar value of everything you give up by taking it. Here, the cost of buying downtown is the dollar value you assign to the time and trouble it takes to make the trip. But how do we estimate that value?

One way is to perform the following hypothetical auction. Imagine that a stranger has offered to pay you to do an errand that involves the same walk downtown (perhaps to drop off a letter for her at the post office). If she offered you a payment of, say, \$1,000, would you accept? If so, we know that your cost of walking downtown and back must be less than \$1,000. Now imagine her offer being reduced in small increments until you finally refuse the last offer. For example, if you'd agree to walk downtown and back for \$9.00 but not for \$8.99, then your cost of making the trip is \$9.00. In this case, you should buy the game downtown because the \$10 you'll save (your benefit) is greater than your \$9.00 cost of making the trip.

But suppose your cost of making the trip had been greater than \$10. In that case, your best bet would have been to buy the game from the nearby campus store. Confronted with this choice, different people may choose differently, depending on how costly they think it is to make the trip downtown. But although there is no uniquely correct choice, most people who are asked what they would do in this situation say they would buy the game downtown.

## ECONOMIC SURPLUS

Suppose that in Example 1.1 your "cost" of making the trip downtown was \$9. Compared to the alternative of buying the game at the campus store, buying it downtown resulted in an **economic surplus** of \$1, the difference between the benefit of making the trip and its cost. In general, your goal as an economic decision maker is to choose those actions that generate the largest possible economic surplus. This means taking all actions that yield a positive total economic surplus, which is just another way of restating the Cost-Benefit Principle.

Note that the fact that your best choice was to buy the game downtown doesn't imply that you *enjoy* making the trip, any more than choosing a large class means that you prefer large classes to small ones. It simply means that the trip is less unpleasant than the prospect of paying \$10 extra for the game. Once again, you've faced a trade-off. In this case, the choice was between a cheaper game and the free time gained by avoiding the trip.

## OPPORTUNITY COST

Of course, your mental auction could have produced a different outcome. Suppose, for example, that the time required for the trip is the only time you have left to study for a difficult test the next day. Or suppose you are watching one of your favorite movies on cable, or that you are tired and would love a short nap. In such cases, we say that the **opportunity cost** of making the trip—that is, the value of what you must sacrifice to walk downtown and back—is high and you are more likely to decide against making the trip.

**economic surplus** the benefit of taking an action minus its cost

## Cost-Benefit

**opportunity cost** the value of what must be forgone to undertake an activity

Strictly speaking, your opportunity cost of engaging in an activity is the value of everything you must sacrifice to engage in it. For instance, if seeing a movie requires not only that you buy a \$10 ticket but also that you give up a \$20 babysitting job that you would have been willing to do for free, then the opportunity cost of seeing the film is \$30.

Under this definition, *all* costs—both implicit and explicit—are opportunity costs. Unless otherwise stated, we will adhere to this strict definition.

We must warn you, however, that some economists use the term *opportunity cost* to refer only to the implicit value of opportunities forgone. Thus, in the example just discussed, these economists wouldn't include the \$10 ticket price when calculating the opportunity cost of seeing the film. But virtually all economists would agree that your opportunity cost of not doing the babysitting job is \$20.

In the previous example, if watching the last hour of the cable TV movie is the most valuable opportunity that conflicts with the trip downtown, the opportunity cost of making the trip is the dollar value you place on pursuing that opportunity. It is the largest amount you'd be willing to pay to avoid missing the end of the movie. Note that the opportunity cost of making the trip is not the combined value of *all* possible activities you could have pursued, but only the value of your *best* alternative—the one you would have chosen had you not made the trip.

Throughout the text we'll pose concept checks like the one that follows. You'll find that pausing to answer them will help you to master key concepts in economics. Because doing these concept checks isn't very costly (indeed, many students report that they're actually fun), the Cost-Benefit Principle indicates that it's well worth your while to do them.



Cost-Benefit

### CONCEPT CHECK 1.1

You would again save \$10 by buying the game downtown rather than at the campus store, but your cost of making the trip is now \$12, not \$9. By how much would your economic surplus be smaller if you bought the game downtown rather than at the campus store?

## THE ROLE OF ECONOMIC MODELS

Economists use the Cost-Benefit Principle as an abstract model of how an idealized rational individual would choose among competing alternatives. (By “abstract model” we mean a simplified description that captures the essential elements of a situation and allows us to analyze them in a logical way.) A computer model of a complex phenomenon like climate change, which must ignore many details and includes only the major forces at work, is an example of an abstract model.

Noneconomists are sometimes harshly critical of the economist's cost-benefit model on the grounds that people in the real world never conduct hypothetical mental auctions before deciding whether to make trips downtown. But this criticism betrays a fundamental misunderstanding of how abstract models can help to explain and predict human behavior. Economists know perfectly well that people don't conduct hypothetical mental auctions when they make simple decisions. All the Cost-Benefit Principle really says is that a rational decision is one that is explicitly or implicitly based on a weighing of costs and benefits.

Most of us make sensible decisions most of the time, without being consciously aware that we are weighing costs and benefits, just as most people ride a bike without being consciously aware of what keeps them from falling. Through trial and error, we gradually learn what kinds of choices tend to work best in different contexts, just as bicycle riders internalize the relevant laws of physics, usually without being conscious of them.

Even so, learning the explicit principles of cost-benefit analysis can help us make better decisions, just as knowing about physics can help in learning to ride a bicycle.

For instance, when a young economist was teaching his oldest son to ride a bike, he followed the time-honored tradition of running alongside the bike and holding onto his son, then giving him a push and hoping for the best. After several hours and painfully skinned elbows and knees, his son finally got it. A year later, someone pointed out that the trick to riding a bike is to turn slightly in whichever direction the bike is leaning. Of course! The economist passed this information along to his second son, who learned to ride almost instantly. Just as knowing a little physics can help you learn to ride a bike, knowing a little economics can help you make better decisions.

#### RECAP

#### COST-BENEFIT ANALYSIS

Scarcity is a basic fact of economic life. Because of it, having more of one good thing almost always means having less of another (the Scarcity Principle). The Cost-Benefit Principle holds that an individual (or a firm or a society) should take an action if, and only if, the extra benefit from taking the action is at least as great as the extra cost. The benefit of taking any action minus the cost of taking the action is called the *economic surplus* from that action. Hence, the Cost-Benefit Principle suggests that we take only those actions that create additional economic surplus.

### THREE IMPORTANT DECISION PITFALLS<sup>1</sup>

Rational people will apply the Cost-Benefit Principle most of the time, although probably in an intuitive and approximate way, rather than through explicit and precise calculation. Knowing that rational people tend to compare costs and benefits enables economists to predict their likely behavior. As noted earlier, for example, we can predict that students from wealthy families are more likely than others to attend colleges that offer small classes. (Again, while the cost of small classes is the same for all families, their benefit, as measured by what people are willing to pay for them, tends to be higher for wealthier families.)

Yet researchers have identified situations in which people tend to apply the Cost-Benefit Principle inconsistently. In these situations, the Cost-Benefit Principle may not predict behavior accurately. But it proves helpful in another way, by identifying specific strategies for avoiding bad decisions.

#### PITFALL 1: MEASURING COSTS AND BENEFITS AS PROPORTIONS RATHER THAN ABSOLUTE DOLLAR AMOUNTS

As the next example makes clear, even people who seem to know they should weigh the pros and cons of the actions they are contemplating sometimes don't have a clear sense of how to measure the relevant costs and benefits.

#### Comparing Costs and Benefits

#### EXAMPLE 1.2

***Should you walk downtown to save \$10 on a \$2,020 laptop computer?***

You are about to buy a \$2,020 laptop computer at the nearby campus store when a friend tells you that the same computer is on sale at a downtown store for only \$2,010. If the downtown store is half an hour's walk away, where should you buy the computer?

<sup>1</sup>The examples in this section are inspired by the pioneering research of Daniel Kahneman and the late Amos Tversky. Kahneman was awarded the 2002 Nobel Prize in economics for his efforts to integrate insights from psychology into economics. You can read more about this work in Kahneman's brilliant 2011 book, *Thinking Fast and Slow* (New York: Macmillan).

Assuming that the laptop is light enough to carry without effort, the structure of this example is exactly the same as that of Example 1.1. The only difference is that the price of the laptop is dramatically higher than the price of the computer game. As before, the benefit of buying downtown is the dollar amount you'll save, namely, \$10. And since it's exactly the same trip, its cost also must be the same as before. So if you are perfectly rational, you should make the same decision in both cases. Yet when people are asked what they would do in these situations, the overwhelming majority say they'd walk downtown to buy the game but would buy the laptop at the campus store. When asked to explain, most of them say something like "The trip was worth it for the game because you save 40 percent, but not worth it for the laptop because you save only \$10 out of \$2,020."

This is faulty reasoning. The benefit of the trip downtown is not the *proportion* you save on the original price. Rather, it is the *absolute dollar amount* you save. The benefit of walking downtown to buy the laptop is \$10, exactly the same as for the computer game. And since the cost of the trip must also be the same in both cases, the economic surplus from making both trips must be exactly the same. That means that a rational decision maker would make the same decision in both cases. Yet, as noted, most people choose differently.

The pattern of faulty reasoning in the decision just discussed is one of several decision pitfalls to which people are often prone. In the discussion that follows, we will identify two additional decision pitfalls. In some cases, people ignore costs or benefits that they ought to take into account. On other occasions they are influenced by costs or benefits that are irrelevant.

### CONCEPT CHECK 1.2

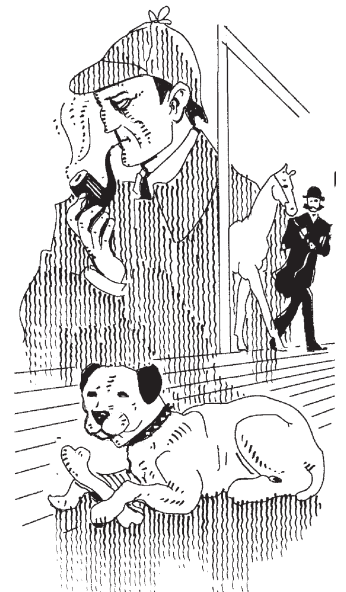
Which is more valuable: saving \$100 on a \$2,000 plane ticket to Tokyo or saving \$90 on a \$200 plane ticket to Chicago?

## PITFALL 2: IGNORING IMPLICIT COSTS

Sherlock Holmes, Arthur Conan Doyle's legendary detective, was successful because he saw details that most others overlooked. In *Silver Blaze*, Holmes is called on to investigate the theft of an expensive racehorse from its stable. A Scotland Yard inspector assigned to the case asks Holmes whether some particular aspect of the crime requires further study. "Yes," Holmes replies, and describes "the curious incident of the dog in the nighttime." "The dog did nothing in the nighttime," responds the puzzled inspector. But, as Holmes realized, that was precisely the problem! The watchdog's failure to bark when *Silver Blaze* was stolen meant that the watchdog knew the thief. This clue ultimately proved the key to unraveling the mystery.

Just as we often don't notice when a dog fails to bark, many of us tend to overlook the implicit value of activities that fail to happen. As discussed earlier, however, intelligent decisions require taking the value of forgone opportunities properly into account.

The opportunity cost of an activity, once again, is the value of all that must be forgone in order to engage in that activity. If buying a computer game downtown means not watching the last hour of a movie, then the value to you of watching the end of that movie is an implicit cost of the trip. Many people make bad decisions because they tend to ignore the value of such forgone opportunities. To avoid overlooking implicit costs, economists often translate questions like "Should I walk downtown?" into ones like "Should I walk downtown or watch the end of the movie?"



Implicit costs are like dogs that fail to bark in the night.

## Implicit Cost

## EXAMPLE 1.3

**Should you use your frequent-flyer coupon to fly to Fort Lauderdale for spring break?**

With spring break only a week away, you are still undecided about whether to go to Fort Lauderdale with a group of classmates at the University of Iowa. The round-trip airfare from Cedar Rapids is \$500, but you have a frequent-flyer coupon you could use for the trip. All other relevant costs for the vacation week at the beach total exactly \$1,000. The most you would be willing to pay for the Fort Lauderdale vacation is \$1,350. That amount is your benefit of taking the vacation. Your only alternative use for your frequent-flyer coupon is for your trip to Boston the weekend after spring break to attend your brother's wedding. (Your coupon expires shortly thereafter.) If the Cedar Rapids–Boston round-trip airfare is \$400, should you use your frequent-flyer coupon to fly to Fort Lauderdale for spring break?

## Cost-Benefit

The Cost-Benefit Principle tells us that you should go to Fort Lauderdale if the benefits of the trip exceed its costs. If not for the complication of the frequent-flyer coupon, solving this problem would be a straightforward matter of comparing your benefit from the week at the beach to the sum of all relevant costs. And since your airfare and other costs would add up to \$1,500, or \$150 more than your benefit from the trip, you would not go to Fort Lauderdale.

But what about the possibility of using your frequent-flyer coupon to make the trip? Using it for that purpose might make the flight to Fort Lauderdale seem free, suggesting you'd reap an economic surplus of \$350 by making the trip. But doing so also would mean you'd have to fork over \$400 for your airfare to Boston. So the implicit cost of using your coupon to go to Fort Lauderdale is really \$400. If you use it for that purpose, the trip still ends up being a loser because the cost of the vacation, \$1,400, exceeds the benefit by \$50. In cases like these, you're much more likely to decide sensibly if you ask yourself, "Should I use my frequent-flyer coupon for this trip or save it for an upcoming trip?"



Barry Barker/McGraw-Hill Companies

Is your flight to Fort Lauderdale "free" if you travel on a frequent-flyer coupon?

We cannot emphasize strongly enough that the key to using the Cost-Benefit Principle correctly lies in recognizing precisely what taking a given action prevents us from doing. Concept Check 1.3 illustrates this point by modifying the details of Example 1.3 slightly.

**CONCEPT CHECK 1.3**

Refer to given information in Example 1.3, but this time your frequent-flyer coupon expires in a week, so your only chance to use it will be for the Fort Lauderdale trip. Should you use your coupon?

**PITFALL 3: FAILURE TO THINK AT THE MARGIN**

When deciding whether to take an action, the only relevant costs and benefits are those that would occur as a result of taking the action. Sometimes people are influenced by costs they ought to ignore. Other times they compare the wrong costs and benefits. *The only costs that should influence a decision about whether to take an action are those we can avoid by not taking the action. Similarly, the only benefits we should consider are those that would not occur unless the action were taken.* As a practical matter, however, many decision makers appear to be influenced by costs or benefits that would have occurred no matter what. Thus, people are often influenced by **sunk costs**—costs that are

**sunk cost** a cost that is beyond recovery at the moment a decision must be made

beyond recovery at the moment a decision is made. For example, money spent on a nontransferable, nonrefundable airline ticket is a sunk cost.

As the following example illustrates, sunk costs must be borne *whether or not an action is taken*, so they are irrelevant to the decision of whether to take the action.

## Sunk Cost

## EXAMPLE 1.4

### **How much should you eat at an all-you-can-eat restaurant?**

Sangam, an Indian restaurant in Philadelphia, offers an all-you-can-eat lunch buffet for \$10. Customers pay \$10 at the door, and no matter how many times they refill their plates, there is no additional charge. One day, as a goodwill gesture, the owner of the restaurant tells 20 randomly selected guests that their lunch is on the house. The remaining guests pay the usual price. If all diners are rational, will there be any difference in the average quantity of food consumed by people in these two groups?

Having eaten their first helping, diners in each group confront the following question: “Should I go back for another helping?” For rational diners, if the benefit of doing so exceeds the cost, the answer is yes; otherwise it is no. Note that at the moment of decision, the \$10 charge for the lunch is a sunk cost. Those who paid it have no way to recover it. Thus, for both groups, the (extra) cost of another helping is exactly zero. And since the people who received the free lunch were chosen at random, there’s no reason their appetites or incomes should be any different from those of other diners. The benefit of another helping thus should be the same, on average, for people in both groups. And since their respective costs and benefits are the same, the two groups should eat the same number of helpings, on average.

Psychologists and economists have experimental evidence, however, that people in such groups do *not* eat similar amounts.<sup>2</sup> In particular, those for whom the luncheon charge is not waived tend to eat substantially more than those for whom the charge is waived. People in the former group seem somehow determined to “get their money’s worth.” Their implicit goal is apparently to minimize the average cost per bite of the food they eat. Yet minimizing average cost is not a particularly sensible objective. It brings to mind the man who drove his car on the highway at night, even though he had nowhere to go, because he wanted to boost his average fuel economy. The irony is that diners who are determined to get their money’s worth usually end up eating too much.

The fact that the cost-benefit criterion failed the test of prediction in Example 1.4 does nothing to invalidate its advice about what people *should* do. If you are letting sunk costs influence your decisions, you can do better by changing your behavior.

In addition to paying attention to costs and benefits that should be ignored, people often use incorrect measures of the relevant costs and benefits. This error often occurs when we must choose the *extent* to which an activity should be pursued (as opposed to choosing whether to pursue it at all). We can apply the Cost-Benefit Principle in such situations by repeatedly asking the question “Should I increase the level at which I am currently pursuing the activity?”

In attempting to answer this question, the focus should always be on the benefit and cost of an *additional* unit of activity. To emphasize this focus, economists refer to the cost of an additional unit of activity as its **marginal cost**. Similarly, the benefit of an additional unit of the activity is its **marginal benefit**.

**marginal cost** the increase in total cost that results from carrying out one additional unit of an activity

**marginal benefit** the increase in total benefit that results from carrying out one additional unit of an activity

<sup>2</sup>See, for example, Richard Thaler, “Toward a Positive Theory of Consumer Choice,” *Journal of Economic Behavior and Organization* 1, no. 1 (1980).