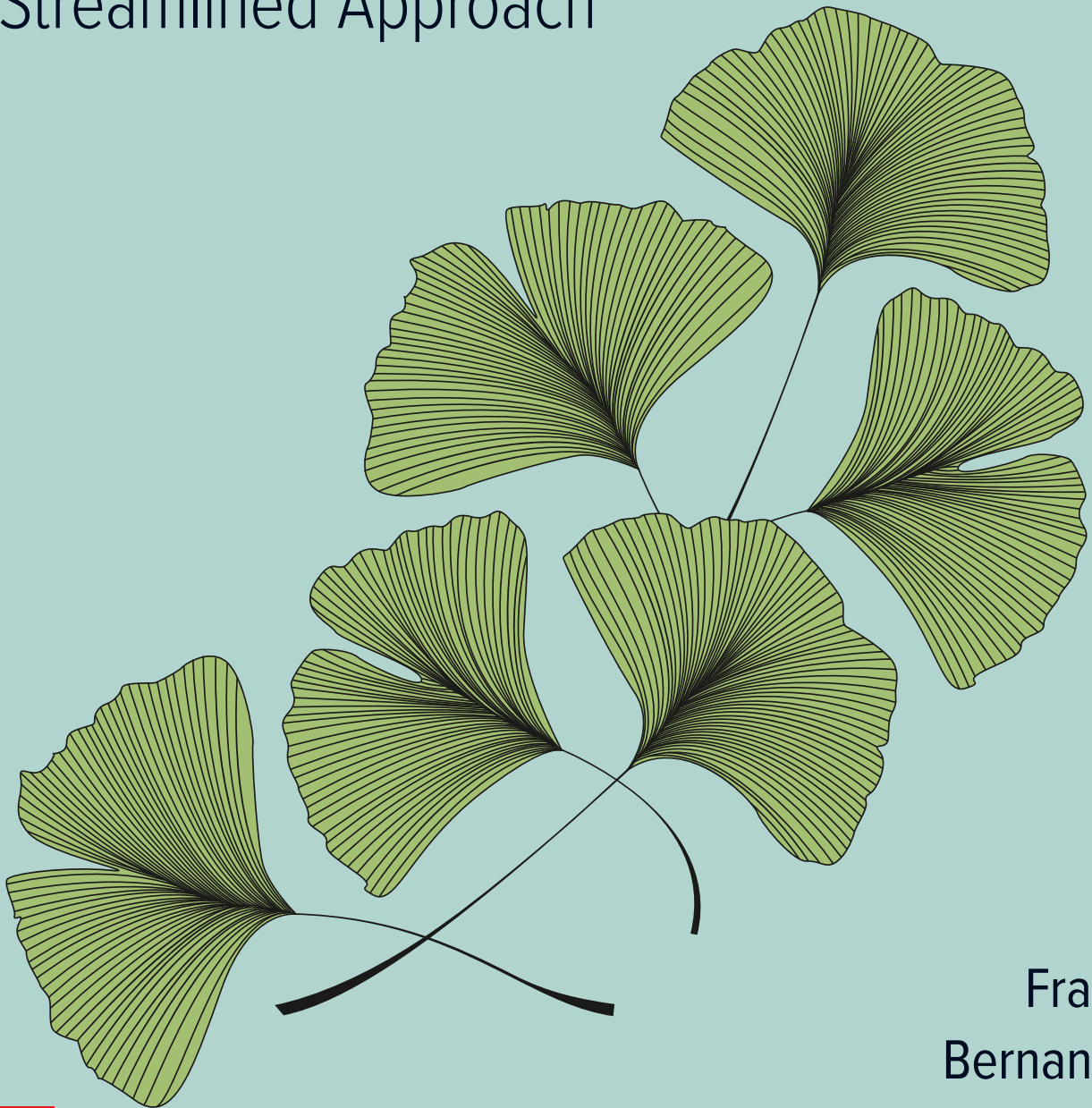


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fourth edition

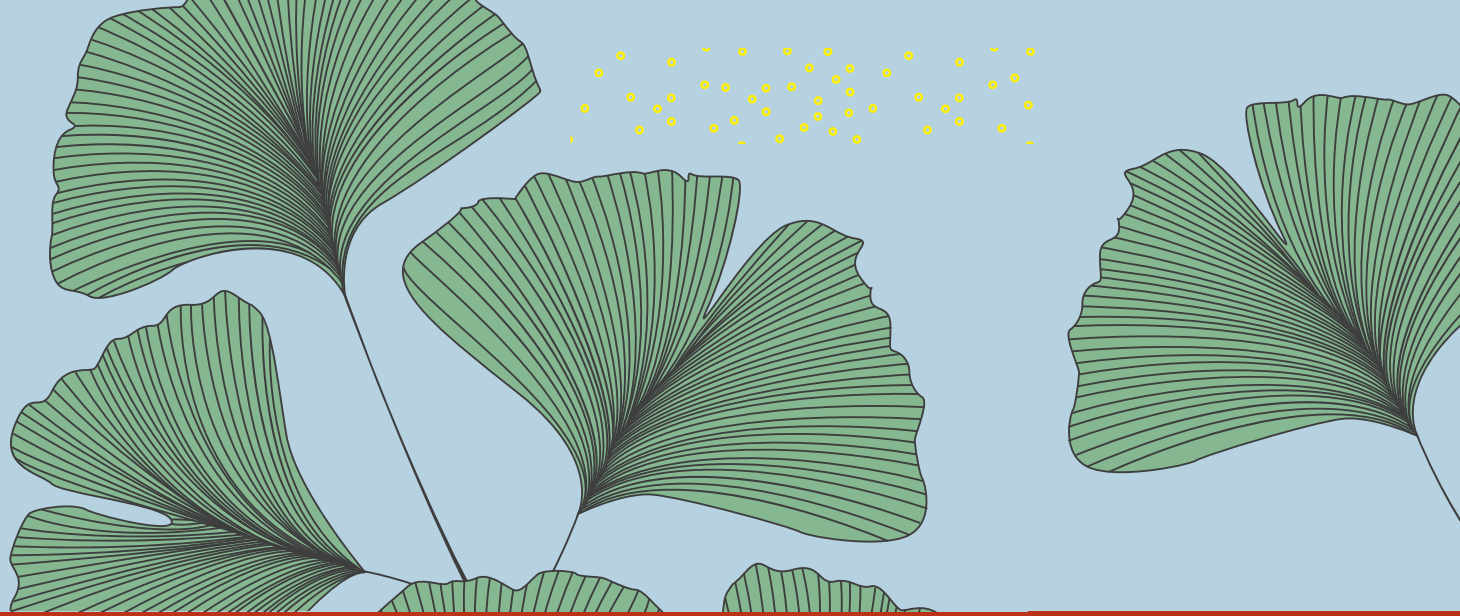
Principles of Microeconomics

A Streamlined Approach



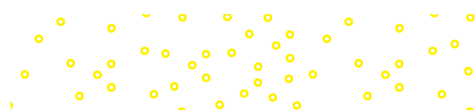
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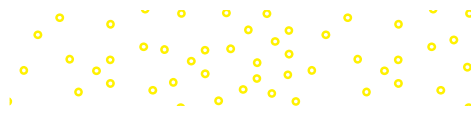
Frank
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FOURTH EDITION

Principles of
MICROECONOMICS
A STREAMLINED APPROACH





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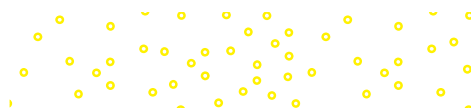
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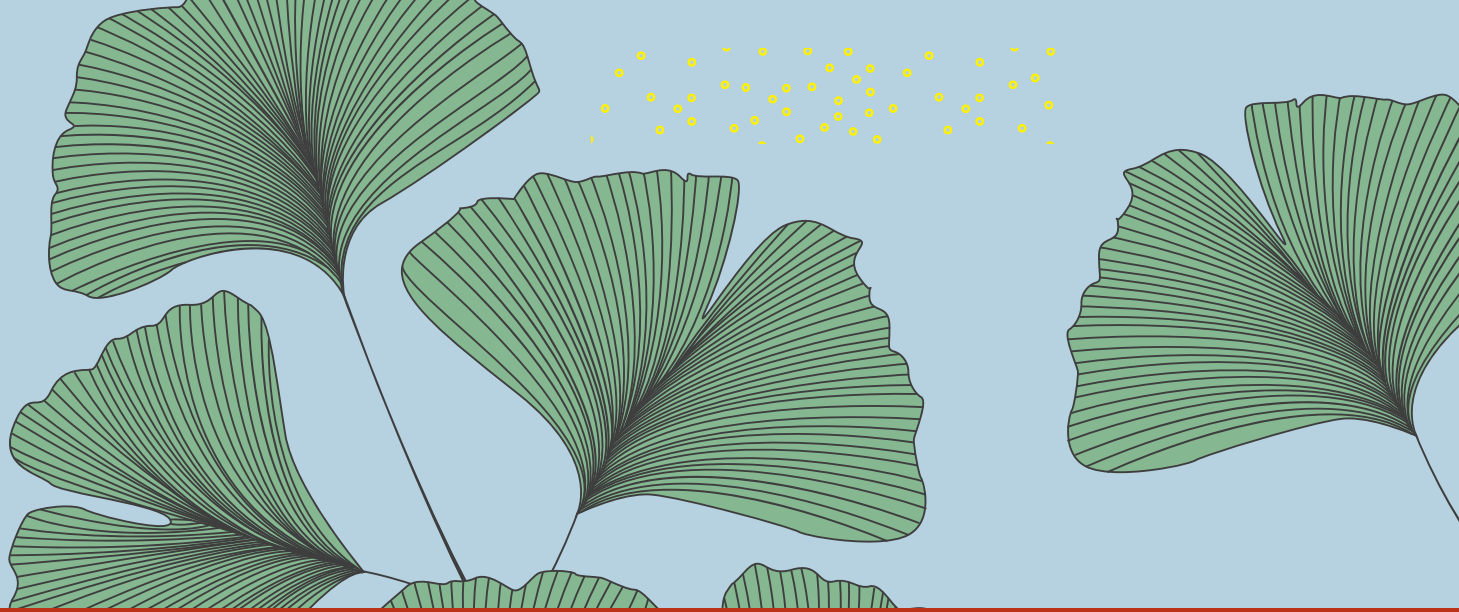
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FOURTH EDITION

Principles of
MICROECONOMICS
A STREAMLINED APPROACH

ROBERT H. FRANK

Cornell University

BEN S. BERNANKE

Brookings Institution [affiliated]

Former Chair, Board of Governors of the Federal Reserve System

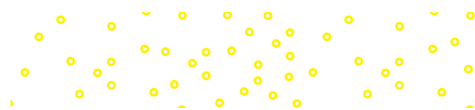
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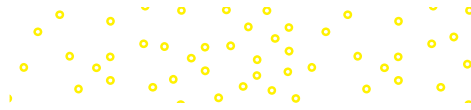
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ORI HEFFETZ

Cornell University and Hebrew University of Jerusalem

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PRINCIPLES OF MICROECONOMICS: A STREAMLINED APPROACH

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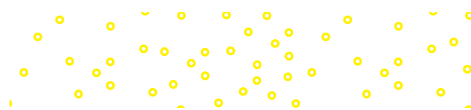
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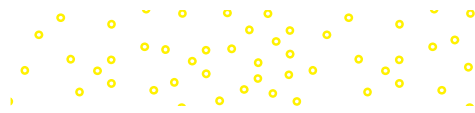
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DEDICATION

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R. H. F.

For Anna

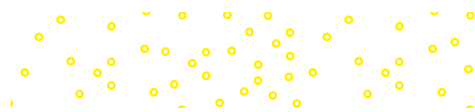
B. S. B.

For Fiona and Henry

K. A.

For Katrina, Eleanor, Daniel, and Amalia

O. H.



ABOUT THE AUTHORS

ROBERT H. FRANK



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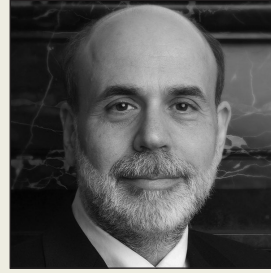
Robert H. Frank is the H. J. Louis Professor of Management and Professor of Economics, emeritus, at Cornell's Johnson School of Management, where he taught from 1972 to 2020. After receiving his B.S. from Georgia Tech in 1966, he taught math and science for two years as a Peace Corps Volunteer in rural 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. He also holds honorary doctorate degrees from the University of St. Gallen and Dalhousie University. 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 (1992–1993), Professor of American Civilization at l'École des Hautes Études en Sciences Sociales in Paris (2000–2001), and the Peter and Charlotte Schoenfeld Visiting Faculty Fellow at the NYU Stern School of Business in 2008–2009. His papers have appeared in the *American Economic Review*, *Econometrica*, the *Journal of Political Economy*, and other leading professional journals, and for more than two decades, his economics columns appeared regularly in *The New York Times*.

Professor Frank is the author of a best-selling intermediate economics textbook *Microeconomics and Behavior*, Tenth Edition (McGraw Hill, 2021). His research has focused on rivalry and cooperation in economic and social behavior. His books on these themes include *Choosing the Right Pond* (Oxford, 1985), *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), *The Darwin Economy* (Princeton, 2011), *Success and Luck* (Princeton, 2016), and *Under the Influence* (Princeton, 2020), which have been translated into 24 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.

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Professor Frank 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, 2012, and 2018, 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



©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 chair of the Economics Department. Professor Bernanke is currently a Distinguished Fellow in Residence with the Economic Studies Program at the Brookings Institution.

Professor Bernanke was sworn in on February 1, 2006, as chair and a member of the Board of Governors of the Federal Reserve System—his second term expired January 31, 2014. Professor Bernanke also served as chair of the Federal Open Market Committee, the Fed's principal monetary policymaking body. Professor Bernanke was also chair of the President's Council of Economic Advisers from June 2005 to January 2006.

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Professor Bernanke's intermediate textbook, with Andrew Abel and Dean Croushore, *Macroeconomics*, Ninth Edition (Addison-Wesley, 2017), is a best seller in its field. He has authored numerous 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 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. From 2001 to 2004 he served as editor of the *American Economic Review*, and served as the president of the American Economic Association in 2019. 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



©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. Professor Antonovics is also currently serving as the Provost of UC San Diego's Seventh College.

Professor Antonovics is known for her excellence in teaching and her innovative use of technology in the classroom. Her popular introductory-level microeconomics courses have regularly enrolled over 900 students each fall. She also teaches labor economics at both the undergraduate and graduate level. She has received numerous teaching awards, including the UCSD Department of Economics award for Best Undergraduate Teaching, the UCSD Academic Senate Distinguished Teaching Award, and the UCSD Chancellor's Associates Faculty Excellence Award in 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



©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, and at the Economics Department at the

Hebrew University of Jerusalem.

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 Cornell's Ithaca and New York City campuses and via live videoconferencing in dozens of cities across the United States, Canada, and Latin America.

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 Research Associate at the National Bureau of Economic Research (NBER), and serves on the editorial board of *Social Choice and Welfare*.

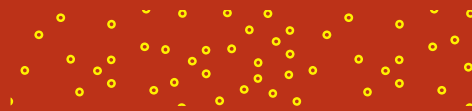
A LESS IS MORE FOCUS

Our fourth streamlined edition arrives in the midst of some of the most dramatic upheavals ever witnessed, both in the economy generally and in higher education in particular. The COVID-19 pandemic has produced levels of unemployment not seen since the Great Depression and has created dramatic changes in the ways we teach across educational institutions at every level.

These developments have reinforced our confidence in the instructional philosophy that motivated us to produce our first edition—the need to strip away clutter and focus more intensively on central concepts. This approach, we believe, is especially well suited for the new environment.

In earlier editions, we noted that although 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 economics 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. Such dismal performance, never defensible, has become even more difficult to justify in the face of looming resource shortages in higher education.

The problem, in our view, has almost always been that courses 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. The human brain tends to ignore new information unless it comes up repeatedly. That's hardly surprising, since only a tiny fraction of the terabytes of information that bombard us each day is likely to be relevant for anything we care about. Only when something comes up a third or fourth time does the brain start laying down new circuits for dealing with it. Yet when planning their lectures, many instructors ask themselves, "How much can I cover today?" And because modern electronic media enable them to click through upwards of 100 PowerPoint slides in an hour, they feel they better serve their students when they put more information before them. But that's not the way learning works! Professors should instead be asking, "How much can my students absorb?"



Our approach to this text was inspired by 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 ideas do most of the heavy lifting in economics, and that if we focus narrowly and repeatedly on those ideas, illustrating and applying them in numerous familiar contexts, 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. Our emphasis throughout is on active learning. We ask students to apply basic economic ideas themselves to answer related questions, exercises, and problems.

ADAPTING TO CLASSROOM TRENDS

Baumol's cost disease refers to the tendency for costs to rise more rapidly for goods and services for which growth in labor productivity is either slow or nonexistent. It is thus no surprise that the cost of traditional methods of delivering classroom instruction has been rising so much faster than the cost of producing most manufactured goods.

Largely as a result of Baumol's cost disease, tuition increases have far exceeded even the rapid growth in the cost of health care. This is what we would expect if the dominant teaching model remains as it was a century ago, in which a learned instructor stands in front of a class reciting truths cataloged in an assigned text. But as the late Herb Stein once remarked, "If something cannot go on forever, it will stop." And so it is with rising tuitions. Universities are already facing strong pressure to moderate their rates of tuition growth, pressure that has been greatly exacerbated by the COVID-19 pandemic.

One result has been that much of the content that professors have traditionally delivered in live lecture will instead be delivered electronically. Indeed, technological advances have given today's students an unparalleled ability to access information via the Internet, YouTube, and social media.

If early experience is any indication, the "flipped-classroom" model is one of the most promising adaptations to this new environment. In this approach, students are expected to study basic concepts before coming to class and then deepen their understanding of them through structured classroom exercises and discussion. The logic of the flipped classroom is compelling because under this approach, students have access to instructors precisely when students are engaged in those activities that students find the most challenging (for example, problem solving and policy evaluation). Indeed, numerous studies have found that the flipped-classroom

approach increases both student satisfaction and student learning.

A second adaptation, more pronounced in the wake of the COVID-19 lockdowns of March 2020, has been the move to remote instruction. The streamlined approach of this text is well suited for the goals of both the flipped-classroom and remote-instruction models. Rather than trying to bombard students with information they can easily access online, our book seeks to promote a deeper understanding of economics by focusing on core concepts. In addition, one of our central goals has been to create resources to help instructors promote student engagement outside the classroom. Some instructors may find these resources useful in completely overhauling the way they teach, while others may be interested in using them to make a few minor changes to their current courses.

In other words, this edition is intended to support a variety of teaching styles (and, indeed, our team of authors varies considerably in our pedagogical approach). The traditional approach has been to ask students to read the relevant sections from the textbook before coming to class. But instructors report that today's students are far less likely than their predecessors to complete such assignments. Stronger incentives can boost compliance. One effective approach assigns SmartBook chapters with adaptive questioning built in. Another administers brief tests at the start of class. These might involve two or three simple multiple-choice questions on the assigned material that are administered and graded electronically via audience response tools using smartphone apps.

Perhaps the biggest hurdle to effective implementation of the new teaching approaches has been a dearth of effective pre-class concept-delivery materials. To help fill this gap, we have created a library of short videos that focus on basic economic concepts. Many students have found these videos and animations engaging enough to watch even if they're not going to be tested on them, but we've also provided easily administered in-class questions that can boost compliance still further.

A big payoff in both the flipped-classroom and remote-instruction models comes from being able to use limited class time to discuss the concepts that students have studied before class. One approach begins by asking students to answer a multiple-choice question requiring application of a concept, and then reporting the frequencies with which students selected the various multiple-choice options. Students are then given a few moments to discuss the question—either with their neighbors in traditional classroom settings, or with fellow students in Zoom breakout rooms—before having an

opportunity to change the answers they originally submitted. Professors then call on students who've offered both correct and incorrect answers to the question to defend their answers to the class and lead the ensuing discussion. We've spent considerable effort drafting the kinds of questions that reliably provoke animated discussions of this sort.

In summary, here are the resources we have developed to support the flipped-classroom and remote-instruction approaches, all available within McGraw Hill Connect® specific to the fourth edition:

Before Class (Exposure)

- **SmartBook® Adaptive Reading Assignments:** SmartBook contains the same content as the print book, but actively tailors that content to the needs of the individual through adaptive probing and integrated learning resources. Instructions can assign SmartBook reading assignments for points to create incentives for students to come to class prepared.
- **Learning Glass Lecture Videos:** A collection of brief instructional videos featuring the authors, Kate Antonovics and Ori Heffetz, utilize exciting learning glass technology to provide students with an overview of important economic concepts. Perfect for an introduction to basic concepts before coming to class, or as a quick review, these videos can be accessed as resources within SmartBook, or are available as stand-alone assignments within Connect.

In Class (Engagement)

- **Clicker Questions:** Classroom-tested by the authors, these multiple-choice questions are designed to facilitate discussion and group work in class.
- **Economic Naturalist Application-Focused Videos:** A known hallmark of this franchise, the Economic Naturalist examples are now available as an expanded set of short, engaging video vignettes within Connect and SmartBook.

After Class (Reinforcement)

- **Connect Exercises:** All end-of-chapter homework exercises are available to be assigned within Connect. Many of these exercises include algorithmic variations and require students to interact with the graphing and tool within the platform. **Worked Problem Videos**, available as hints within Connect, work through these problems to aid in student understanding of core economic concepts and offer assistance with more challenging material.

- **Test Bank Assessment:** Hundreds of multiple-choice questions are available for summative assessments of the chapter content. Select problems are now offered as an algorithmic alternative, providing even more variation.

All of the above assets can be implemented by instructors as preferred in order to satisfy as much or as little of the flipped-classroom approach as is desired.

KEY THEMES AND FEATURES

Economic Naturalism

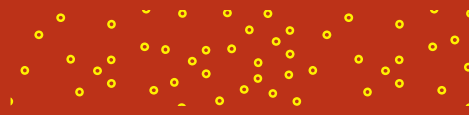
Relying on examples drawn from familiar contexts, we encourage students to become “economic naturalists,” people who employ basic economic principles to understand and explain what they observe in the world around them. An economic naturalist understands, for example, that infant safety seats are required 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 text. Each one, we believe, poses a question that should make any curious person eager to learn the answer.

Our ultimate goal is to produce economic naturalists—people who see each human interaction 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 follow:

- 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?

Economic Naturalist Video Series: We are very excited to offer an expanded video series based on Economic Naturalist examples. A series of videos covering some of our favorite micro- and macro-focused examples can be used as part of classroom presentations, or assigned for homework along with accompanying questions within McGraw Hill Connect®. These fascinating, fun, and thought-provoking applications of economics in everyday life encourage students to think like an economist. Refer to the distinguishing features pages of the preface for additional information. You can view one of these dynamic videos here: <http://econeveryday.com/why-do-cooked-rotisserie-chickens-cost-less-than-fresh-uncooked-chickens/>



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 self-tests 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 basic concepts, and are available within Connect as assignable content so that instructors can require students to engage with this material. Experience with earlier editions confirms that this approach really does prepare students to apply basic economic ideas to solve economic puzzles drawn from the real world.

Both the Economic Naturalist and Learning Glass videos and accompanying multiple-choice questions that test students' understanding of the principles illustrated in the videos have become valued tools for instructors who incorporate elements of the flipped-classroom approach in their teaching, or those who are relying more heavily on other forms of remote learning. Our less-is-more approach to topic coverage is also uniquely well suited to these new instructional approaches.

Modern Microeconomics

- *The cost-benefit principle, which tells us to take only those actions whose benefits exceed their costs, is the core idea behind the economic way of thinking.* Introduced in Chapter 1 and employed repeatedly thereafter, this principle is more fully developed here than in any other text. It 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—that is, taking those actions whose benefits exceed their costs—facilitates the achievement of every goal we care about.
- One of the biggest hurdles to the fruitful application of cost-benefit thinking is to recognize and measure the relevant costs and benefits. 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 7, *Games and Strategic Behavior*, we show how these principles enable students to answer a variety of strategic questions that arise in the marketplace and everyday life. In new Chapter 8, *An Introduction to Behavioral Economics*, we survey many of the most exciting developments in what has become the economics profession's most vibrant new field. 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 9, *Externalities and Property Rights*, we show how such devices function to minimize misallocations that result from externalities.

CHANGES IN THE FOURTH EDITION

Changes Common to All Chapters

In all chapters, the narrative has been tightened. Many of the examples have been updated, with a focus on student-centered examples that connect to current topics such as the COVID-19 pandemic. The examples, self-tests, and the end-of-chapter material from the previous edition have been redesigned to provide more clarity and ease of use. Data have been updated throughout.

Chapter-by-Chapter Changes

Chapter 1

- Updated student-centered examples, such as Netflix, wireless keyboards, dogwalking, and Jeff Bezos
- New and updated end-of-chapter problems that reinforce the chapter's learning objectives
- Updated appendix on working with equations, graphs, and tables based on electric scooter rentals

Chapter 2

- Updated student-centered examples, such as digital versus print ads and Marvel Studio films
- New Economic Naturalist, "Why was there a shortage of toilet paper during the COVID-19 pandemic?"
- Three new end-of-chapter questions that reinforce the chapter's learning objectives, including a question related to the drop in crude oil prices during the COVID-19 pandemic

Chapter 3

- Minor updates only
- Updated student-centered examples, such as LeBron James
- New Economic Naturalist, “Why would Jeff Bezos live in a smaller house in Manhattan than in Medina, Washington?”

Chapter 4

- Minor updates only

Chapter 5

- Minor updates only

Chapter 6

- Updated student-centered examples, such as Instagram, electric scooter rentals, iTunes, HBO, Netflix, and cable Internet
- Updated end-of-chapter problems

Chapter 7

- Updated student-centered examples, such as the Ford Mustang and Chevrolet Camaro

Chapter 8

- New to this edition, this chapter serves as an introduction to behavioral economics for those who wish to incorporate this thought-provoking material

Chapter 9

- Updated student-centered examples, such as roommate conflicts
- Updated end-of-chapter questions

Chapter 10

- Updated information on carbon taxes, including mention of the Paris Agreement
- Updated material on welfare payments, in-kind transfers, and the negative income tax

Chapter 11

- Updated student-centered examples, such as interior designer Kelly Wearstler
- Revised Economic Naturalist that discusses the U.S.-China trade war that started in 2018, highlighting that there is more to trade than the exchange of

goods and services and its supply and demand analysis in this chapter; also covers issues such as intellectual property and national security

ORGANIZED LEARNING IN THE FOURTH 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. Reports available within Connect allow instructors to easily output data related to student performance across chapter learning objectives, AACSB criteria, and Bloom’s Taxonomy Learning Categories.

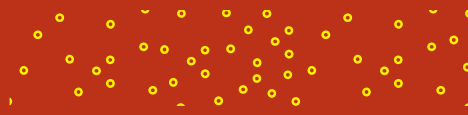
Assurance of Learning Ready

Many educational institutions today are focused on the notion of assurance of learning, an important element of some accreditation standards. *Principles of Microeconomics, A Streamlined Approach, 4/e*, is designed specifically to support your assurance of learning initiatives with a simple, yet powerful, solution. Instructors can use Connect to easily query for learning objectives that directly relate to the objectives of the course and then use the reporting features of Connect 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 Microeconomics, A Streamlined Approach, 4/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 Microeconomics, A Streamlined Approach, 4/e*, are provided only as a guide for the users of this text.



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Special thanks to Peggy Dalton Verner, Frostburg State University, for her energy, creativity, and help in refining the assessment material in both the text and Connect; Sukanya Kemp, University of Akron, for her detailed accuracy check of the learning glass and economic naturalist videos; Alvin Angeles and team at the University of California, San Diego, for their efforts in the production and editing of the learning glass videos; and Kevin Bertotti and the team at ITVK for their creativity in transforming Economic Naturalist examples into dynamic and engaging video vignettes.

Finally, our sincere thanks to the following teachers and colleagues, whose thorough reviews and thoughtful suggestions led to innumerable substantive improvements to *Principles of Microeconomics, A Streamlined Approach*, 4/e.

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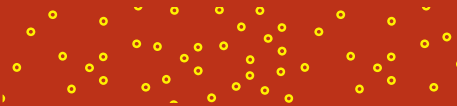
Ratha Ramoo, *Diablo Valley College*

Thomas Rhoads, *Towson University*

Bill Robinson, *University of Nevada–Las Vegas*

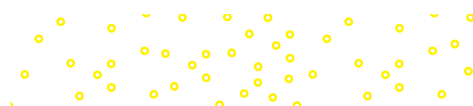
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DISTINGUISHING FEATURES

Economic Naturalist Examples and Videos

Each Economic Naturalist example starts with a question to spark curiosity and interest in learning an answer. These examples fuel interest while teaching students to see economics in the world around them. Videos of select and new Economic Naturalist examples are denoted in the margin of the material to which they pertain. They are housed within Connect with accompanying questions. A full list of Economic Naturalist examples and videos can be found in the following pages.

Numbered Examples

Throughout the text, numbered and titled examples are referenced and called out to further illustrate concepts. Our engaging questions and examples from everyday life highlight how each human action is the result of an implicit or explicit cost-benefit calculation.

SELF-TESTS

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 the self-test questions are found at the end of each chapter.

The Economic Naturalist 11.1

What is the China trade shock?

The China trade shock, a term most commonly associated with economists David Autor, David Dorn, and Gordon Hanson, is used to describe the dramatic change in international trade patterns that resulted from China's rise as a major player in the global economy over the past few decades.

In a series of influential studies, these economists and their collaborators investigated the costs of the shock to U.S. workers. They found that employment has fallen

ECONOMIC NATURALISM

With the rudiments of the cost-benefit framework under your belt, you are now in a position to become an "economic naturalist," someone who uses insights from economics to help make sense of observations from everyday life. People who have studied biology are able to observe and marvel at many details of nature that would otherwise have escaped their notice. For example, on a walk in the woods in early April, the novice may see only trees. In contrast, the biology student notices many different species of trees and understands why some are already in leaf while others still lie dormant. Likewise, the novice may notice that in some animal species males are much larger than females, but the biology student knows that pattern occurs only in species in which males take several mates. Natural selection favors larger males in those species because their greater size helps them prevail in the often bloody contests among males for access to females. In contrast, males tend to be roughly the same size as females in monogamous species, in which there is much less fighting for mates.



EXAMPLE 1.3

Implicit Cost

Should you use your frequent-flyer coupon to fly to Cancun for spring break?

With spring break only a week away, you are still undecided about whether to go to Cancun 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 Cancun vacation is \$1,350. That amount is your benefit of taking the vacation. Your only alternative use for your frequent-flyer coupon is for a 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 Cancun for spring break?

The Cost-Benefit Principle tells us that you should go to Cancun 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 because 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 Cancun.

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 Cancun 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 Cancun 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?"



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

SELF-TEST 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 her shots than other players. Based on this information, the assistant suggests to the head coach that the star player 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 her assistant for incompetence. What was wrong with the assistant's idea?

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 *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.

Recap

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

Worked Problem Videos

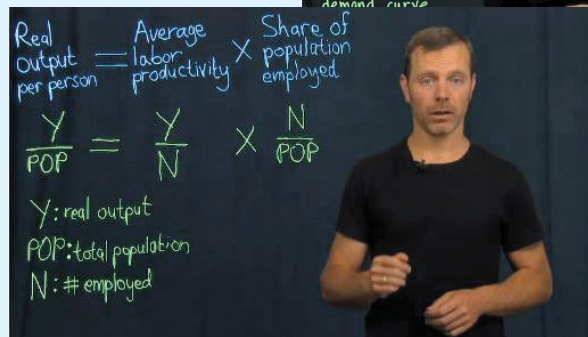
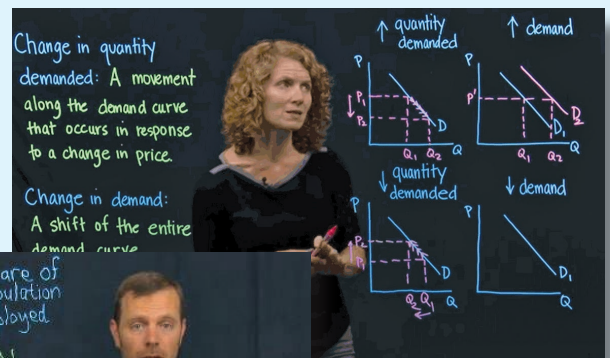
Brief videos work through end-of-chapter problems to aid in student understanding of core economic concepts and offer assistance with more challenging material. The videos are available as hints within Connect.

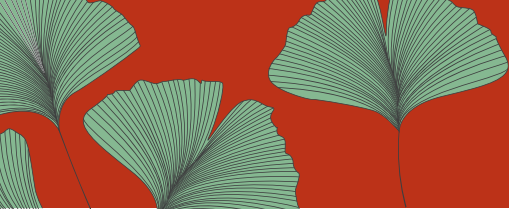
To earn extra money in the summer, you grow tomatoes and sell them at a local farmers' market for 30 cents per pound. By adding compost to your garden, you can increase your yield as shown in the table below. If compost costs 50 cents per pound and your goal is to make as much profit as possible, how many pounds of compost should you add?

Pounds of compost	Pounds of tomatoes	Additional pounds of tomatoes	Additional revenue (or marginal benefit)
	100		
1	120	20	\$ 6.00 ✓
2	125	5	\$ 1.50 ✓
3	128		
4	130		
5	131		
6	131.5		

LEARNING GLASS VIDEOS

Dozens of lecture videos featuring authors Kate Antonovics and Ori Heffetz utilize learning glass technology to provide you with an overview of important concepts. These videos can be accessed as resources within SmartBook® or as assignable content with questions via McGraw Hill Connect®.





ECONOMIC NATURALIST VIDEO SERIES

Behavioral Economics: Why do real estate agents often show clients two nearly identical houses, even though one is both cheaper and in better condition than the other?

Comparative Advantage: Why are many products designed in one place yet assembled in another?

Cost Benefit 1: Why does the light come on when you open the refrigerator door but not when you open the freezer?

Cost Benefit 2: Why are child safety seats required in automobiles but not in airplanes?

Discount Pricing: Why might an appliance retailer hammer dents into the sides of its stoves and refrigerators?

Elasticity: Why do people buy the same amount of salt as before even when the price of salt doubles?

Menu Costs: Will new technologies eliminate menu costs?

Monopolistic Competition: Why do we often see convenience stores located on adjacent street corners?

Prisoner's Dilemma: Why do people shout at parties?

Production Costs: Why are brown eggs more expensive than white ones?

Supply and Demand: Why are rotisserie chickens less expensive than fresh chickens?

Tariffs: Why do consumers in the United States often pay more than double the world price for sugar?

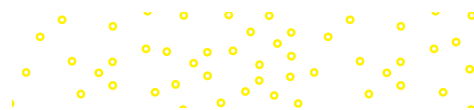
The Demand for Money: Why does the average Argentine citizen hold more U.S. dollars than the average U.S. citizen?

The Invisible Hand: Why do supermarket checkout lines all tend to be roughly the same length?

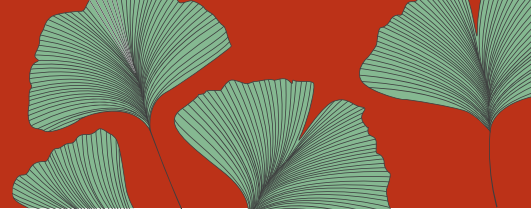
The Law of Demand: Why are smaller automobile engines more common in Europe than in the United States?

The Optimal Amount of Information: Why might a patient be more likely to receive an expensive magnetic resonance imaging (MRI) exam for a sore knee if covered under a conventional health insurance rather than a health maintenance organization (HMO) plan?

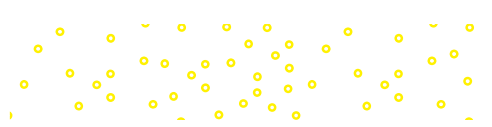
The Tragedy of the Commons and Property Rights: Why do blackberries in public parks get picked before they're completely ripe?



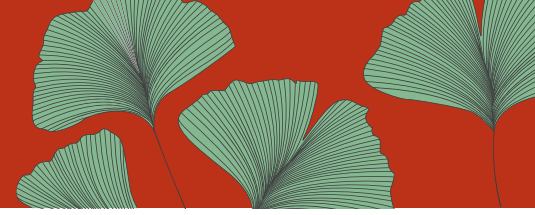
ECONOMIC NATURALIST EXAMPLES



- 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?
- 1.2 Why don’t auto manufacturers make cars without heaters?
- 1.3 Why do the keypad buttons on drive-up automated teller machines have Braille dots?
- 2.1 When the federal government implements a large pay increase for its employees, why do rents for apartments located near Washington Metro stations go up relative to rents for apartments located far away from Metro stations?
- 2.2 Why do major term papers go through so many more revisions today than in the 1970s?
- 2.3 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?
- 2.4 Why was there a shortage of toilet paper during the COVID-19 pandemic?
- 3.1 Why does California experience chronic water shortages?
- 3.2 Why would Jeff Bezos live in a smaller house in Manhattan than in Medina, Washington?
- 3.3 Why did people turn to four-cylinder cars in the 1970s, only to shift back to six- and eight-cylinder cars in the 1990s?
- 3.4 Why are automobile engines smaller in England than in the United States?
- 3.5 Why are waiting lines longer in poorer neighborhoods?
- 3.6 Will a higher tax on cigarettes curb teenage smoking?
- 3.7 Why was the luxury tax on yachts such a disaster?
- 4.1 When recycling is left to private market forces, why are many more aluminum beverage containers recycled than glass ones?
- 4.2 Why are gasoline prices so much more volatile than car prices?
- 5.1 Why do supermarket checkout lines all tend to be roughly the same length?
- 5.2 Are there “too many” smart people working as corporate earnings forecasters?
- 6.1 Why does Intel sell the overwhelming majority of all microprocessors used in personal computers?
- 6.2 Why do many movie theaters offer discount tickets to students?
- 6.3 Why might an appliance retailer instruct its clerks to hammer dents into the sides of its stoves and refrigerators?
- 7.1 Why are cartel agreements notoriously unstable?
- 7.2 How did Congress unwittingly solve the television advertising dilemma confronting cigarette producers?
- 7.3 Why do people shout at parties?
- 7.4 Why do we often see convenience stores located on adjacent street corners?
- 8.1 Why did the American Olympic swimmer Shirley Babashoff, who set one world record and six national records at the 1976 Olympics, refuse to appear on the cover of *Sports Illustrated*?
- 8.2 Why would people pay thousands of dollars to attend a weight-loss camp that will feed them only 1,500 calories per day?
- 8.3 Why was Obamacare difficult to enact and is harder still to repeal?
- 8.4 Why have attempts to privatize Social Security proved so politically unpopular in the United States?
- 8.5 If prosperous voters would be happier if they spent less on positional goods and lived in environments with more generously funded public sectors, why haven’t they elected politicians who would deliver what they want?
- 9.1 What is the purpose of free speech laws?
- 9.2 Why does the government subsidize private property owners to plant trees on their hillsides?
- 9.3 Why do blackberries in public parks get picked too soon?
- 9.4 Why are shared milkshakes consumed too quickly?
- 9.5 Why do football players take anabolic steroids?
- 10.1 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?
- 11.1 What is the China trade shock?
- 11.2 Why did the U.S. start a trade war with China?
- 11.3 What is fast track authority?



SUPPLEMENTS



The following ancillaries are available for quick download and convenient access via the Instructor Resource material available through McGraw Hill Connect®.

Solutions Manual

Prepared by the authors with assistance from Peggy Dalton Verner, Frostburg State University, this manual provides detailed answers to the end-of-chapter review questions and problems.

Test Bank

The test bank has been carefully revised and reviewed for accuracy. Hundreds of questions have been categorized by chapter learning objectives, AACSB learning categories, Bloom's Taxonomy objectives, and level of difficulty. Select problems are now offered as an algorithmic alternative, providing even more variation.

Test Builder in Connect

Available within Connect, Test Builder is a cloud-based tool that enables instructors to format tests that can be printed or administered within an LMS. Test Builder offers a modern, streamlined interface for easy content configuration that matches course needs, without requiring a download.

Test Builder allows you to:

- access all test bank content from a particular title.
- easily pinpoint the most relevant content through robust filtering options.
- manipulate the order of questions or scramble questions and/or answers.
- pin questions to a specific location within a test.
- determine your preferred treatment of algorithmic questions.
- choose the layout and spacing.
- add instructions and configure default settings.

Test Builder provides a secure interface for better protection of content and allows for just-in-time updates to flow directly into assessments.

PowerPoints

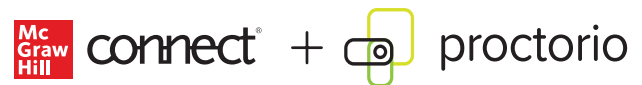
Presentation slides contain a detailed, chapter-by-chapter review of the important ideas presented in the

textbook, accompanied by animated graphs and slide notes. You can edit, print, or rearrange the slides to fit the needs of your course.

Customizable Micro Lecture Notes and PowerPoints

One of the biggest hurdles to an instructor considering changing textbooks is the prospect of having to prepare new lecture notes and slides. For the microeconomics chapters, this hurdle no longer exists. A full set of lecture notes for principles of microeconomics, prepared by Bob Frank for his award-winning introductory microeconomics course at Cornell University, is available as Microsoft Word files that instructors are welcome to customize as they see fit. The challenge for any instructor is to reinforce the lessons of the text in lectures without generating student unrest by merely repeating what's in the book. These lecture notes address that challenge by constructing examples that run parallel to those presented in the book, yet are different from them in interesting contextual ways. Also available is a complete set of richly illustrated PowerPoint files to accompany these lecture notes. Instructors are also welcome to customize these files as they wish.

Remote Proctoring and Browser-Locking Capabilities

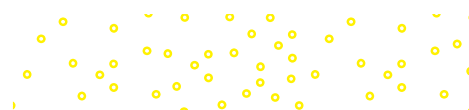


New remote proctoring and browser-locking capabilities, hosted by Proctorio within Connect, provide control of the assessment environment by enabling security options and verifying the identity of the student.

Seamlessly integrated within Connect, these services allow instructors to control students' assessment experience by restricting browser activity, recording students' activity, and verifying students are doing their own work.

Instant and detailed reporting gives instructors an at-a-glance view of potential academic integrity concerns, thereby avoiding personal bias and supporting evidence-based claims.

FOR MORE INFORMATION ABOUT CONNECT AND ITS AVAILABLE RESOURCES, REFER TO THE PAGES THAT FOLLOW.





Because learning changes everything.®

Connect Economics Asset Alignment with Bloom's Taxonomy

Principles of Microeconomics: A Streamlined Approach, 4e

We Take Students Higher

As a learning science company we create content that supports higher order thinking skills. Within Connect®, we tag assessments accordingly so you can filter your search, assign it, and receive reporting on it. These content asset types can be associated with one or more levels of Bloom's Taxonomy.

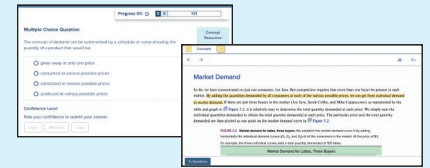
The chart below shows a few of the key assignable economics assets with *McGraw Hill Connect* aligned with Bloom's Taxonomy. Take your students higher by assigning a variety of applications, moving them from simple memorization to concept application.

	SmartBook 2.0	ECON Adaptive Math Prep	Videos	Exercises	Interactive Graphs	Application-Based Activities	ECON Everyday Current Events Blog*	Writing Assignment Plus
Higher Order Thinking Skills								
CREATE								✓
EVALUATE						✓	✓	✓
ANALYZE				✓	✓	✓	✓	✓
APPLY		✓	✓	✓	✓	✓	✓	✓
UNDERSTAND	✓	✓	✓	✓	✓	✓	✓	✓
LOWER ORDER Thinking Skills								
REMEMBER	✓	✓	✓	✓	✓	✓	✓	✓

* Outside of Connect.

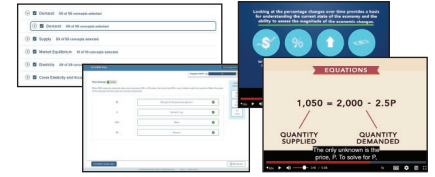
SmartBook 2.0

Adaptively aids students to study more efficiently by highlighting where in the chapter to focus, asking review questions and pointing them to passages in the text until they understand. Assignable and assessable.



Adaptive Econ Prep

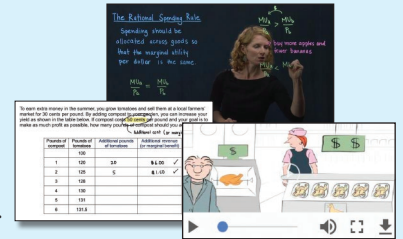
Math and graphing preparedness assignments help students refresh important prerequisite topics necessary to be successful in economics. New Adaptive Econ Prep Tool provides students just-in-time math remediation that is prerequisite to success in Principles of Economics courses and adapts to each student.



Videos

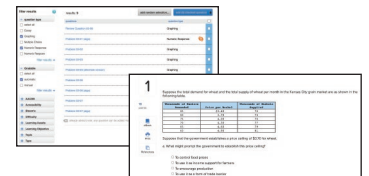
Worked examples and real-world application videos help students learn economics.

Learning Glass videos reinforce challenging topics featuring the authors and innovative learning glass technology. **Economic Naturalist videos** bring examples to life showing interesting applications of economic concepts. **Worked Problem videos** work through select end-of-chapter questions for extra help and guidance through challenging material.



Exercises

Exercises with algorithmic variations provide ample opportunities for students to practice and hone quantitative skills. Graphing Exercises provide opportunities for students to draw, interact with, manipulate, and analyze graphs.



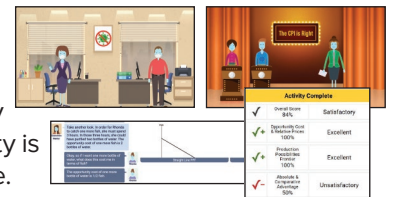
Interactive Graphs

Interactive Graphs provide visual displays of real data and economic concepts for students to manipulate. All graphs are accompanied by assignable assessment questions and feedback to guide students through the experience of learning to read and interpret graphs and data.



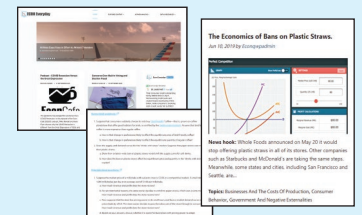
Application-Based Activities

Immersive real-life scenarios engage students and put them in the role of everyday economists. Students practice their economic thinking and problem-solving skills as they apply course concepts and see the implications of their decisions as they go. Each activity is designed as a 15-minute experience, unless students eagerly replay for a better outcome.



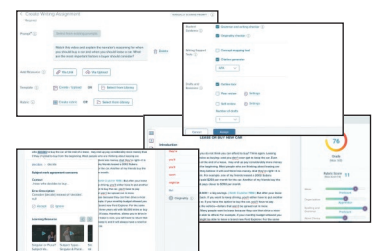
ECON Everyday Blog*

Our ECON Everyday blog saves instructors time bringing current, student-centered content into their course all semester long. Short articles, written for principles-level students, are tagged by topic to bring currency into your course. We also provide discussion questions to help you drive the conversation forward. Visit www.econeveryday.com and subscribe for updates. (*Outside of Connect.)



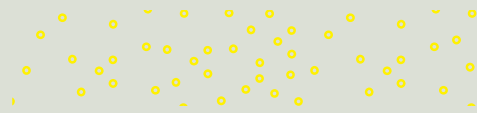
Writing Assignment Plus

Writing Assignment Plus delivers a learning experience that helps students improve their written communication skills and conceptual understanding. Faculty can assign, monitor, grade, and provide feedback on writing projects efficiently. Built-in grammar and writing review helps students improve writing quality while an originality check helps students correct central plagiarism before submission. End result? Improved workplace skills of writing in critical thinking.





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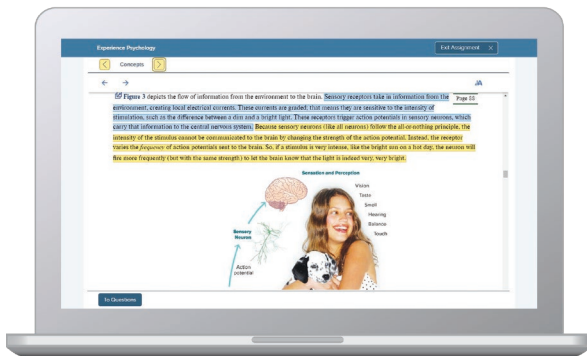
Instructors: Student Success Starts with You

Tools to enhance your unique voice

Want to build your own course? No problem. Prefer to use our turnkey, prebuilt course? Easy. Want to make changes throughout the semester? Sure. And you'll save time with Connect's auto-grading too.

65%

Less Time Grading



Laptop: McGraw Hill; Woman/dog: George Doyle/Getty Images

Study made personal

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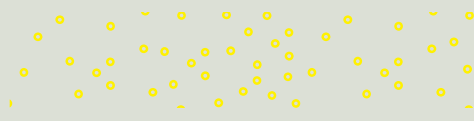
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COMPARISON GUIDE FOR FRANK, BERNANKE, ANTONOVICS, AND HEFFETZ PRODUCTS

Principles of Economics provides enhanced coverage and offers more topics and mathematical rigor. *Principles of Economics: A Streamlined Approach* is a stripped-down version of the big book featuring core content with a less-is-more approach. See which product is right for you!

Comparison Guide							
Principles of Economics, 8th edition				Principles of Economics: A Streamlined Approach, 4th edition			
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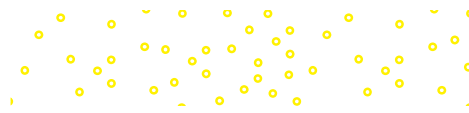
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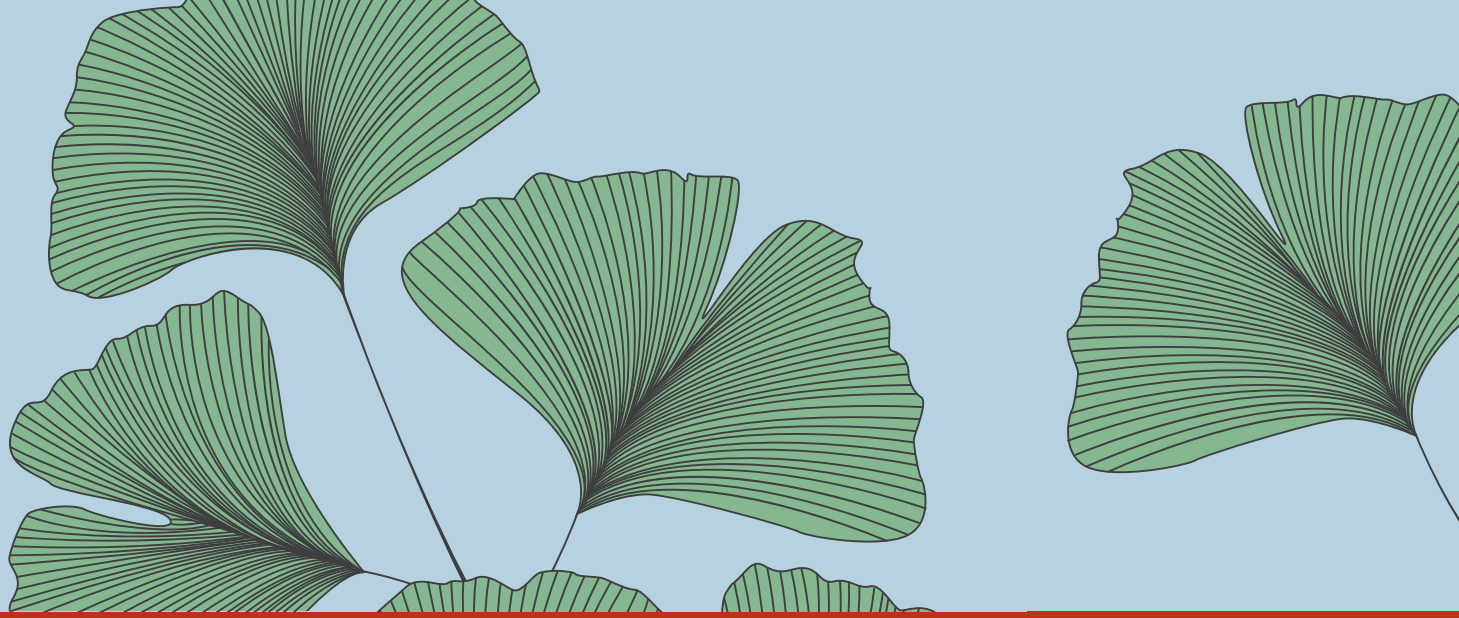
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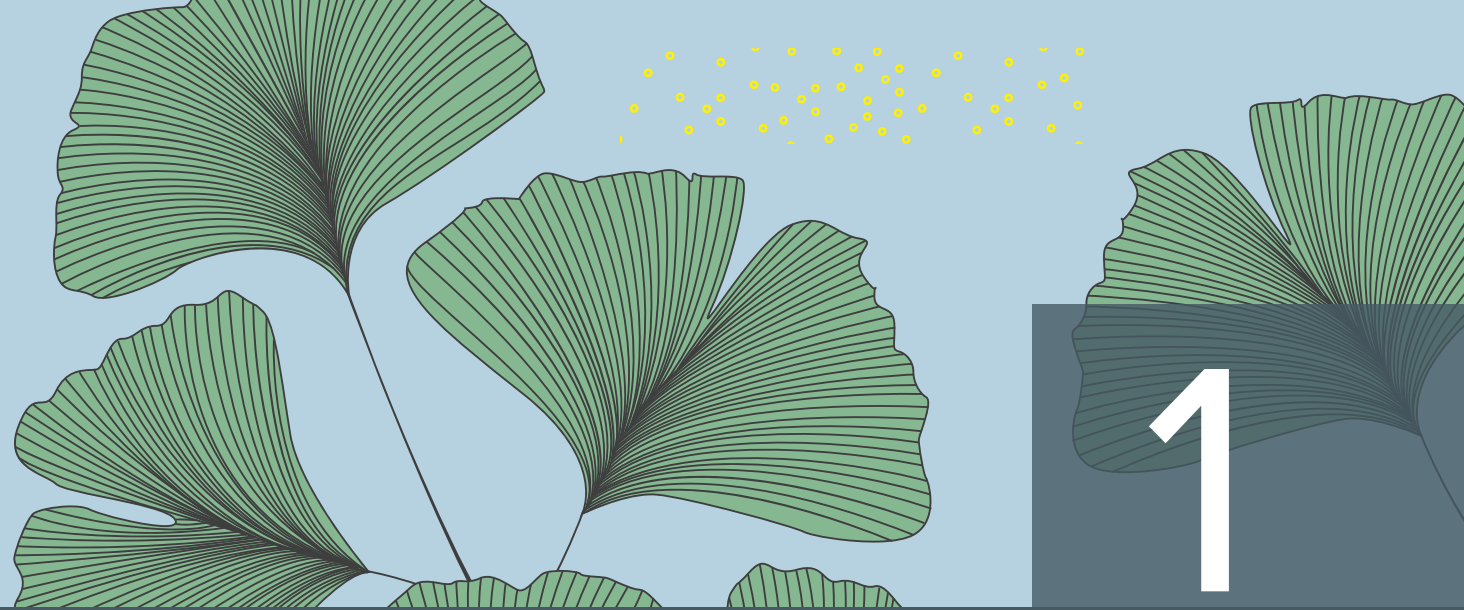
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FOURTH EDITION

Principles of
MICROECONOMICS
A STREAMLINED APPROACH



1

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- LO1** Explain why 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 why if you want to predict people's behavior, a good place to start is by examining their incentives.

Thinking Like an Economist

How 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?

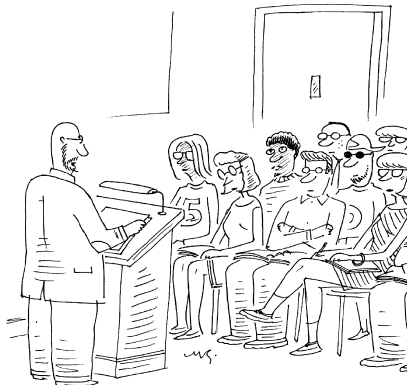
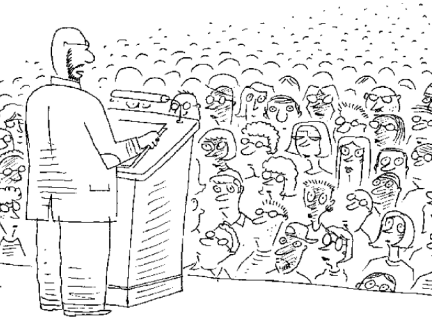
If cost were no object, the best size might be a single student. Think about it: the whole course, all term long, with just you and your professor! Everything could be custom-tailored to your own background and ability. You could cover the material at just the right pace. The tutorial format also would 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 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 could easily 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 risk lowering the quality of instruction—a bad thing. At the same time, they reduce costs and hence the tuition students must pay—a good thing.





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

In this chapter, we’ll introduce some simple ideas 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. 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*, a core principle of economics.

With this 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 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. Jeff Bezos is one of the richest people on Earth. His wealth is estimated at more than \$180 billion. That's more than the combined wealth of the poorest 54 percent of Americans. Bezos 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—uses up time and energy that he could otherwise spend on other things. Indeed, someone once calculated that the value of Bezos's time is so great that pausing to pick up a \$100 bill from the sidewalk simply wouldn't be worth his while.



Chip Somodevilla/Getty Images

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

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.

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

EXAMPLE 1.1

Comparing Costs and Benefits

Should you walk downtown to save \$10 on a \$25 wireless keyboard?

Imagine you are about to buy a \$25 wireless keyboard at the nearby campus store when a friend tells you that the same keyboard 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 keyboard?

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, because that's the amount you'll save on the price of the keyboard. 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 package 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 but not for \$8.99, then your cost of making the trip is \$9. In this case, you should buy the keyboard downtown because the \$10 you'll save (your benefit) is greater than your \$9 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 keyboard 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 keyboard downtown.

economic surplus the benefit of taking an action minus its cost

Economic Surplus

Suppose that in Example 1.1 your “cost” of making the trip downtown was \$9. Compared to the alternative of buying the keyboard 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 keyboard 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 keyboard. Once again, you've faced a trade-off. In this case, the choice was between a cheaper keyboard 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 shows on Netflix, 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.

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 dogwalking 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 dogwalking job is \$20.

In the previous example, if watching another hour of your favorite show on Netflix 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 watching your show at another time. 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 self-tests like the one that follows. You'll find that pausing to answer them will help you master key concepts in economics. Because doing these self-tests 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.

SELF-TEST 1.1

You would again save \$10 by buying the wireless keyboard 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 keyboard 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 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.

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 *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 PITFALLS¹

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.

EXAMPLE 1.2**Comparing Costs and Benefits****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?

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 wireless keyboard. As before, the benefit of buying downtown is the dollar amount you'll save, namely, \$10. And because it's exactly the same trip, its cost also must be the

¹The 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).

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 keyboard 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 keyboard 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 wireless keyboard. And because 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.

SELF-TEST 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."² "The dog did nothing in the nighttime,"² 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 wireless keyboard downtown means not watching another hour of your favorite show on Netflix, then the value to you of watching the show 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 another hour of my favorite show?"



Implicit costs are like dogs that fail to bark in the night. Many of us tend to overlook activities that fail to happen.

²Arthur Conan Doyle, "The Adventure of Silver Blaze," *The Memoirs of Sherlock Holmes* (London: George Newnes Ltd., 1893).

EXAMPLE 1.3**Implicit Cost****Should you use your frequent-flyer coupon to fly to Cancun for spring break?**

With spring break only a week away, you are still undecided about whether to go to Cancun 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 Cancun vacation is \$1,350. That amount is your benefit of taking the vacation. Your only alternative use for your frequent-flyer coupon is for a 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 Cancun for spring break?

The Cost-Benefit Principle tells us that you should go to Cancun 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 because 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 Cancun.

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 Cancun 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 Cancun 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?"



Bkinder/E+/Getty Images

Is your flight to Cancun "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. Self-Test 1.3 illustrates this point by modifying the details of Example 1.3 slightly.

SELF-TEST 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 Cancun trip. Should you use your coupon?

Pitfall 3: Failing 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 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 a cost that is beyond recovery at the moment a decision must be made

EXAMPLE 1.4 Sunk Cost

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 they can eat at the all-you-can-eat buffet for free. The remaining guests pay the usual price. If all diners are rational, will those who are able to eat at the buffet for free consume a different amount of food, on average, than those who have to pay \$10 for the buffet?

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 because 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 because 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.³ In particular, those who have to pay for the all-you-can-eat buffet tend to eat substantially more than those for whom the buffet is free. People in the former group somehow seem 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. 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**.

When the problem is to discover the proper level for an activity, the cost-benefit rule is to keep increasing the level as long as the marginal benefit of the activity

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

³See, for example, Richard Thaler, “Toward a Positive Theory of Consumer Choice,” *Journal of Economic Behavior and Organization* 1, no. 1 (1980).