bernheim | whinston

microeconomics 2e

connect® ECONOMICS

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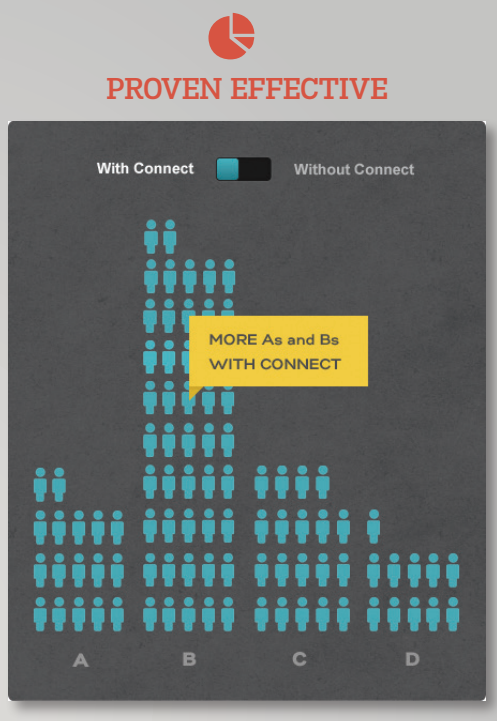

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See the next two pages for more details on LearnSmart, the graphing tool, eBooks, and Tegrity lecture capture – all available with Connect Plus Economics!

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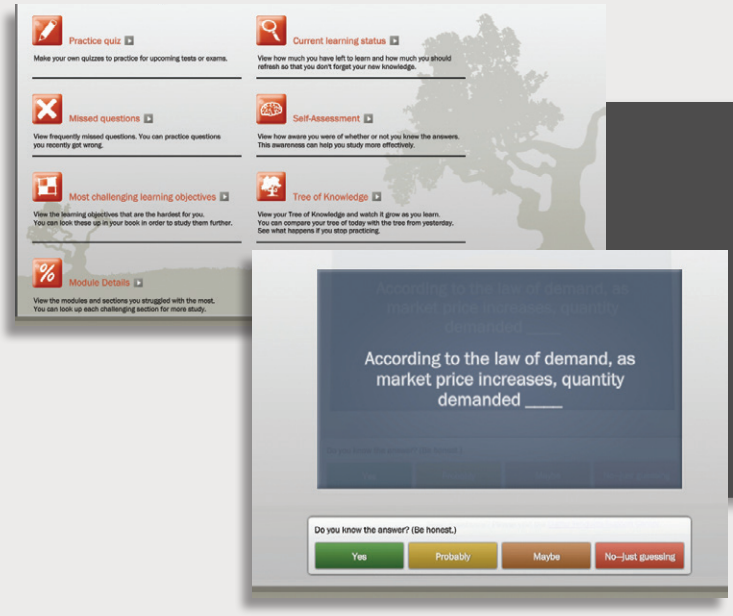
FEATURES



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McGraw-Hill LearnSmart is an adaptive learning program that identifies what an individual student knows and doesn't know. LearnSmart's adaptive learning path helps students learn faster, study more efficiently, and retain more knowledge. Reports available for both students and instructors indicate where students need to study more and assess their success rate in retaining knowledge.

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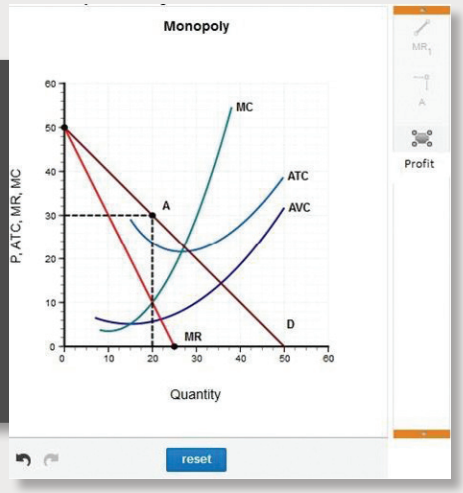
The graphing tool within Connect Economics provides opportunities for students to draw, interact with, manipulate, and analyze graphs in their online auto-graded assignments, as they would with pencil and paper. The Connect graphs are identical in presentation to the graphs in the book, so students can easily relate their assignments to their reading material.



Get Engaged.

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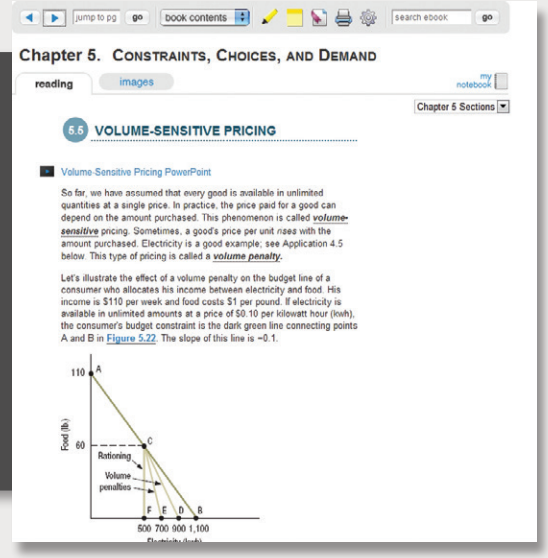
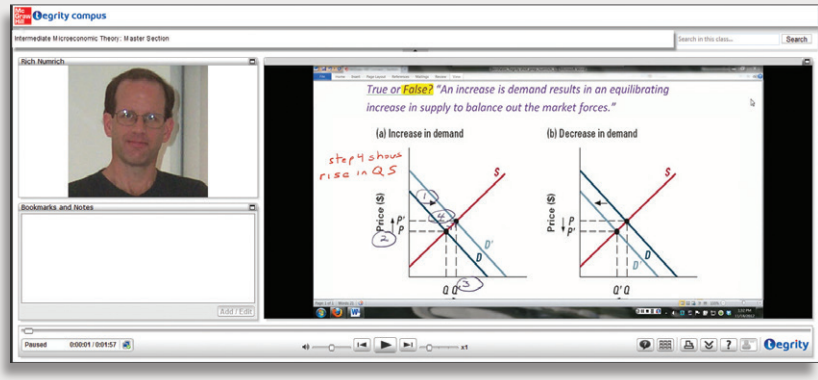


Lecture Capture



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Microeconomics

Second Edition

Microeconomics

Second Edition

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Stanford University

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Northwestern University

McGraw-Hill Irwin

The McGraw-Hill Companies

McGraw-Hill Irwin

MICROECONOMICS, SECOND EDITION
Published by McGraw-Hill/Irwin, a business unit of The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY, 10020.

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 0 DOW/DOW 1 0 9 8 7 6 5 4 3

ISBN 978-0-07-337585-4
MHID 0-07-337585-3

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Compositor: *Laserwords Private Limited*
Printer: *R. R. Donnelley*

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Library of Congress Cataloging-in-Publication Data

Bernheim, B. Douglas.
Microeconomics / B. Douglas Bernheim, Michael D. Whinston.—Second edition.
pages cm.—(The McGraw-Hill series in economics)
Includes index.
ISBN 978-0-07-337585-4 (alk. paper)—ISBN 0-07-337585-3 (alk. paper)
1. Microeconomics. I. Whinston, Michael Dennis. II. Title.
HB172.B485 2014
338.5—dc23

2012049438

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Dedication

To our families

About the Authors

B. Douglas Bernheim is the Edward Ames Edmonds Professor of Economics at Stanford University. He has also taught in the Department of Finance at Northwestern University's J.L. Kellogg Graduate School of Management and the Department of Economics at Princeton University. He received his A.B. from Harvard University in 1979, and Ph.D. from M.I.T. in 1982. Professor Bernheim's work has spanned a number of fields, including public economics, political economy, game theory, contract theory, behavioral economics, industrial organization, and financial economics. He is a Fellow of the American Academy of Arts and Sciences and of the Econometric Society. He has also served as Co-Editor of the *American Economic Review,* the profession's most widely read journal. Professor Bernheim's teaching has included undergraduate courses in microeconomics and public economics, and graduate courses in microeconomics, public economics, political economy, industrial organization, behavioral economics, and insurance and risk management.

Michael D. Whinston is the Robert E. and Emily H. King Professor of Business Institutions in the Department of Economics at Northwestern University, where he also holds appointments at the Kellogg Graduate School of Management and the Law School. Prior to moving to Northwestern, he taught at Harvard. Professor Whinston received his B.S. from the Wharton School at the University of Pennsylvania in 1980, his M.B.A. from the Wharton School in 1984, and his Ph.D. from M.I.T. in 1984. His research has covered a variety of topics in microeconomics and industrial organization, including game theory, the design of contracts and organizations, firm behavior in oligopolistic markets, antitrust, and law and economics. Professor Whinston is a co-author of the leading graduate textbook in microeconomics, *Microeconomic Theory* [Oxford University Press, 1995]. He is a Fellow of the Econometric Society and has also served as a Co-Editor of the *RAND Journal of Economics,* the leading journal in industrial organization. His teaching has included undergraduate microeconomics, as well as graduate courses in microeconomics, industrial organization, and competitive strategy.

Professors Bernheim and Whinston met during the early 1980s while in graduate school at M.I.T., where they began a long and productive collaboration, as well as a close friendship. Together they have co-authored eight published articles in addition to this book. In the course of their collaboration, they have been known to argue with each other for hours about trivial details, such as whether a sentence should use the word "however" or "nevertheless." It is a miracle that they managed to complete this book and its revision for the second edition.

Preface

All of us confront an endless variety of economic choices. Some of those choices involve personal matters such as financing the purchase of a new car or saving for retirement. Some involve business matters such as cost-effective production techniques or investment in new product development. Some involve matters of public policy, such as whether to vote for a school bond initiative or a candidate who advocates a particular flavor of health care reform. Sometimes good economic decision making is just a matter of common sense. But in many situations, a command of basic microeconomic principles helps us understand the consequences of our choices and make better decisions.

Our object in writing this book is to provide students with a treatment of intermediate microeconomics that stimulates their interest in the field, introduces them to the tools of the discipline, and starts them on the path toward "thinking like an economist." Most students will not turn out to be economists, but whether they end up making business decisions, helping to design public policies, or simply managing their own money, the tools of microeconomics can prove invaluable.

What's New in the Second Edition?

We received a great deal of helpful feedback on the first edition of *Microeconomics*, and we paid careful attention to it. While we worked hard to improve the book in all dimensions, our main focus was on the insightful suggestions we received for enhancing its usefulness to students and instructors. The following is a quick synopsis of the main ways in which the second edition differs from the first.

Read More Online, Calculus Worked-Out Problems, and Calculus In-Text Exercises available at www.mhhe.com/bernheim2e, or scan here. Need a barcode reader? Try ScanLife, available in your app store.

Use of Technology

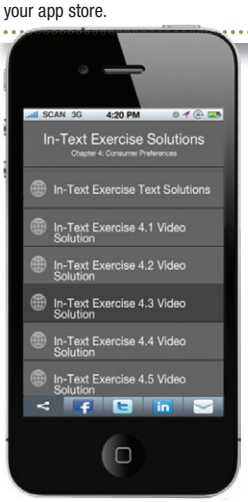
Recent technological developments have started to blur the boundaries of the traditional textbook, opening new vistas for improved pedagogy. In producing the second edition, we have taken advantage of these possibilities, creating a great deal of useful material that does not appear in the physical book. *Microeconomics* is the most digitally focused product available for the intermediate microeconomics course.

For students using smartphones and tablets, **scanning barcodes** (or QR codes) located within the chapters provide immediate access to more resources. There are two types of codes in each chapter.

> The barcode appearing on the first page of each chapter gives students access to additional chapter resources which include:
>
> - *Read More Online* features for that chapter.
> - Calculus Worked-Out Problems that mirror the chapter's Worked-Out Problems.
> - Calculus In-Text Exercises that mirror the In-Text Exercises in the chapter.
> - Solutions to the Calculus In-Text Exercises.

- The barcodes next to each In-Text Exercise lead the student to text and video solutions for that chapter's exercises. Students are encouraged to work through the In-Text Exercises themselves and then check either solution format to check their answer, or to get help if they're unsure how to solve the problem. The video solutions add extra commentary so students can clearly understand the thought processes involved in solving these exercises. They are valuable study tools for completing homework and preparing for exams.

Want the video or text solution? Visit www.mhhe.com/bernheim2e or scan here. Need a barcode reader? Try ScanLife, available in your app store.



Students not using smartphones or tablets can access the same resources by clicking the barcodes when viewing the eBook or by going to **www.mhhe.com/bernheim2e**.

Microeconomics is also designed to be used with *McGraw-Hill Connect Plus® Economics*, an online assessment and grading program that allows instructors to administer homework entirely online. (See more details at the end of this preface and on the inside cover.) *Connect Plus Economics* includes the following elements:

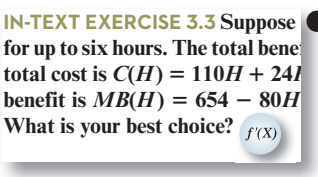
- End-of-chapter questions and problems available both as they appear in the text and as algorithmic variations—the same question but with different values to solve for.
- Graphing problems.
- Detailed feedback for each question and problem. Select problems have video feedback so students can view step-by-step solutions and explanations.
- LearnSmart™, an adaptive learning system that uses a series of probing questions to pinpoint each student's knowledge gaps, is available as part of *Connect*. *LearnSmart* analyzes the gaps and then provides an optimal learning path for each student.
- A media-rich, interactive eBook is included in *Connect Plus*, which contains links to the special features in the barcodes as well as other resources. Also, as students are working on a homework problem in *Connect*, there will be a link from that problem to the appropriate place in the eBook where a student can get more help.

A FLEXIBLE ROLE FOR CALCULUS

We re-engineered the second edition so that it is equally appropriate for courses that require calculus and those that don't. The fundamental concepts and intuitions of microeconomics remain the same regardless of whether calculus is used. For example, in both cases, students need to learn about marginal cost and its relationship to total cost. Also, in both cases, all but the most mathematically inclined students understand these concepts best when they are explained with the same clear diagrams. While students who know calculus can perform the extra step of taking the relevant derivative (for example, to obtain the marginal function curve from the total function curve), this step is easily compartmentalized. That is what we have done in this edition. Calculus is included in the following ways:

$f'(X)$ If you have the formula for an indifference curve, you can find the marginal rate of substitution by taking the derivative and multiplying by -1. To see a worked-out example, look at *Read More Online 4.3.*

- Calculus concepts are explained in text boxes and are indicated with an icon.
- Calculus versions of the text's Worked-Out Problems and In-Text Exercises are available to students in two ways.
  - Access materials directly online, either through the Connect Plus ebook or through the text's website at **www.mhhe.com/bernheim2e.**



By scanning a barcode at the beginning of the chapter using a smartphone or tablet, students can get instant access to these materials without needing to log onto their computers. Whenever there is a calculus version of an In-Text Exercise or Worked-Out Problem, the calculus icon appears next to it.

> The end-of-chapter exercises include calculus problems. To simplify the process of assigning suitable problems, we organize these exercises into three groups: Discussion Questions, Problems, and Calculus Problems. In many cases, we provide both calculus and non-calculus versions of the same exercise. While calculus has many important uses in microeconomics, we take the view that, at the intermediate level, non-calculus students can solve the same quantitative problems as calculus students, as long as they are provided with the formulas for marginal cost, marginal, utility, and the like. The task of deriving those formulas by taking a derivative is primarily a quick technical step in the solution of the typical problem, rather than an economically interesting one.

STREAMLINED EXPOSITION

The typical course in intermediate microeconomics covers a lot of ground. But the reality is that students have limited time and patience for unnecessarily long-winded explanations. So it is important to address each topic with an economy of words. Short. Clear. Punchy. We've put in a lot of work to make sure each section of our text fits that description. We've also streamlined the text by converting optional materials to *Read More Online* features.

RETAINED CORE PRINCIPLES

While much has changed between the first and second editions, much has also remained the same. It is therefore worth reaffirming our commitment to the principles we articulated in the preface to the first edition.

> **Accessibility.** *Microeconomics* teaches economic principles and builds economic intuition without heavy reliance on formal mathematics.

> **Clarity.** We have worked hard to make sure that the writing in *Microeconomics* is transparent, the explanations are clear and intuitive, and the graphs lead students naturally through the key ideas.

> **Up-to-date coverage.** The book covers exciting recent developments in microeconomics, drawing for example on game theory, information economics, and behavioral economics, and providing applications involving topics of current interest.

> **Accuracy.** *Microeconomics* employs clear and understandable explanations of microeconomic principals without resorting to common "fudges" that appear in many other texts.

> **Usefulness.** Students learn to solve quantitative problems whether or not they use calculus.

> **Relevance.** In *Microeconomics*, we always explain *why* we ask the student to learn a particular concept, and underscore the material's relevance by featuring fact-based applications.

Pedagogy for Student Success

A wealth of additional learning features and enrichment materials are provided within the text and online to supplement students' understanding of the subject matter.

LEARNING OBJECTIVES

Each chapter begins with a list of key learning objectives to help focus planning for instructors and studying for students.

Learning Objectives

After reading this chapter, students should be able to:

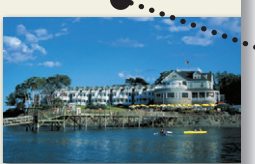
- Explain what supply and demand curves for a good, and supply and demand functions, represent.
- Identify various market forces that shift supply and demand curves.
- Use the concept of market equilibrium to calculate the equilibrium price and the amount bought and sold.
- Evaluate how changes in demand or supply affect market equilibrium.
- Understand elasticity and the way economists use it to measure the

Application 2.2

A Room with a View (and its Price)

The elegant Bar Harbor Inn overlooks beautiful Frenchman's Bay in Bar Harbor, Maine, just minutes from Acadia National Park. At the height of the summer tourist season, the inn's most expensive rooms cost over $350 per night. Unfortunately, those same tourists have little interest in visiting once the leaves have fallen from the trees. By then, they're thinking of Caribbean beaches or the ski slopes in Colorado and Utah.

As a result, the price of hotel rooms at Bar Harbor's many inns, which together make up the supply in this market, vary greatly by season. As Figure 2.7 shows, the supply curve for hotel rooms in Bar Harbor is the same in November as in July.[3] The quantity $\overline{Q}$ is the total number of rooms. At high prices, innkeepers want to rent all those rooms, but at low prices, they withdraw some rooms from the supply, since the price no longer compensates them for the expense and effort of serving customers. (In the dead of winter, some inn owners close temporarily and take a vacation.) The demand in the two months is very different, however, so that



The Bar Harbor Inn

the price in November (P_{Nov}) is much lower than the price in (P_{July}). In 2012, for example, a tourist paid $385 a night to sta the Bar Harbor Inn's best room during July, but only $165 a r to stay in the same room during November.

APPLICATIONS

These in-text boxes highlight real-world examples that put concepts into practice.

WORKED-OUT PROBLEMS

Each chapter includes Worked-Out Problems to show students how to solve the problems posed in the chapter and to prepare them for homework and exams. Each problem is clearly stated and the solution contains detailed steps and narrative explanations to show how the problem is solved. Calculus versions of the problems and solutions are available by scanning the barcode at the beginning of the chapter or at **www.mhhe.com/bernheim2e.**

WORKED-OUT PROBLEM 4.2

The Problem Mitra enjoys reading books and watching movies. Her utility function is $U(M, B) = M \times B^2$, where M stands for the number of movies and B stands for the number of books enjoyed during a month. How does Mitra rank the following bundles? (1) 4 movies and 5 books, (2) 10 movies and 4 books, (3) 25 movies and 2 books, (4) 40 movies and 1 book, (5) 100 movies and no books.

The Solution Applying Mitra's utility function, we find for part (1) that $U(4, 5) = 4 \times 5^2 = 100$. Similarly, we have, (2) $U(10, 4) = 160$, (3) $U(25, 2) = 100$, (4) $U(40, 1) = 40$, and (5) $U(100, 0) = 0$. Therefore, Mitra ranks the bundles listed in the problem, in order of preference, as follows: first, 10 movies and 4 books; next, either 4 movies and 5 books or 25 movies and 2 books (she is indifferent between those two bundles); next, 40 movies and 1 book; and last, 100 movies and no books.

IN-TEXT EXERCISES

These ask students to either redo the Worked-Out Problem or extend the concept in a slightly different way. Solutions are available in text form and—new to this edition—in video format. The videos walk students through the solutions, reinforcing the lessons from lectures and independent reading. The videos and text solutions can be accessed at **www.mhhe.com/bernheim2e,** or by scanning the barcode next to the exercise with a smartphone.

Want the video or text solution? Visit www.mhhe.com/bernheim2e or scan here. Need a barcode reader? Try ScanLife, available in your app store.

IN-TEXT EXERCISE 4.2 **Judy drinks both Coke and Pepsi. Suppose the formula for her indifference curves is $C = U - 1.2P$, where C stands for liters of Coke and P stands for liters of Pepsi consumed over a month. Draw some of Judy's indifference curves. Which does she prefer, a bundle consisting of three liters of Coke and no Pepsi, or a bundle consisting of three liters of Pepsi and no Coke?**

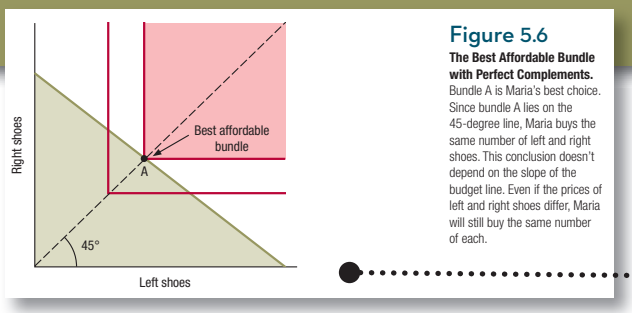
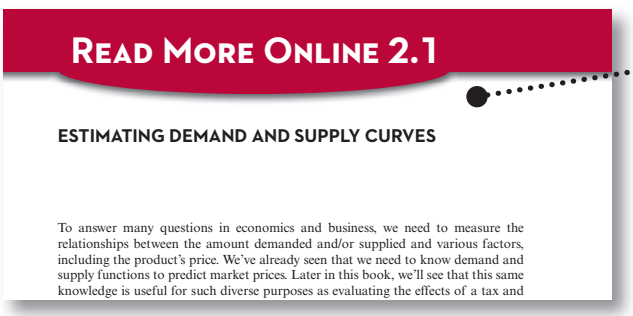


Figure 5.6
The Best Affordable Bundle with Perfect Complements. Bundle A is Maria's best choice. Since bundle A lies on the 45-degree line, Maria buys the same number of left and right shoes. This conclusion doesn't depend on the slope of the budget line. Even if the prices of left and right shoes differ, Maria will still buy the same number of each.

FIGURES AND TABLES

The exhibits, graphs, and tables are critical for students to understand the world of microeconomics. Color is used to help students understand the make-up and meaning of each graph, and an extended caption is included with figures to further explain the concepts.


READ MORE ONLINE 2.1

ESTIMATING DEMAND AND SUPPLY CURVES

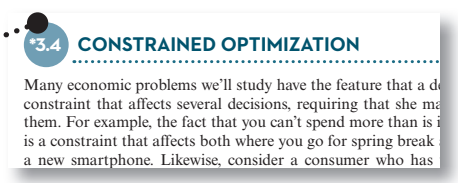
To answer many questions in economics and business, we need to measure the relationships between the amount demanded and/or supplied and various factors, including the product's price. We've already seen that we need to know demand and supply functions to predict market prices. Later in this book, we'll see that this same knowledge is useful for such diverse purposes as evaluating the effects of a tax and

READ MORE ONLINE

Read More Online features, which offer additional in-depth discussion of particular topics, are found throughout the book. These can be accessed through the barcode at the beginning of the chapter, or online at **www.mhhe.com/bernheim2e.** A list of these extensions appears on page (pages xxviii and xxix).

OPTIONAL SECTIONS

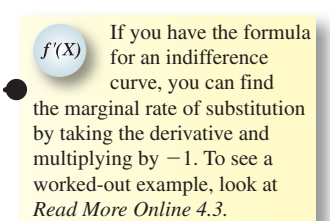
While we have moved some optional topics to *Read More Online* features, we've kept ones that strike us and our reviewers as particularly important in the text. These are marked with an asterisk so that students can easily distinguish them from core material.


*3.4 CONSTRAINED OPTIMIZATION

Many economic problems we'll study have the feature that a d
constraint that affects several decisions, requiring that she ma
them. For example, the fact that you can't spend more than is i
is a constraint that affects both where you go for spring break
a new smartphone. Likewise, consider a consumer who has

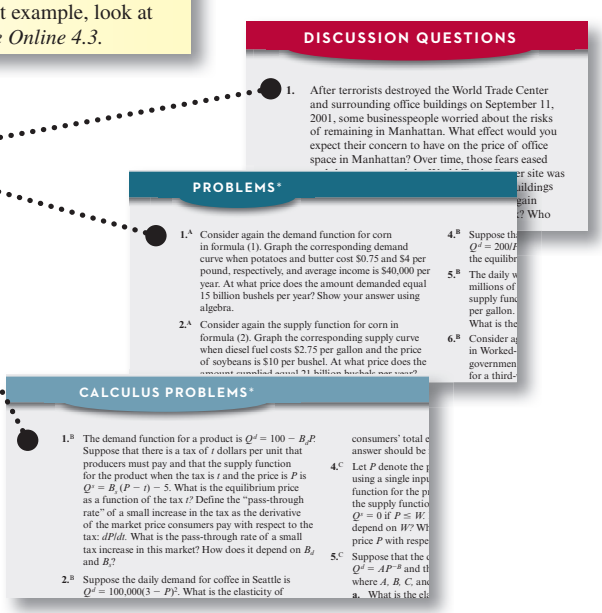
CALCULUS TEXT BOXES

In addition to Calculus versions of the Worked-Out Problem and In-Text Exercises, Calculus text boxes explain how to understand the material through the lens of calculus.


$f'(X)$ If you have the formula for an indifference curve, you can find the marginal rate of substitution by taking the derivative and multiplying by −1. To see a worked-out example, look at *Read More Online 4.3.*

IMPROVED AND EXPANDED END-OF-CHAPTER EXERCISES

Many instructors who used the first edition asked us to beef up the end-of-chapter exercises. We heard you loud and clear. Users of the second edition will find a much larger number of exercises and better representation of the topics covered in the text. We have also divided the exercises for each chapter into three sections: *Discussion Questions*, which require thought but no math (or at least very little); *Problems*, which require algebra, graphs, or both; and *Calculus Problems*, which typically include (but are not limited to) calculus versions of some of the Problems. We also rate the difficulty of each exercise, using A for Easiest, B for More Difficult, and C for Most Difficult. Much thought and effort has gone into creating questions that students will find tractable and enlightening.


DISCUSSION QUESTIONS

1. After terrorists destroyed the World Trade Center and surrounding office buildings on September 11, 2001, some businesspeople worried about the risks of remaining in Manhattan. What effect would you expect their concern to have on the price of office space in Manhattan? Over time, those fears eased

PROBLEMS*

1.A Consider again the demand function for corn in formula (1). Graph the corresponding demand curve when potatoes and butter cost $0.75 and $4 per pound, respectively, and average income is $40,000 per year. At what price does the amount demanded equal 15 billion bushels per year? Show your answer using algebra.

2.A Consider again the supply function for corn in formula (2). Graph the corresponding supply curve when diesel fuel costs $2.75 per gallon and the price of soybeans is $10 per bushel. At what price does the

4.B Suppose th $Q^d = 200/P$ the equilibr

5.B The daily w millions of supply fun per gallon. What is the

6.B Consider a in Worked- governmen for a third-

CALCULUS PROBLEMS*

1.B The demand function for a product is $Q^d = 100 - B_dP$. Suppose that there is a tax of t dollars per unit that producers must pay and that the supply function for the product when the tax is t and the price is P is $Q^s = B_s(P - t) - 5$. What is the equilibrium price as a function of the tax t? Define the "pass-through rate" of a small increase in the tax as the derivative of the market price consumers pay with respect to the tax: dP/dt. What is the pass-through rate of a small tax increase in this market? How does it depend on B_d and B_s?

2.B Suppose the daily demand for coffee in Seattle is $Q^d = 100{,}000(3 - P)^2$. What is the elasticity of

consumers' total e answer should be

4.C Let P denote the using a single inpu function for the p the supply functio $Q^s = 0$ if $P \leq W$, depend on W? Wh price P with respe

5.C Suppose that the $Q^d = AP^{-B}$ and th where A, B, C, an a. What is the el

Organization of the Book

The organization of *Microeconomics* is slightly unconventional for an undergraduate microeconomics text, but has the advantage of following the logical progression of the discipline. Microeconomic theory begins by examining the behavior of individuals in their roles as either consumers or managers of firms. On this foundation, it builds a theory of aggregate economic outcomes, with an emphasis on market equilibrium. *Microeconomics* follows this logical structure more closely than other texts by clearly distinguishing the study of individual decision making from the analysis of markets. It is divided into the following three parts.

Part I contains three introductory chapters. The first introduces the field of microeconomics. The second reviews the basic principles of supply and demand. The third elaborates on a central theme of microeconomics reasoning: how to find a decision that maximizes the difference between total benefits and total costs by equating marginal benefits to marginal costs. We invoke that principle repeatedly throughout the rest of the book.

Part II focuses on individuals' economic decisions. Three chapters on consumer theory (Chapters 4–6) and three on producer theory (Chapters 7–9) are followed by three chapters (Chapters 10–12) covering decisions involving time, uncertainty, and strategy (game theory). An additional chapter (Chapter 13) examines behavioral perspectives on economic decision making.

Part III concerns markets. We begin with three chapters covering competitive markets (Chapters 14–16), including one on partial equilibrium theory, one on the analysis of government interventions, and one on general equilibrium. We then turn to market failures, including three chapters on monopoly and oligopoly (Chapters 17–19), one on externalities and public goods (Chapter 20), and one on informational imperfections (Chapter 21).

While the organization of the book emphasizes the distinction between topics concerning decision making and topics concerning markets, we recognize that instructors may not wish to teach the material in that order. For example, many instructors may wish to jump directly from basic producer theory (which concludes in Chapter 9) to competitive equilibrium (which begins in Chapter 14), returning to the additional topics on decision making as time allows. The book is written to provide instructors with this flexibility.

Alternative Course Designs

Instructors who use this book can organize their courses in a variety of different ways. A basic one-semester or one-quarter course might cover all of Chapters 1–9, 14–15, and 17. Alternatively, by covering fewer sections in some of those chapters, Chapters 18.1–18.3, 19, and 20 might be added. A more ambitious course, or one lasting two terms, might also cover parts of Chapters 10–13 (additional topics on decision making), 16 (general equilibrium), the remainder of 18 (price discrimination through self-selection and bundling), and 21 (informational imperfections). As we've noted, the material on decisions involving time, uncertainty, and strategy (game theory) in Chapters 10–12 could be covered immediately after covering consumer and producer theory, or delayed until later in the course.

Business-oriented courses might instead reduce to some degree their coverage of consumer theory (Chapters 4–6) and externalities and public goods (Chapter 20) in favor of covering game theory (Chapter 12) and all of Chapter 18 on pricing policies. More policy-oriented courses might skip over Chapter 18 entirely in favor of covering general equilibrium (Chapter 16).

As we've mentioned, the book devotes a separate chapter to behavioral economics (Chapter 13). That material is entirely compartmentalized, and any instructor who wishes to teach a conventional course on intermediate microeconomics can simply skip the chapter. For those who are interested in introducing behavioral perspectives, we have designed the chapter with a modular structure, so that it can be used in one of two different ways. Most obviously, an instructor can introduce behavioral economics as a standalone topic, covering all or part of the chapter. Alternatively, an instructor can integrate behavioral perspectives with traditional perspectives, for example, covering Sections 13.1 and 13.2 after basic consumer theory (Chapters 4 through 6), Section 13.3 after decisions involving time (Chapter 10), Section 13.4 after decisions involving uncertainty (Chapter 11), and Section 13.5 after decisions involving strategy (Chapter 12).

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Supplementary Materials

Microeconomics strives to present economics clearly and logically, giving students insight into the world around them. To help instructors make the topic more accessible to students, *Microeconomics* offers a range of materials written to integrate seamlessly with the text, providing extra practice for students and additional resources for teachers. These resources include:

Instructor's Manual—The Instructor's Manual provides instructors with additional insight into the various chapters and examples in *Microeconomics*, as well as resources for bringing the concepts to life within the classroom. It is a must for new teachers and those new to this book, because it identifies the goals of each chapter and highlights common areas of student difficulty. The Instructor's Manual also includes several fully developed case studies that show microeconomics at work in the world and that offer graduated questions—allowing instructors to cover as much or as little of the book as they see fit, and making the case studies usable from the very first week of class. Detailed solutions to the end-of-chapter questions and problems are also available.

Test Bank and EZTest Online—The Test Bank is comprised of over 50 questions per chapter, including multiple-choice, short-answer, and essay question options. Each question is tagged by level of difficulty, section in the book, and AACSB category. EZTest Online contains all of the questions in the test bank and offers the ability to create customized exams. This user-friendly program allows instructors to sort questions by format, edit existing questions or add new ones, and scramble questions for multiple versions of the same test.

PowerPoint Presentations—The PowerPoint Presentations to accompany *Microeconomics* are cutting-edge, assisting learning by drawing selected graphs one line at a time on screen. The animation—simple enough to be clear while complete enough to be useful—also helps to demonstrate how tables can be assembled and data analyzed when completing problems. The presentations include exhibits from the book itself, creating a seamless connection between what students have read and what they see in the lecture.

Online Learning Center (www.mhhe.com/bernheim2e)—The Online Learning Center contains the above materials for instructors and also materials for students, including quizzes, *Read More Online* features, In-Text Exercise solutions, and Calculus In-Text Exercises and Worked-Out Problems.

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Acknowledgements

Many people have made important contributions to the development of this book, and those thanked in the preface to the first edition have our continuing gratitude. The second edition has benefited from the unflagging support of the team at McGraw-Hill. We would like to thank Scott Smith and Michele Janicek, Brand Managers; Alyssa Lincoln and Christina Kouvelis, Development Editors; Patricia Frederickson, Lead Project Manager; Keri Johnson, Content Licensing Specialist; and Marianne Musni, Content Project Manager. We also thank Kane Sweeney for his excellent research assistant work on this edition.

We also want to thank those that contributed to the digital features for this edition:

Chris Johnson, *University of North Florida*
Leonie Stone, *SUNY Geneseo*
Daniel Mizak, *Frostburg State University*
Debashis Pal, *University of Cincinnati*
Ross vanWassenhove, *University of Houston*

We owe a heartfelt thank you to the many reviewers who helped shape this edition:

Douglas Agbetsiafa, *Indiana University–South Bend*
Terry Alexander, *Iowa State University*
Marigee Bacolod, *University of California–Irvine*
Amit Batabyal, *Rochester Institute of Technology*
James Bradfield, *Hamilton College*
Miki Brunyer, *Saint John's University*
Paul Carrillo, *George Washington University*
Tina Carter, *Florida State University*
Eliane Catilina, *American University*
Ron Cheung, *Florida State University*
Finn Christensen, *Towson University*
Timothy Classen, *Loyola University–Chicago*
Dennis Coates, *University of Maryland–Baltimore County*
Yi Deng, *University of South Florida–Tampa*
Joanne Doyle, *James Madison University*
Thomas Grennes, *North Carolina State University–Raleigh*
Claire Hammond, *Wake Forest University*
Steve Heubeck, *Ohio State University–Columbus*
Robert Jerome, *James Madison University*
Sumit Joshi, *George Washington University*
Ernesto Lucas, *Hawaii Pacific University–Honolulu*
Richard Mcgrath, *Armstrong Atlantic State University*
John Merrifield, *University of Texas at San Antonio*
Farahmand Rezvani, *Montclair State University*
Udayan Roy, *Long Island University–C.W. Post Campus*
Lynda Rush, *California State Polytechnic University–Pomona*
Edward Steinberg, *Columbia University*
Andrew Stivers, *Oregon State University*
Vasant Sukhatme, *Macalester College*
Jane Sung, *Truman State University*
David Switzer, *Saint Cloud State University*
Jason Taylor, *Central Michigan University*

Each of these individuals invested a great deal of time and effort reviewing the first edition. Their insightful comments have helped us improve the book immeasurably.

And, we thank the reviewers who helped us during the development of our first edition:

Arabinda Basistha *West Virginia University*
David Bernotas *University of Georgia*
Ravi Bhandri *University of California, Berkeley*
McKinley Blackburn *University of South Carolina*
Victor Brajer *California State University, Fullerton*
Daniel Condon *Dominican University, Illinois*
Jeremiah Cotton *University of Massachusetts*
Carl Davidson *Michigan State University*
Richard Eastin *University of Southern California*
Raymond Fisman *Columbia University, Graduate School of Business*
Craig Gallet *California State University, Sacramento*
Rajeev Goel *Illinois State University*
Denise Hare *Reed College*
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Joseph Jadlow *Oklahoma State University*
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James Leonard Lloyd *University of Houston*
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Michael Marlow *California Polytechnic*
David McAdams *Massachusetts Institute of Technology*
James Meehan *Colby College*
Jack Osman *San Francisco State University*
Edgar Preugschat *University of Minnesota*
Luis Rayo *University of Chicago*
Lynn Riggs *DePaul University*
Anusuya Roy *University of Southern Indiana*
George Santopietro *Radford University*
Sudipta Sarangi *Louisiana State University*
Timothy Schibik *University of Southern Indiana*
Sergei Severinov *Duke University*
Curtis Simon *Clemson University*
Thomas More Smith *University of Illinois*
Jennifer Van Gilder *Ursinus College*
Michele Villinski *DePauw University*
Steve Waters *Brigham Young University*
Denis Weisman *Kansas State University*
Randall Westgren *University of Illinois, Urbana-Champaign*

Finally, we would like to thank our families once again for their loving support and patience (which we sorely tested) during the many early mornings, long days, and late nights that we spent working on this project.

B. Douglas Bernheim
Michael D. Whinston

Brief Contents

Contents

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Introduction

part I

Part I The first three chapters of this book lay the groundwork for the material that follows. In Chapter 1, we'll provide a brief overview of microeconomics, previewing the types of questions it addresses, the tools it employs, the themes it emphasizes, and its uses in personal decision making, business, and public policy. In Chapter 2, we'll review some basic concepts that are typically covered in introductory economics courses, including demand, supply, market equilibrium, and elasticity. In Chapter 3, we'll study some basic principles of good decision making, and develop useful tools for identifying the choice that strikes the best balance between benefits and costs.

chapters

1 Preliminaries

Learning Objectives

After reading this chapter, students should be able to:

- Describe the scope of microeconomics and understand that it concerns the allocation of scarce resources.
- Explain the goals of microeconomic inquiry.
- Explain how economists apply the scientific method to common economic questions.
- Identify recurring economic themes within the field.
- Recognize a variety of situations where economic ideas can be applied.

It is often said that money can't buy happiness. Yet undeniably, people derive both sustenance and pleasure from material goods. Some of those goods, like clean water or a quiet spot on the beach, are found in nature. Others, like automobiles and television sets, are produced from natural resources. All these goods, whether natural or manufactured, share an important characteristic: their supplies are limited, or scarce.

Scarcity forces societies to confront three critical issues. First, each society must decide *what to produce.* When we produce more of one good, we use up scarce resources, reducing our ability to produce others. If a farmer uses an acre of land to plant wheat, he can't use the same acre to grow corn or tomatoes, to graze livestock, or as the site for a housing development.

Second, a society must decide *how to produce goods.* There is usually more than one method. For example, if a farmer uses more fertilizer per acre, he can grow the same amount of wheat on less land. That decision frees up scarce land, which then becomes available for other purposes, such as housing. But fertilizer is also scarce. If farmers use more of it to grow wheat, less will remain for other crops.

Finally, a society must determine *who gets what.* Generally, societies do not distribute goods equally. In the United States, the five richest individuals—Microsoft's Bill Gates, Berkshire Hathaway's Warren Buffet, Oracle's Larry Ellison, and Koch

Industries' Charles and David Koch—held roughly one out of every three hundred dollars of personal wealth in 2012, which obviously entitled them to far more goods than the rest of us.

The field of economics examines the ways in which societies accomplish these three tasks. In other words, it concerns the allocation of scarce resources. If everyone could have whatever they wanted whenever they wanted it, there would be no need for economics.

In this introductory chapter, we'll cover four main topics.

1. *What is microeconomics?* Microeconomics concerns decision making by individuals—typically consumers and the managers of firms—and how their decisions determine the allocation of a society's scarce resources. As we'll see, microeconomists address a wide range of issues related to individual and social behavior.
2. *Tools of microeconomics.* Microeconomists try to understand the allocation of scarce resources by applying the scientific method. We'll summarize that method and describe its application to economic questions.
3. *Themes of microeconomics.* As you read through this book, you'll notice that some themes come up over and over again. We'll preview the most important ones.
4. *Uses of microeconomics.* Microeconomics provides tools that we can use not only to improve our own decisions, but also to evaluate the effects of public policies. We'll briefly describe several problems to which microeconomic principles have been usefully applied.

1.1 WHAT IS MICROECONOMICS?

There are two main branches of economics, microeconomics and macroeconomics. While microeconomics concerns individual decision making and its collective effect on the allocation of a society's scarce resources, macroeconomics concerns aggregate phenomena. Booms and busts (recessions), the pace of economic growth, and the rate of unemployment are all macroeconomic topics. Much of modern macroeconomics involves applications of microeconomics, in the sense that explanations for aggregate outcomes are often rooted in theories of decision making by consumers and firms.

Institutions for Allocating Resources

Microeconomic analysis begins with an understanding of the institutions, including laws and customs, that define a society's procedures for allocating resources. Those procedures empower various people to make decisions, but they also constrain their choices. For example, in most Western economies, consumers are free to spend their money as they choose, but they can't spend more than they can earn, accumulate, or borrow. Even an absolute dictator is constrained by the scarcity of a country's total resources.

Decentralization versus Centralization In some societies, most economic decisions are decentralized. Capitalism involves a high degree of decentralization. A ***capitalist economy*** is one in which the means of production are mostly owned and controlled by and for the benefit of private individuals, and the allocation of

A ***capitalist economy*** is one in which the means of production are mostly owned and controlled by and for the benefit of private individuals, and the allocation of resources is governed by voluntary trading among businesses and consumers.

resources is governed by voluntary trading among businesses and consumers. Typically, this trading is organized into markets, which we discuss below. Production takes place in thousands of independent firms, which are free to produce whatever their owners and managers choose. Likewise, consumers are free to spend their money as they please.

A ***communist economy*** is one in which the state owns and controls the means of production and distribution.

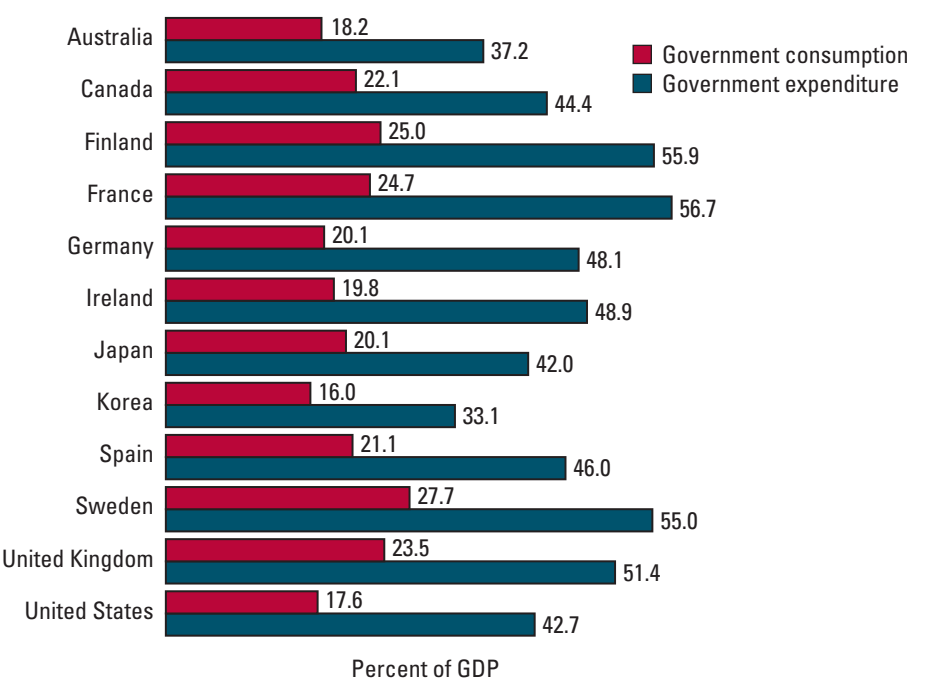
In some societies, many economic decisions are centralized. Communism involves a high degree of centralization. A ***communist economy*** is one in which the state owns and controls the means of production and distribution.[1] Government officials decide what to produce, how to produce it, and who gets it. In the old Soviet Union, for example, the managers of manufacturing plants received their production targets and other instructions from government ministries. Government officials also decided who would receive coveted consumer items, such as washing machines and automobiles.

No economy is completely centralized or decentralized. Every society takes a hybrid approach. While there is no foolproof way to measure a society's degree of economic centralization, we can get a general idea by examining statistics on the size of government. Figure 1.1 shows total government spending on goods and services (also known as *government consumption*) and total government expenditure (which includes both consumption and transfer payments like social security and welfare), expressed as percentages of gross domestic product, or GDP (a measure of national economic activity), for 12 countries as of 2009. Finland, France, and Sweden have the most centralized economies of the twelve; in each case, roughly a quarter of

Figure 1.1

Relative Economic Centralization. For each of the 12 countries in this figure, the lengths of the bars show total government spending on goods and services (also known as *government consumption*) and total government expenditure as fractions of gross domestic product (GDP) in 2009.

Source: Based on data from Table 16.1. Total general government expenditure from OECD (2011), *National Accounts at a Glance 2011*, OECD Publishing. http://dx.doi.org/10.1787/na_glance-2011-en.



[1]This definition is not intended to encompass the meaning of communism as a political philosophy. The ownership and control of the means of production and distribution are also substantially centralized in socialist economies. As this book is primarily concerned with the operation of capitalist economies, we will not delve into the economic, political, and philosophical distinctions between the various forms of communism and socialism.

Application 1.1

A Pain in the Neck

The United States and other developed nations spend as much as 14 percent of their GDPs on medical care. How is the allocation of those resources determined? In most countries, decisions that affect medical expenditures are both centralized and decentralized.

Suppose you have severe neck pain and need a strong painkiller. Who picks your medication? To some extent, you do. However, you are also constrained by government policy. In the United States, the Food and Drug Administration (FDA) regulates pharmaceutical products like painkillers. Before bringing a new drug to market, the manufacturer must first demonstrate to the FDA that it is both effective and reasonably safe. Consumers are not permitted to choose drugs that haven't received FDA approval. For example, when this was written, doctors were free to prescribe a painkiller called lumiracoxib in Mexico, Ecuador, and the Dominican Republic, but not in the United States. Newly approved drugs are usually dispensed only on a prescription basis, according to the judgment of physicians. Prescription painkillers include codeine and morphine. Ultimately, the FDA approves many drugs for over-the-counter (OTC) use. Consumers can purchase and use OTC drugs without a doctor's consent. OTC painkillers include aspirin, acetominophen, ibuprofen, and naproxen.

In short, the choice of a pain killer depends not only on voluntary transactions between consumers and producers, but also on the decisions of health care providers and government regulators. Therefore, the allocation of pain killers is decentralized in some ways, and centralized in others.

GDP goes to government consumption and more than half to government expenditure. South Korea's economy is the least centralized; only 16 percent of GDP goes to government consumption and 33.1 percent to government expenditure. The United States lies on the low end of this spectrum, along with Japan and Australia.

Sometimes, a country centralizes aspects of resource allocation, like national defense, and decentralizes others, like spending on breakfast cereal. (We'll see in Chapter 20 why this can make sense.) However, as Application 1.1 illustrates, in some cases the decisions that affect the allocation of particular goods are both centralized and decentralized.

Markets The most common form of economic decentralization involves markets. ***Markets*** are economic institutions that provide people with opportunities and procedures for buying and selling goods and services. The procedures are sometimes defined by explicit rules, sometimes by custom. Compare, for example, the strict rules and procedures governing the sale and purchase of corporate stock on the New York Stock Exchange, with the loose customs that prevail in an open bazaar.

Markets are economic institutions that provide people with opportunities and procedures for buying and selling goods and services.

In microeconomic analysis, a market is associated with a single group of closely related products that are offered for sale within particular geographic boundaries. For example, an economist might examine the retail market for ice cream in Boston. Often, it is difficult to say exactly what constitutes an appropriate group of products or geographic boundaries. For example, should we consider a narrower product category, like chocolate ice cream, or a broader one that includes sorbet and frozen yogurt? Should we consider a smaller geographic area like Beacon Hill, or a larger one like Massachusetts?

Economists think of products as belonging to the same market when they are highly interchangeable. If consumers freely substitute sorbet for ice cream and vice versa, an economist would group those goods into a single market. Likewise, if people who live

in Beacon Hill are happy to frequent ice cream parlors in Back Bay, and vice versa, an economist would group those Boston neighborhoods into a single market. When any seller can serve any customer regardless of location, the market is worldwide.

Unlike economists, most people associate markets with specific physical locations where trading takes place. Picture, for example, a flea market, a farmer's market, or the trading floor of the New York Stock Exchange. To an economist, a flea market doesn't qualify as a market for two reasons. First, sellers offer a wide variety of goods, from socks to sofas. An economist would distinguish between a sock market and a sofa market. Second, to an economist, the sock market would include other sources of socks for the flea market's customers, such as local clothing and department stores, and possibly companies that sell socks over the Internet.

A flea market located in San Jose, California

In many markets, the sellers are companies and the buyers are individuals. For example, a consumer can buy ice cream from a Kroger supermarket and televisions from a Best Buy store. But there are also markets in which companies are buyers: Kroger buys ice cream from Ben and Jerry's, and Best Buy purchases televisions from Sony. And there are markets in which individuals are sellers: employees sell their labor services to Kroger and Best Buy. In some markets, buyers and sellers both include mixes of companies and individuals. Think about markets for used cars. You can buy a used car from, or sell one to, either a company or another individual.

A ***price*** is the rate at which someone can swap money for a good.

In modern markets, trade is usually governed by prices. A ***price*** is the rate at which someone can swap money for a good. Much of microeconomics seeks to understand the process by which prices are determined.

A ***property right*** is an enforceable claim on a good or resource.

Markets rely on institutions that establish and protect private property rights. A ***property right*** is an enforceable claim on a good or resource. Holding all the property rights to an object is the same thing as owning it. If sellers lacked property rights, they would have nothing of value to offer buyers. (That's why you can't sell the Brooklyn Bridge!)

Property rights are ***transferrable*** if the current owner of a good can reassign those rights to another consenting party.

Trade can occur only if property rights are ***transferrable***, in the sense that the current owner of a good can reassign those rights to another consenting party. When you buy a used car, for example, the previous owner transfers the car's title into your name. When property rights aren't transferrable, markets can't operate. For example, though many workers in the United States have rights to pension benefits, those rights aren't legally transferrable, so there's no market for them. You can't buy the rights to someone else's pension benefits.

A ***market economy*** allocates scarce resources primarily through markets. In a ***free market system,*** the government mostly allows markets to operate as they will, with little regulation or other intervention.

Nations that allocate scarce resources primarily through markets are said to have ***market economies***. Governments can play either large or small roles in such economies. In a ***free market system***, the role of government is mostly limited to enforcing and protecting property rights; otherwise, markets are allowed to operate as they will, with little regulation or other intervention.

There are, of course, ways to decentralize resource allocation without using markets. For example, many resources, like space on the beach, are available on a first-come first-served basis. Others, like seats in an oversubscribed college class, may be assigned by lottery.

One of the main objectives of microeconomics is to determine how well each method of allocating scarce resources performs. This knowledge allows us to judge whether specific economic decisions should be centralized or decentralized, and whether markets are preferable to other economic institutions.

Economic Motives

By studying economic institutions, we learn about the constraints people face when they make economic decisions. To understand their choices, we need to appreciate their motives.

Microeconomists usually assume that people are motivated by material self-interest—that is, by the desire for goods and services. Throughout this book (except where we explicitly state otherwise), we'll assume that material self-interest is the *only* motive for behavior. Microeconomic theory can, however, accommodate other motivations, such as the possibility that someone might care about someone else's well-being.

The procedures used to allocate scarce resources create incentives for people to engage in certain activities and to avoid others. In market economies, the ways people respond to material incentives depend on whether they act as *consumers, employees,* or *owners of firms.*

In deciding how to spend their resources, self-interested consumers try to choose the mix of goods and services that provides the highest possible level of personal satisfaction. Their incentives depend on prices. Ordinarily, a high price discourages the consumption of a good, while a low price encourages it.

In deciding how to spend their time, self-interested employees try to choose the mix of work and leisure that provides the highest possible level of personal satisfaction. Their incentives depend on how they are compensated. Higher pay for each hour of work increases the attractiveness of work relative to leisure.

In directing production, the owners of firms try to choose the mix of inputs and outputs that provides the highest possible level of profit. Because owners can exchange profits for goods and services, higher profits permit greater material satisfaction. Owners respond to incentives created by the prices of inputs and outputs. For inputs, high prices discourage their use. For outputs, high prices encourage their production.

The quest for either material self-interest or broader notions of personal satisfaction also motivates behavior outside of markets. For example, children respond to incentives to study hard at school; politicians respond to incentives to promote policies that increase the likelihood of their reelection; and military officers respond to incentives to behave in ways that increase the likelihood of their promotion. Microeconomic analysis can help us understand how people respond to incentives in these and other nonmarket settings.

Positive versus Normative Analysis

A central objective of microeconomics is to address factual questions, also known as ***positive questions***, usually concerning choices or market outcomes. This activity is known as ***positive economic analysis***.[2] The truth of every possible answer to a positive question is potentially testable—the relevant facts, once known, must either confirm or contradict it.

Positive economic analysis addresses factual questions, also known as ***positive questions,*** usually concerning choices or market outcomes. It concerns what did, will, or would happen.

[2]The word *positive* does *not* mean that the answer admits no doubt. On the contrary, all answers—particularly those involving predictions—involve *some* degree of uncertainty. Rather, in this context, *positive* simply means that the prediction concerns a factual matter.

All positive questions concern what *did* happen, what *will* happen, or what *would* happen. In addressing what *did* happen, economists provide a factual account of the past—for example, how the distribution of wealth among U.S. households changed between 1900 and 2000. In addressing what *will* happen, they forecast the future—for example, how the average interest rate charged on home mortgages will change over the next year. In addressing what *would* happen, they describe the likely consequences of a course of action, based on an understanding of cause and effect.

While historical fact-finding and forecasting are certainly important branches of economics, the cause-and-effect analysis of actions and their consequences is the bread and butter of microeconomics. Here are some examples of questions about what *would* happen:

- If Dell were to reduce the price of notebook computers by 10 percent, how many more notebooks would the company sell? Would the increase in the sale of notebooks cut into the sales of Dell's desktop computers? If so, by how much?
- If Ford were to launch an advertising campaign to promote its new line of cars, would Toyota respond by advertising more? By lowering prices? By changing how it markets some models?
- If New York were to raise the minimum wage from $7.25 to $7.75, how would that affect employment? Would businesses hire fewer workers? Would they relocate to other states?

To answer positive questions accurately, economists must stick to objective facts and avoid value judgments. Because the facts aren't always what we would like them to be, positive economic analysis can at times seem callous, insensitive, or politically incorrect.

In 2001, for example, economist Steven Levitt and legal scholar John Donohue teamed up to study the important positive question of whether unwanted children are more likely to commit crimes when they become teenagers and adults.[3] After examining variations in crime statistics across states and across time, they concluded that the legalization of abortion—which presumably reduced the number of unwanted children—led to lower crime rates among teenagers and young adults roughly 20 years later. The study touched off a firestorm of controversy. The authors received stacks of hate mail; some critics accused them of encouraging genocide. Yet the study drew no implications concerning the desirability of abortion. Its purpose was to investigate the positive, cause-and-effect relationship between neglect and subsequent criminal behavior. Professor Levitt sees a less controversial implication of the study: "We should do the best we can to try to make sure kids who are born are wanted and loved."

Normative economic analysis addresses questions that involve value judgments, also known as ***normative questions.*** It concerns what ought to happen rather than what did, will, or would happen.

Another objective of microeconomics is to address questions that involve value judgments, also known as ***normative questions***, concerning the allocation of resources. This activity is known as ***normative economic analysis***. Normative questions concern what *ought* to happen, rather than what did, will, or would happen. Here are some examples:

- Is society better off with free trade between countries or with trade barriers?
- What is the best way to control carbon emissions?
- Are there ways to improve the structure of our health insurance system?

[3]John Donohue and Steven Levitt, "The Impact of Legalized Abortion on Crime," *Quarterly Journal of Economics* 166, May 2001, pp. 379–420.

Since value judgments are subjective, answers to normative questions are neither right nor wrong, and their validity isn't testable. Consider the following normative statement: "Economic inequality is evil." This statement is a value judgment, and people are free to disagree about it, even when they agree about the objective facts.

If all normative statements are subjective, how can an economist usefully conduct normative analysis? Typically, economists rely on a single overarching value judgment, known as the principle of ***individual sovereignty***, which holds that each person knows what's best for him or her. This principle requires us to avoid paternalistic judgments, like the notion that classical music is "better for you" than hip hop. If you choose hip hop, then hip hop must be better for you. Economists apply the same principles to policy questions. If, *with full knowledge of all consequences,* someone would choose trade barriers over free trade, we conclude that he's better off with trade barriers. In this way, economists turn normative questions into positive questions. To determine whether a consumer would be better off or worse off with one of two alternatives, they predict which one the consumer would choose, given full and correct information about the effects of each.

The principle of ***individual sovereignty*** holds that each person knows what's best for him or her.

Unfortunately, the interests of different people often conflict. A policy that benefits one person may hurt another. This conflict requires us to weigh one person's gain against another's loss. For example, suppose we must choose between two policies, one of which benefits person A at the expense of person B, and the other of which benefits person B at the expense of person A. If person A is poor and person B is wealthy, most people would probably lean toward the first policy. But what if the benefit to A was small, while the cost to B was large? What if the policy involves taking money away from someone who works hard and giving it to someone who makes no effort?

Neither the principle of individual sovereignty, nor any other economic principle, can help us to decide whether the gain to one person outweighs the loss to another. However, if someone supplies a subjective criterion, normative economic analysis can identify the best policy. For example, suppose someone believes that from a social perspective, extra dollars in the hands of person A are worth twice as much as extra dollars in the hands of person B (possibly because person A is poor relative to person B). If positive economic analysis reveals that a policy is likely to raise person A's income by $80 and lower person B's income by $100, then *according to this criterion,* the policy will be beneficial.

The Scope of Microeconomics

Microeconomics isn't just about money. Suppose, for example, that you're scheduled to take a test and have only a limited amount of time to study. Since your time is a scarce resource, its allocation between studying, sleep, and recreation is an economic issue.

Virtually every human decision involves the use of some scarce resource. As a result, micreconomists study an extremely broad range of topics, including marriage, crime, addiction, and suicide. In effect, microeconomics has evolved into the study of decision making, the ways in which decisions by many individuals combine to produce social outcomes, and the desirability of those outcomes.