PRINCIPLES OF

MACROECONOMICS

ELEVENTH EDITION

CASE · FAIR · OSTER

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Macroeconomics

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Wellesley College

Ray C. Fair

Yale University

Sharon M. Oster

Yale University

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and
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About the Authors

Karl E. Case is Professor of Economics Emeritus at Wellesley College where he has taught for 34 years and served several tours of duty as Department Chair. He is a Senior Fellow at the Joint Center for Housing Studies at Harvard University and a founding partner in the real estate research firm of Fiserv Case Shiller Weiss, which produces the S&P Case-Shiller Index of home prices. He serves as a member of the Index Advisory Committee of Standard and Poor's, and along with Ray Fair he serves on the Academic Advisory Board of the Federal Reserve Bank of Boston.

Before coming to Wellesley, he served as Head Tutor in Economics (director of undergraduate studies) at Harvard, where he won the Allyn Young Teaching Prize. He was Associate Editor of the *Journal of Economic Perspectives* and the *Journal of Economic Education,* and he was a member of the AEA's Committee on Economic Education.

Professor Case received his B.A. from Miami University in 1968; spent three years on active duty in the Army, and received his Ph.D. in Economics from Harvard University in 1976.

Professor Case's research has been in the areas of real estate, housing, and public finance. He is author or coauthor of five books, including *Principles of Economics, Economics and Tax Policy*, and *Property Taxation: The Need for Reform*, and he has published numerous articles in professional journals.

For the last 25 years, his research has focused on real estate markets and prices. He has authored numerous professional articles, many of which attempt to isolate the causes and consequences of boom and bust cycles and their relationship to regional and national economic performance.

Ray C. Fair is Professor of Economics at Yale University. He is a member of the Cowles Foundation at Yale and a Fellow of the Econometric Society. He received a B.A. in Economics from Fresno State College in 1964 and a Ph.D. in Economics from MIT in 1968. He taught at Princeton University from 1968 to 1974 and has been at Yale since 1974.

Professor Fair's research has primarily been in the areas of macroeconomics and econometrics, with particular emphasis on macroeconometric model building. He also has done work in the areas of finance, voting behavior, and aging in sports. His publications include *Specification, Estimation, and Analysis of Macroeconometric Models* (Harvard Press, 1984); *Testing Macroeconometric Models* (Harvard Press, 1994); and *Estimating How the Macroeconomy Works* (Harvard Press, 2004).

Professor Fair has taught introductory and intermediate macroeconomics at Yale. He has also taught graduate courses in macroeconomic theory and macroeconometrics.

Professor Fair's U.S. and multicountry models are available for use on the Internet free of charge. The address is http://fairmodel.econ.yale.edu. Many teachers have found that having students work with the U.S. model on the Internet is a useful complement to an introductory macroeconomics course.

Sharon M. Oster is the Frederic Wolfe Professor of Economics and Management and former Dean of the Yale School of Management. Professor Oster joined Case and Fair as a coauthor in the ninth edition of this book. Professor Oster has a B.A. in Economics from Hofstra University and a Ph.D. in Economics from Harvard University.

Professor Oster's research is in the area of industrial organization. She has worked on problems of diffusion of innovation in a number of different industries, on the effect of regulations on business, and on competitive strategy. She has published a number of articles in these areas and is the author of several books, including *Modern Competitive Analysis* and *The Strategic Management of Nonprofits*.

Prior to joining the School of Management at Yale, Professor Oster taught for a number of years in Yale's Department of Economics. In the department, Professor Oster taught introductory and intermediate microeconomics to undergraduates as well as several graduate courses in industrial organization. Since 1982, Professor Oster has taught primarily in the Management School, where she teaches the core microeconomics class for MBA students and a course in the area of competitive strategy. Professor Oster also consults widely for businesses and nonprofit organizations and has served on the boards of several publicly traded companies and nonprofit organizations.

Brief Contents

Contents

Preface

Our goal in the 11th edition, as it was in the first edition, is to instill in students a fascination with both the functioning of the economy and the power and breadth of economics. The first line of every edition of our book has been "The study of economics should begin with a sense of wonder." We hope that readers come away from our book with a basic understanding of how market economies function, an appreciation for the things they do well, and a sense of the things they do poorly. We also hope that readers begin to learn the art and science of economic thinking and begin to look at some policy and even personal decisions in a different way.

What's New in This Edition?

- The 11th edition has continued the changes in the *Economics in Practice* boxes that we began several editions ago. In these boxes, we try to bring economic thinking to the concerns of the typical student. In many cases, we do this by spotlighting recent research, much of it by young scholars.
  - Chapter 6 looks at recent work on "green" national income accounting, a topic likely to excite many environmentally conscious undergraduates.
  - Chapter 7 describes research on the long-term effects on wages and job prospects of new college graduates who begin their careers in a recession.

  In other cases, we use recent events to show the power and breadth of economic models and principles.
  - When Hurricane Sandy struck the east coast of the United States, why did most of the subsequent charges of price-gouging involve gas and hotel rooms? Chapter 4 uses principles of elasticity to answer this question.
  - Several of the new boxes in the macroeconomics chapters focus on the debates we have had in the United States in the last year on tax and spending policy. Finally, more of the boxes are global, with examples on the move from tea to coffee drinking in China, or roads in India, or the relative productivity of American versus Indian managers.

  It is our hope that students will come to see both how broad the tools of economics are and how exciting is much of the new research in the field. For each box, we have also added questions to take students back from the box to the analytics of the textbook to reinforce the underlying economic principles of the illustrations.
- As in the previous edition, we have reworked some of the chapters to streamline them and to improve readability. In this edition, Chapters 2 and 3, have been substantially reworked, while many of the other chapters have been tightened and made more current.
- A major change has been made in macro: We have replaced the LM curve with a Fed interest rate rule. Chapters 12 and 13 have been completely rewritten to incorporate this change. There is no IS/LM model, and no longer does the money supply play any exogenous role in the AS/AD model. This change simplifies the analysis and makes the model more realistic. The Fed does in practice target the interest rate and not the money supply! The supply of money and demand for money chapters (Chapters 10 and 11) have been retained because they deal with many basic questions in macro. The main point of these two chapters going forward is to show how the Fed controls the interest rate. This then allows us to use the Fed rule in Chapters 12 and 13. Without Chapters 10 and 11, students would not understand what is behind the Fed rule and would not understand quantitative easing and the like.

- U.S. short-term interest rates have been roughly zero since the 10th edition, and we have added discussion on what a zero interest rate bound means. This discussion is now framed around the Fed rule. We have also updated and expanded our discussion of the Fed's balance sheet (Chapter 10). Also, federal government deficits have been high since the 10th edition, and we have expanded our discussion of this (Chapters 9 and 15).
- All of the macro data have been updated through 2012. The slow recovery from the 2008–2009 recession is evident in these data. This gives students a good idea of what has been happening to the economy since they left high school.
- Many new questions and problems at the end of the chapters have been added.

The Foundation

The themes of *Principles of Macroeconomics*, 11th edition, are the same themes of the first ten editions. The purposes of this book are to introduce the discipline of economics and to provide a basic understanding of how economies function. This requires a blend of economic theory, institutional material, and real-world applications. We have maintained a balance between these ingredients in every chapter. The hallmark features of our book are as follows:

1. Three-tiered explanations of key concepts (*stories-graphs-equations*)
2. Intuitive and accessible structure
3. International coverage

Three-Tiered Explanations: Stories-Graphs-Equations

Professors who teach principles of economics are faced with a classroom of students with different abilities, backgrounds, and learning styles. For some students, analytical material is difficult no matter how it is presented; for others, graphs and equations seem to come naturally. The problem facing instructors and textbook authors is how to convey the core principles of the discipline to as many students as possible without selling the better students short. Our approach to this problem is to present most core concepts in the following three ways.

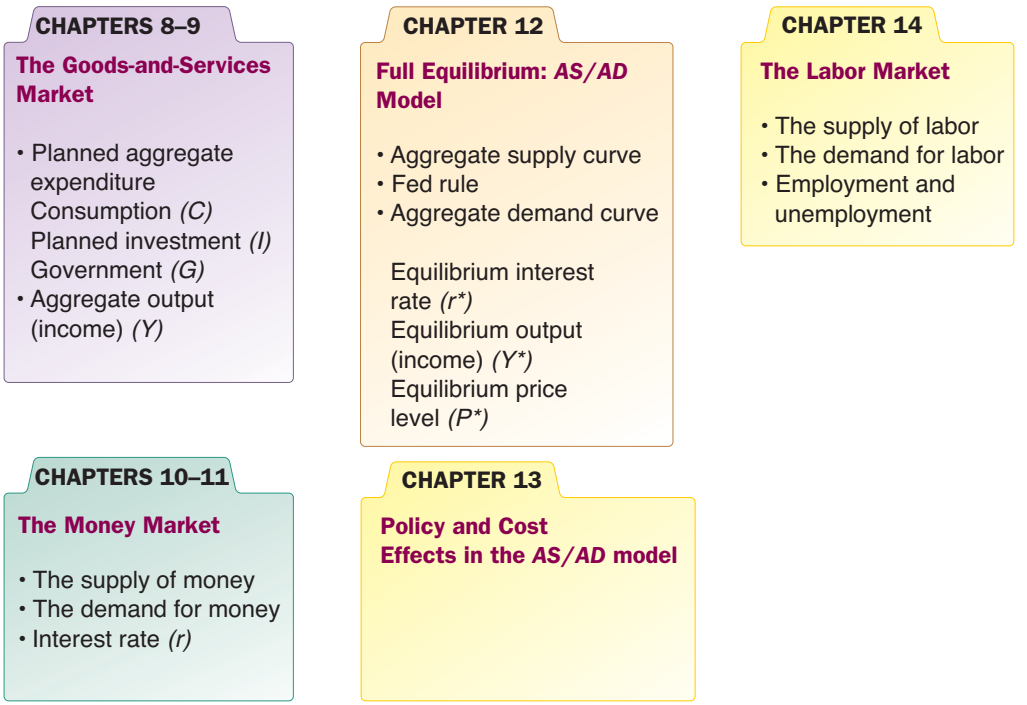
First, we present each concept in the context of a simple intuitive ***story*** or example in words often followed by a table. Second, we use a ***graph*** in most cases to illustrate the story or example. And finally, in many cases where appropriate, we use an ***equation*** to present the concept with a mathematical formula.

Macroeconomic Structure

We remain committed to the view that it is a mistake simply to throw aggregate demand and aggregate supply curves at students in the first few chapters of a principles book. To understand the *AS* and *AD* curves, students need to know about the functioning of both the goods market and the money market. The logic behind the simple demand curve is wrong when it is applied to the relationship between aggregate demand and the price level. Similarly, the logic behind the simple supply curve is wrong when it is applied to the relationship between aggregate supply and the price level. We thus build up to the AS/AD model slowly.

The goods market is discussed in Chapters 8 and 9 (the IS curve). The money market is discussed in Chapters 10 and 11 (material behind the Fed rule). Everything comes together in Chapter 12, which derives the AD and AS curves and determines the equilibrium values of aggregate output, the price level, and the interest rate. This is the core chapter and where the Fed rule plays a major role. Chapter 13 then uses the model in Chapter 12 to analyze policy effects and cost shocks. Chapter 14 then brings in the labor market. The figure at the top of the next page (Figure III.1 on page 145) gives you an overview of this structure.

One of the big issues in the organization of the macroeconomic material is whether long-run growth issues should be taught before short-run chapters on the determination of national income and countercyclical policy. In the last four editions, we moved a significant discussion of growth to Chapter 7, "Unemployment, Inflation, and Long-Run Growth," and



▲ FIGURE III.1 The Core of Macroeconomic Theory

highlighted it. However, while we wrote Chapter 17, the major chapter on long-run growth, so that it can be taught before or after the short-run chapters, we remain convinced that it is easier for students to understand the growth issue once they have come to grips with the logic and controversies of short-run cycles, inflation, and unemployment.

International Coverage

As in previous editions, we continue to integrate international examples and applications throughout the text. This probably goes without saying: The days in which an introductory economics text could be written with a closed economy in mind have long since gone.

Tools for Learning

As authors and teachers, we understand the challenges of the principles of economics course. Our pedagogical features are designed to illustrate and reinforce key economic concepts through real-world examples and applications.

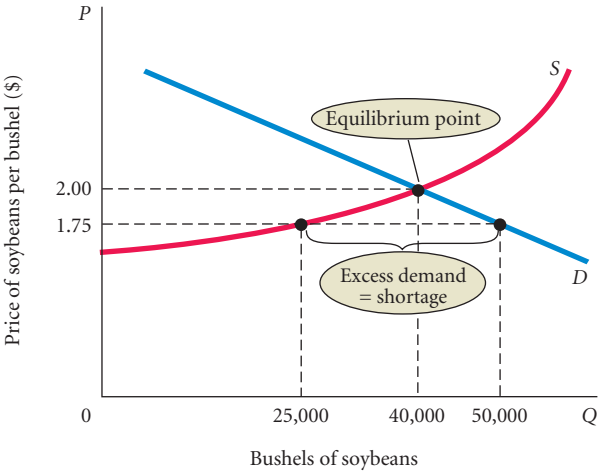
Economics in Practice

As described earlier, the *Economics in Practice* feature focuses on recent research or events that support a key concept in the chapter and help students think about the broad and exciting applications of economics to their lives and the world around them. Each box contains a question or two to further connect the material they are learning with their lives.

Graphs

Reading and interpreting graphs is a key part of understanding economic concepts. The Chapter 1 Appendix, "How to Read and Understand Graphs," shows readers how to interpret the 200-plus graphs featured in this book. We use red curves to illustrate the behavior of firms and blue curves to show the behavior of households. We use a different shade of red and blue to signify a shift in a curve.

FIGURE 3.9 Excess Demand, or Shortage
At a price of $1.75 per bushel, quantity demanded exceeds quantity supplied. When excess *demand* exists, there is a tendency for price to rise. When quantity demanded equals quantity supplied, excess demand is eliminated and the market is in equilibrium. Here the equilibrium price is $2.50 and the equilibrium quantity is 35,000 bushels.



Problems and Solutions

Each chapter and appendix ends with a problem set that asks students to think about and apply what they've learned in the chapter. These problems are not simple memorization questions. Rather, they ask students to perform graphical analysis or to apply economics to a real-world situation or policy decision. More challenging problems are indicated by an asterisk. Many problems have been updated. The solutions to all of the problems are available in the *Instructor's Manuals*. Instructors can provide the solutions to their students so they can check their understanding and progress.

FRED® ECONOMIC DATA | ST. LOUIS FED™

MyEconLab MyEconLab Real-time data

MyEconLab is a powerful assessment and tutorial system that works hand-in-hand with *Microeconomics*, *Macroeconomics*, and *Economics*. MyEconLab includes comprehensive homework, quiz, test, and tutorial options, allowing instructors to manage all assessment needs in one program. Key innovations in the MyEconLab course for the eleventh edition, include the following:

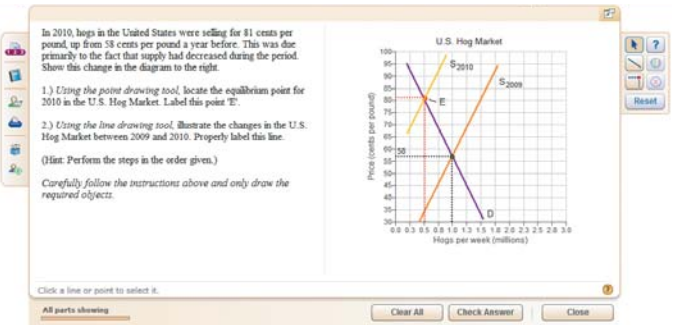
- Real-time *Data Analysis Exercises*, marked with , allow students and instructors to use the absolute latest data from FRED, the online macroeconomic data bank from the Federal Reserve Bank of St. Louis. By completing the exercises, students become familiar with a key data source, learn how to locate data, and develop skills to interpret data.
- In the eText available in MyEconLab, select figures labeled MyEconLab Real-time data allow students to display a popup graph updated with real-time data from FRED.
- Current News Exercises, new to this edition of the MyEconLab course, provide a turnkey way to assign gradable news-based exercises in MyEconLab. Every week, Pearson scours the news, finds a current article appropriate for the course, creates an exercise around this news article, and then automatically adds it to MyEconLab. Assigning and grading current news-based exercises that deal with the latest macro events and policy issues and has never been more convenient.

Both the text and supplement package provide ways for instructors and students to assess their knowledge and progress through the course. MyEconLab, the new standard in personalized online learning, is a key part of Case, Fair, and Oster's integrated learning package for the 11th edition.

For the Instructor

MyEconLab is an online course management, testing, and tutorial resource. Instructors can choose how much or how little time to spend setting up and using MyEconLab. Each

chapter contains two Sample Tests, Study Plan Exercises, and Tutorial Resources. Student use of these materials requires no initial setup by their instructor. The online Gradebook records each student's performance and time spent on the Tests and Study Plan and generates reports by student or by chapter. Instructors can assign tests, quizzes, and homework in MyEconLab using four resources:



- Preloaded Sample Tests
- Problems similar to the end-of-chapter problems
- Test Item File questions
- Self-authored questions using Econ Exercise Builder

Exercises use multiple-choice, graph drawing, and free-response items, many of which are generated algorithmically so that each time a student works them, a different variation is presented. MyEconLab grades every problem, even those with graphs. When working homework exercises, students receive immediate feedback with links to additional learning tools.

Customization and Communication MyEconLab in CourseCompass™ provides additional optional customization and communication tools. Instructors who teach distance learning courses or very large lecture sections find the CourseCompass format useful because they can upload course documents and assignments, customize the order of chapters, and use communication features such as Digital Drop Box and Discussion Board.

Experiments in MyEconLab

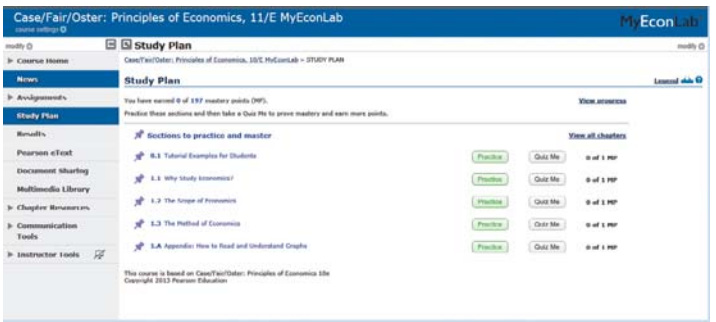
Experiments are a fun and engaging way to promote active learning and mastery of important economic concepts. Pearson's experiments program is flexible and easy for instructors and students to use.

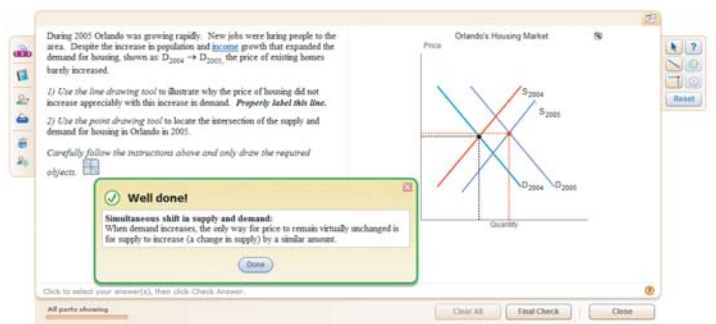
- Single-player experiments allow your students to play an experiment against virtual players from anywhere at any time with an Internet connection.
- Multiplayer experiments allow you to assign and manage a real-time experiment with your class. In both cases, pre- and post-questions for each experiment are available for assignment in MyEconLab.

For the Student

MyEconLab puts students in control of their learning through a collection of tests, practice, and study tools tied to the online interactive version of the textbook, as well as other media resources. Within MyEconLab's structured environment, students practice what they learn, test their understanding, and pursue a personalized Study Plan generated from their performance on Sample Tests and tests set by their instructors. At the core of MyEconLab are the following features:

- Sample Tests, two per chapter
- Personal Study Plan
- Tutorial Instruction
- Graphing Tool





Sample Tests Two Sample Tests for each chapter are preloaded in MyEconLab, enabling students to practice what they have learned, test their understanding, and identify areas in which they need further work. Students can study on their own, or they can complete assignments created by their instructor.

Personal Study Plan Based on a student's performance on tests, MyEconLab generates a personal Study Plan that shows where the student needs further study. The Study Plan consists of a series of additional practice exercises with detailed feedback and guided solutions that are keyed to other tutorial resources.

Tutorial Instruction Launched from many of the exercises in the Study Plan, MyEconLab provides tutorial instruction in the form of step-by-step solutions and other media-based explanations.

Graphing Tool A graphing tool is integrated into the Tests and Study Plan exercises to enable students to make and manipulate graphs. This feature helps students understand how concepts, numbers, and graphs connect.

Additional MyEconLab Tools MyEconLab includes the following additional features:

1. **Economics in the News**—This feature provides weekly updates during the school year of news items with links to sources for further reading and discussion questions.
2. **eText**—While students are working in the Study Plan or completing homework assignments, one of the tutorial resources available is a direct link to the relevant page of the text so that students can review the appropriate material to help them complete the exercise.
3. **Glossary**—This searchable version of the textbook glossary provides additional examples and links to related terms.
4. **Glossary Flashcards**—Every key term is available as a flashcard, allowing students to quiz themselves on vocabulary from one or more chapters at a time.

MyEconLab content has been created through the efforts of the following individuals:

Charles Baum, Middle Tennessee State University; Sarah Ghosh, University of Scranton; Russell Kellogg, University of Colorado–Denver; Bert G.Wheeler, Cedarville University; and Noel Lotz and Douglas A. Ruby, Pearson Education.

Resources for the Instructor

The following supplements are designed to make teaching and testing flexible and easy and are available for *Micro*, *Macro*, and *Economics* volumes.

Instructor's Manuals

Two *Instructor's Manuals*, one for *Principles of Microeconomics* and one for *Principles of Macroeconomics*, were prepared by Tony Lima of California State University, East Bay (Hayward, California). The *Instructor's Manuals* are designed to provide the utmost teaching support for instructors. They include the following content:

- Detailed *Chapter Outlines* include key terminology, teaching notes, and lecture suggestions.
- *Topics for Class Discussion* provide topics and real-world situations that help ensure that economic concepts resonate with students.
- Unique *Economics in Practice* features that are not in the main text provide extra real-world examples to present and discuss in class.

- *Teaching Tips* provide tips for alternative ways to cover the material and brief reminders on additional help to provide students. These tips include suggestions for exercises and experiments to complete in class.
- *Extended Applications* include exercises, activities, and experiments to help make economics relevant to students.
- *Excel Workbooks*, available for many chapters, make it easy to customize numerical examples and produce graphs.
- *Solutions* are provided for all problems in the book.

Six Test Item Files

We have tailored the Test Item Files to help instructors easily and efficiently assess student understanding of economic concepts and analyses. Test questions are annotated with the following information:

- **Difficulty:** 1 for straight recall, 2 for some analysis, 3 for complex analysis
- **Type:** Multiple-choice, true/false, short-answer, essay
- **Topic:** The term or concept the question supports
- **Skill:** Fact, definition, analytical, conceptual
- **AACSB:** See description in the next section.

The Test Item Files include questions with tables that students must analyze to solve for numerical answers. The Test Item Files also contain questions based on the graphs that appear in the book. The questions ask students to interpret the information presented in the graph. Many questions require students to sketch a graph on their own and interpret curve movements.

Microeconomics Test Item File 1, by Randy Methenitis of Richland College: Test Item File 1 (TIF1) includes over 2,700 questions. All questions are machine gradable and are either multiple-choice or true/false. This Test Item File is for use with the 11th edition of *Principles of Microeconomics* in the first year of publication. TIF1 is available in a computerized format using TestGen EQ test-generating software and is included in MyEconLab.

Microeconomics Test Item File 2, by Randy Methenitis of Richland College: This additional Test Item File contains another 2,700 machine-gradable questions based on the TIF1 but regenerated to provide instructors with fresh questions when using the book the second year. This Test Item File is available in a computerized format using TestGen EQ test-generating software.

Microeconomics Test Item File 3, by Richard Gosselin of Houston Community College: This third Test Item File includes 1,000 conceptual problems, essay questions, and short-answer questions. Application-type problems ask students to draw graphs and analyze tables. The Word files are available on the Instructor's Resource Center (**www.pearsonhighered.com/educator**).

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The Test Item Files were checked for accuracy by the following professors:

Leon J. Battista, Bronx Community College; Margaret Brooks, Bridgewater State College; Mike Cohick, Collin County Community College; Dennis Debrecht, Carroll College; Amrik Dua, California State Polytechnic University, Pomona; Mitchell Dudley, The College of William & Mary; Ann Eike, University of Kentucky; Connel Fullencamp, Duke University; Craig Gallet, California State University, Sacramento; Michael Goode, Central Piedmont Community College; Steve Hamilton, California State Polytechnic University; James R. Irwin, Central Michigan University; Aaron Jackson, Bentley College; Rus Janis, University of Massachusetts, Amherst; Jonatan Jelen, The City College of New York; Kathy A. Kelly, University of Texas, Arlington; Kate Krause, University of New Mexico; Gary F. Langer, Roosevelt University; Leonard Lardaro, University of Rhode Island; Ross LaRoe, Denison University; Melissa Lind, University of Texas, Arlington; Solina Lindahl, California State Polytechnic University; Pete Mavrokordatos, Tarrant County College; Roberto Mazzoleni, Hofstra University; Kimberly Mencken, Baylor University; Ida Mirzaie, Ohio State University; Shahruz Mohtadi, Suffolk University; Mary Pranzo, California State University, Fresno; Ed Price, Oklahoma State University; Robert Shoffner, Central Piedmont Community College; James Swofford, University of South Alabama; Helen Tauchen, University of North Carolina, Chapel Hill; Eric Taylor, Central Piedmont Community College; Henry Terrell, University of Maryland; John Tommasi, Bentley College; Mukti Upadhyay, Eastern Illinois University; Robert Whaples, Wake Forest University; and Timothy Wunder, University of Texas, Arlington.

The Association to Advance Collegiate Schools of Business (AACSB) The authors of the Test Item File have connected select Test Item File questions to the general knowledge and skill guidelines found in the AACSB assurance of learning standards.

What Is the AACSB? AACSB is a not-for-profit corporation of educational institutions, corporations, and other organizations devoted to the promotion and improvement of higher education in business administration and accounting. A collegiate institution offering degrees in business administration or accounting may volunteer for AACSB accreditation review. The AACSB makes initial accreditation decisions and conducts periodic reviews to promote continuous quality improvement in management education. Pearson Education is a proud member of the AACSB and is pleased to provide advice to help you apply AACSB assurance of learning standards.

What Are AACSB Assurance of Learning Standards? One of the criteria for AACSB accreditation is quality of the curricula. Although no specific courses are required, the AACSB expects a curriculum to include learning experiences in areas such as the following:

- Communication
- Ethical Reasoning
- Analytic Skills
- Use of Information Technology
- Multicultural and Diversity
- Reflective Thinking

Questions that test skills relevant to these guidelines are appropriately tagged. For example, a question testing the moral questions associated with externalities would receive the Ethical Reasoning tag.

How Can Instructors Use the AACSB Tags? Tagged questions help you measure whether students are grasping the course content that aligns with the AACSB guidelines noted. In addition, the tagged questions may help instructors identify potential applications of these skills. This in turn may suggest enrichment activities or other educational experiences to help students achieve these skills.

TestGen

The computerized TestGen package allows instructors to customize, save, and generate classroom tests. The test program permits instructors to edit, add, or delete questions from the Test Item Files; create new graphics; analyze test results; and organize a database of tests

and student results. This software allows for extensive flexibility and ease of use. It provides many options for organizing and displaying tests, along with search and sort features. The software and the Test Item Files can be downloaded from the Instructor's Resource Center (**www.pearsonhighered.com/educator**).

PowerPoint® Lecture Presentations

Six sets of PowerPoint slides, three for *Principles of Microeconomics* and three for *Principles of Macroeconomics*, prepared by Fernando Quijano of Dickinson State University, are available:

- A comprehensive set of PowerPoint slides that can be used by instructors for class presentations or by students for lecture preview or review. The presentation includes all the figures, photos, tables, key terms, and equations in the textbook. Two versions are available—the first is in step-by-step mode so that you can build graphs as you would on a blackboard, and the second is in automated mode, using a single click per slide.
- A comprehensive set of PowerPoint slides with Classroom Response Systems (CRS) questions built in so that instructors can incorporate CRS "clickers" into their classroom lectures. For more information on Pearson's partnership with CRS, see the description below. Instructors may download these PowerPoint presentations from the Instructor's Resource Center (**www.pearsonhighered.com/educator**).
- Student versions of the PowerPoint presentations are available as .pdf files from the book's MyEconLab course. This version allows students to print the slides and bring them to class for note taking.

Classroom Response Systems

Classroom Response Systems (CRS) is an exciting new wireless polling technology that makes large and small classrooms even more interactive because it enables instructors to pose questions to their students, record results, and display the results instantly. Students can answer questions easily by using compact remote-control transmitters. Pearson has partnerships with leading providers of classroom response systems and can show you everything you need to know about setting up and using a CRS system. We provide the classroom hardware, text-specific PowerPoint® slides, software, and support; and we show you how your students can benefit. Learn more at **www.pearsonhighered.com/crs**.

Resources for the Student

The following supplements are designed to help students understand and retain the key concepts of each chapter.

MyEconLab

MyEconLab allows students to practice what they learn, test their understanding, and pursue a personalized Study Plan generated from their performance on Sample Tests and tests set by their instructors. Here are MyEconLab's key features. (See page xx of this preface for more details on MyEconLab.)

- Sample Tests, two per chapter
- Personal Study Plan
- Tutorial Instruction
- Graphing Tool

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The Scope and Method of Economics

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The study of economics should begin with a sense of wonder. Pause for a moment and consider a typical day in your life. It might start with a bagel made in a local bakery with flour produced in Minnesota from wheat grown in Kansas and bacon from pigs raised in Ohio packaged in plastic made in New Jersey. You spill coffee from Colombia on your shirt made in Texas from textiles shipped from South Carolina.

After class you drive with a friend on an interstate highway that is part of a system that took 20 years and billions of dollars to build. You stop for gasoline refined in Louisiana from Saudi Arabian crude oil brought to the United States on a supertanker that took 3 years to build at a shipyard in Maine.

Later, you log onto the Web with a laptop assembled in Indonesia from parts made in China and Skype with your brother in Mexico City, and you call a buddy on your iPhone with parts from a dozen countries. You use or consume tens of thousands of things. Somebody organized men and women and materials to produce and distribute them. Thousands of decisions went into their completion. Somehow they got to you.

In the United States, over 143 million people—almost half the total population—work at hundreds of thousands of different jobs producing over $16 trillion worth of goods and services every year. Some cannot find work; some choose not to work. Some are rich; others are poor.

The United States imports over $250 billion worth of automobiles and parts and over $450 billion worth of petroleum and petroleum products each year; it exports around $125 billion worth of agricultural products, including food. Every month, the United States buys around $35 billion worth of goods and services from China, while China buys about $9 billion worth from the United States.

Some countries are wealthy. Others are impoverished. Some are growing. Some are not. Some businesses are doing well. Others are going bankrupt. As the 11th edition of our text goes to press, the world is beginning to recover from a period during which many people felt the pain of a major economic downturn. In the United States, at the beginning of 2013, there were about 11 million people who wanted to work but could not find a job.

CHAPTER OUTLINE

LEARNING OBJECTIVES

Identify three key reasons to study economics
Describe microeconomics, macroeconomics, and the diverse fields of economics
Discuss the fundamentals of economic methods, theories, and models
Identify the criteria for evaluating economic policies and outcomes

economics The study of how individuals and societies choose to use the scarce resources that nature and previous generations have provided.

Economics is the study of how individuals and societies choose to use the scarce resources that nature and previous generations have provided. The key word in this definition is *choose*. Economics is a behavioral, or social, science. In large measure, it is the study of how people make choices. The choices that people make, when added up, translate into societal choices.

The purpose of this chapter and the next is to elaborate on this definition and to introduce the subject matter of economics. What is produced? How is it produced? Who gets it? Why? Is the result good or bad? Can it be improved?

Why Study Economics?

There are three main reasons to study economics: to learn a way of thinking, to understand society, and to be an informed citizen.

To Learn a Way of Thinking

Probably the most important reason for studying economics is to learn a way of thinking. Economics has three fundamental concepts that, once absorbed, can change the way you look at everyday choices: opportunity cost, marginalism, and the working of efficient markets.

Opportunity Cost

What happens in an economy is the outcome of thousands of individual decisions. People must decide how to divide their incomes among all the goods and services available in the marketplace. They must decide whether to work, whether to go to school, and how much to save. Businesses must decide what to produce, how much to produce, how much to charge, and where to locate. It is not surprising that economic analysis focuses on the process of decision making.

Nearly all decisions involve trade-offs. A key concept that recurs in analyzing the decision-making process is the notion of *opportunity cost*. The full "cost" of making a specific choice includes what we give up by not making the best alternative choice. The best alternative that we forgo, or give up, when we make a choice or a decision is called the **opportunity cost** of that decision.

opportunity cost The best alternative that we forgo, or give up, when we make a choice or a decision.

When asked how much a movie costs, most people cite the ticket price. For an economist, this is only part of the answer: to see a movie takes not only a ticket but also time. The opportunity cost of going to a movie is the value of the other things you could have done with the same money and time. If you decide to take time off from work, the opportunity cost of your leisure is the pay that you would have earned had you worked. Part of the cost of a college education is the income you could have earned by working full-time instead of going to school.

scarce Limited.

Opportunity costs arise because resources are scarce. **Scarce** simply means limited. Consider one of our most important resources—time. There are only 24 hours in a day, and we must live our lives under this constraint. A farmer in rural Brazil must decide whether it is better to continue to farm or to go to the city and look for a job. A hockey player at the University of Vermont must decide whether to play on the varsity team or spend more time studying.

Marginalism

A second key concept used in analyzing choices is the notion of **marginalism**. In weighing the costs and benefits of a decision, it is important to weigh only the costs and benefits that arise from the decision. Suppose, for example, that you live in New Orleans and that you are weighing the costs and benefits of visiting your mother in Iowa. If business required that you travel to Kansas City, the cost of visiting Mom would be only the additional, or *marginal*, time and money cost of getting to Iowa from Kansas City.

marginalism The process of analyzing the additional or incremental costs or benefits arising from a choice or decision.

There are numerous examples in which the concept of marginal cost is useful. For an airplane that is about to take off with empty seats, the marginal cost of an extra passenger is essentially zero; the total cost of the trip is roughly unchanged by the addition of an extra passenger. Thus, setting aside a few seats to be sold at big discounts through www.priceline.com or other Web sites can be profitable even if the fare for those seats is far below the average cost per seat of making the trip. As long as the airline succeeds in filling seats that would otherwise have been empty, doing so is profitable.

Efficient Markets—No Free Lunch Suppose you are ready to check out of a busy grocery store on the day before a storm and seven checkout registers are open with several people in each line. Which line should you choose? Usually, the waiting time is approximately the same no matter which register you choose (assuming you have more than 12 items). If one line is much shorter than the others, people will quickly move into it until the lines are equalized again.

As you will see later, the term *profit* in economics has a very precise meaning. Economists, however, often loosely refer to "good deals" or risk-free ventures as *profit opportunities*. Using the term loosely, a profit opportunity exists at the checkout lines when one line is shorter than the others. In general, such profit opportunities are rare. At any time, many people are searching for them; as a consequence, few exist. Markets like this, where any profit opportunities are eliminated almost instantaneously, are said to be **efficient markets**. (We discuss *markets*, the institutions through which buyers and sellers interact and engage in exchange, in detail in Chapter 2.)

efficient market A market in which profit opportunities are eliminated almost instantaneously.

The common way of expressing the efficient markets concept is "there's no such thing as a free lunch." How should you react when a stockbroker calls with a hot tip on the stock market? With skepticism. Thousands of individuals each day are looking for hot tips in the market. If a particular tip about a stock is valid, there will be an immediate rush to buy the stock, which will quickly drive up its price. This view that very few profit opportunities exist can, of course, be carried too far. There is a story about two people walking along, one an economist and one not. The non-economist sees a $20 bill on the sidewalk and says, "There's a $20 bill on the sidewalk." The economist replies, "That is not possible. If there were, somebody would already have picked it up."

There are clearly times when profit opportunities exist. Someone has to be first to get the news, and some people have quicker insights than others. Nevertheless, news travels fast, and there are thousands of people with quick insights. The general view that large profit opportunities are rare is close to the mark.

The study of economics teaches us a way of thinking and helps us make decisions.

To Understand Society

Another reason for studying economics is to understand society better. Past and present economic decisions have an enormous influence on the character of life in a society. The current state of the physical environment, the level of material well-being, and the nature and number of jobs are all products of the economic system.

At no time has the impact of economic change on a society been more evident than in England during the late eighteenth and early nineteenth centuries, a period that we now call the **Industrial Revolution**. Increases in the productivity of agriculture, new manufacturing technologies, and development of more efficient forms of transportation led to a massive movement of the British population from the countryside to the city. At the beginning of the eighteenth century, approximately 2 out of 3 people in Great Britain worked in agriculture. By 1812, only 1 in 3 remained in agriculture; by 1900, the figure was fewer than 1 in 10. People jammed into overcrowded cities and worked long hours in factories. England had changed completely in two centuries—a period that in the run of history was nothing more than the blink of an eye.

Industrial Revolution The period in England during the late eighteenth and early nineteenth centuries in which new manufacturing technologies and improved transportation gave rise to the modern factory system and a massive movement of the population from the countryside to the cities.

It is not surprising that the discipline of economics began to take shape during this period. Social critics and philosophers looked around and knew that their philosophies must expand to accommodate the changes. Adam Smith's *Wealth of Nations* appeared in 1776. It was followed by the writings of David Ricardo, Karl Marx, Thomas Malthus, and others. Each tried to make sense out of what was happening. Who was building the factories? Why? What determined the level of wages paid to workers or the price of food? What would happen in the future, and what *should* happen? The people who asked these questions were the first economists.

Similar changes continue to affect the character of life in more recent times. In fact, many argue that the late 1990s marked the beginning of a new Industrial Revolution. As we turned the corner into the new millennium, the "e" revolution was clearly having an impact on virtually

every aspect of our lives: the way we buy and sell products, the way we get news, the way we plan vacations, the way we communicate with each other, the way we teach and take classes, and on and on. These changes have had and will clearly continue to have profound impacts on societies across the globe, from Beijing to Calcutta to New York.

These changes have been driven by economics. Although the government was involved in the early years of the World Wide Web, private firms that exist to make a profit (such as Facebook, YouTube, Yahoo!, Microsoft, Google, Monster.com, Amazon.com, and E-Trade) created almost all the new innovations and products. How does one make sense of all this? What will the effects of these innovations be on the number of jobs, the character of those jobs, the family incomes, the structure of our cities, and the political process both in the United States and in other countries?

The study of economics is an essential part of the study of society.

To Be an Informed Citizen

A knowledge of economics is essential to being an informed citizen. Between 2009 and 2013 much of the world struggled with a major recession and very slow recovery, leaving millions of people around the world out of work. Understanding what happens in a recession and what the government can and cannot do to help in a recovery is an essential part of being an informed citizen.

Economics is also essential in understanding a range of other everyday government decisions at the local and federal levels. Why do governments pay for public schools and roads, but not cell phones? In 2010, the federal government under President Obama moved toward universal health care for U.S. citizens. How do you understand the debate of whether this is or is not a good idea? In some states, scalping tickets to a ball game is illegal. Is this a good policy or not? Every day, across the globe, people engage in political decision making around questions like these, questions that depend on an understanding of economics.

To be an informed citizen requires a basic understanding of economics.

The Scope of Economics

Most students taking economics for the first time are surprised by the breadth of what they study. Some think that economics will teach them about the stock market or what to do with their money. Others think that economics deals exclusively with problems such as inflation and unemployment. In fact, it deals with all those subjects, but they are pieces of a much larger puzzle.

Economics has deep roots in and close ties to social philosophy. An issue of great importance to philosophers, for example, is distributional justice. Why are some people rich and others poor? And whatever the answer, is this fair? A number of nineteenth-century social philosophers wrestled with these questions, and out of their musings, economics as a separate discipline was born.

The easiest way to get a feel for the breadth and depth of what you will be studying is to explore briefly the way economics is organized. First of all, there are two major divisions of economics: microeconomics and macroeconomics.

microeconomics The branch of economics that examines the functioning of individual industries and the behavior of individual decision-making units—that is, firms and households.

Microeconomics and Macroeconomics

Microeconomics deals with the functioning of individual industries and the behavior of individual economic decision-making units: firms and households. Firms' choices about what to produce and how much to charge and households' choices about what and how much to buy help to explain why the economy produces the goods and services it does.

ECONOMICS IN PRACTICE

iPod and the World

It is impossible to understand the workings of an economy without first understanding the ways in which economies are connected across borders. The United States was importing goods and services at a rate of over $2.7 trillion per year in 2012 and was exporting at a rate of over $2.1 trillion per year.

For literally hundreds of years, the virtues of free trade have been the subject of heated debate. Opponents have argued that buying foreign-produced goods costs Americans jobs and hurts American producers. Proponents argue that there are gains from trade—that all countries can gain from specializing in the production of the goods and services they produce best.

In the modern world, it is not always easy to track where products are made. A sticker that says "Made in China" can often be misleading. Recent studies of two iconic U.S. products, the iPod and the Barbie doll, make this complexity clear.

The Barbie doll is one of Mattel's best and longest selling products. The Barbie was designed in the United States. It is made of plastic fashioned in Taiwan, which came originally from the Mideast in the form of petroleum. Barbie's hair comes from Japan, while the cloth for her clothes mostly comes from China. Most of the assembly of the Barbie is also done in China, using, as we see, pieces from across the globe. A doll that sells for $10 in the United States carries an export value when leaving Hong Kong of $2, of which only 35 cents is for Chinese labor, with most of the rest covering transportation and raw materials. Because the Barbie comes to the United States from assembly in China and transport from Hong Kong, some would count it as being produced in China. Yet, for this Barbie, $8 of its retail value of $10 is captured by the United States![1]

The iPod is similar. A recent study by three economists, Greg Linden, Kenneth Kraemer, and Jason Dedrick, found that once one includes Apple's payment for its intellectual property, distribution costs, and production costs for some components, almost 80% of the retail price of the iPod is captured by the United States.[2] Moreover, for some of the other parts of the iPod, it is not easy to tell exactly where they are produced. The hard drive, a relatively expensive component, was produced in Japan by Toshiba, but some of the components of that hard drive were actually produced elsewhere in Asia. Indeed, for the iPod, which is composed of many small parts, it is almost impossible to accurately tell exactly where each piece was produced without pulling it apart.

So, next time you see a label saying "Made in China" keep in mind that from an economics point of view, one often has to dig a little deeper to see what is really going on.

THINKING PRACTICALLY

1. What do you think accounts for *where* components of the iPod and Barbie are made?

[1] For a discussion of the Barbie see Robert Feenstra, "Integration of Trade and Disintegration of Production in the Global Economy," *Journal of Economic Perspectives*, Fall 1998, 31–50.
[2] Greg Linden, Kenneth Kraemer, and Jason Dedrick, "Who Profits from Innovation in Global Value Chains?" *Industrial and Corporate Change*, 2010: 81–116.

Another big question addressed by microeconomics is who gets the goods and services that are produced? Wealthy households get more than poor households, and the forces that determine this distribution of output are the province of microeconomics. Why does poverty exist? Who is poor? Why do some jobs pay more than others?

Macroeconomics looks at the economy as a whole. Instead of trying to understand what determines the output of a single firm or industry or what the consumption patterns are of a single household or group of households, macroeconomics examines the factors that determine national output, or national product. Microeconomics is concerned with *household* income; macroeconomics deals with *national* income.

macroeconomics The branch of economics that examines the economic behavior of aggregates—income, employment, output, and so on—on a national scale.

Whereas microeconomics focuses on individual product prices and relative prices, macroeconomics looks at the overall price level and how quickly (or slowly) it is rising (or falling). Microeconomics questions how many people will be hired (or fired) this year in a particular industry or in a certain geographic area and focuses on the factors that determine how much labor a firm or an industry will hire. Macroeconomics deals with *aggregate* employment and unemployment: how many jobs exist in the economy as a whole and how many people who are willing to work are not able to find work.

To summarize:

> Microeconomics looks at the individual unit—the household, the firm, the industry. It sees and examines the "trees." Macroeconomics looks at the whole, the aggregate. It sees and analyzes the "forest."

Table 1.1 summarizes these divisions of economics and some of the subjects with which they are concerned.

The Diverse Fields of Economics

Individual economists focus their research and study in many different areas. Many of these specialized fields are reflected in the advanced courses offered at most colleges and universities. Some are concerned with economic history or the history of economic thought. Others focus on international economics or growth in less developed countries. These fields are summarized in Table 1.2.

Economists also differ in the emphasis they place on theory. Some economists specialize in developing new theories, whereas other economists spend their time testing the theories of others. Some economists hope to expand the frontiers of knowledge, whereas other economists are more interested in applying what is already known to the formulation of public policies.

As you begin your study of economics, look through your school's course catalog and talk to the faculty about their interests. You will discover that economics encompasses a broad range of inquiry and is linked to many other disciplines.

TABLE 1.1 Examples of Microeconomic and Macroeconomic Concerns

Division of Economics	Production	Prices	Income	Employment
Microeconomics	*Production/output in individual industries and businesses* How much steel How much office space How many cars	*Prices of individual goods and services* Price of medical care Price of gasoline Food prices Apartment rents	*Distribution of income and wealth* Wages in the auto industry Minimum wage Executive salaries Poverty	*Employment by individual businesses and industries* Jobs in the steel industry Number of employees in a firm Number of accountants
Macroeconomics	*National production/output* Total industrial output Gross domestic product Growth of output	*Aggregate price level* Consumer prices Producer prices Rate of inflation	*National income* Total wages and salaries Total corporate profits	*Employment and unemployment in the economy* Total number of jobs Unemployment rate

TABLE 1.2 The Fields of Economics

Behavioral economics	uses psychological theories relating to emotions and social context to help understand economic decision making and policy. Much of the work in behavioral economics focuses on the biases that individuals have that affect the decisions they make.
Comparative economic systems	examines the ways alternative economic systems function. What are the advantages and disadvantages of different systems?
Econometrics	applies statistical techniques and data to economic problems in an effort to test hypotheses and theories. Most schools require economics majors to take at least one course in statistics or econometrics.
Economic development	focuses on the problems of low-income countries. What can be done to promote development in these nations? Important concerns of development for economists include population growth and control, provision for basic needs, and strategies for international trade.
Economic history	traces the development of the modern economy. What economic and political events and scientific advances caused the Industrial Revolution? What explains the tremendous growth and progress of post—World War II Japan? What caused the Great Depression of the 1930s?
Environmental economics	studies the potential failure of the market system to account fully for the impacts of production and consumption on the environment and on natural resource depletion. Have alternative public policies and new economic institutions been effective in correcting these potential failures?
Finance	examines the ways in which households and firms actually pay for, or finance, their purchases. It involves the study of capital markets (including the stock and bond markets), futures and options, capital budgeting, and asset valuation.
Health economics	analyzes the health care system and its players: government, insurers, health care providers, and patients. It provides insight into the demand for medical care, health insurance markets, cost-controlling insurance plans (HMOs, PPOs, IPAs), government health care programs (Medicare and Medicaid), variations in medical practice, medical malpractice, competition versus regulation, and national health care reform.
The history of economic thought,	which is grounded in philosophy, studies the development of economic ideas and theories over time, from Adam Smith in the eighteenth century to the works of economists such as Thomas Malthus, Karl Marx, and John Maynard Keynes. Because economic theory is constantly developing and changing, studying the history of ideas helps give meaning to modern theory and puts it in perspective.
Industrial organization	looks carefully at the structure and performance of industries and firms within an economy. How do businesses compete? Who gains and who loses?
International economics	studies trade flows among countries and international financial institutions. What are the advantages and disadvantages for a country that allows its citizens to buy and sell freely in world markets? Why is the dollar strong or weak?
Labor economics	deals with the factors that determine wage rates, employment, and unemployment. How do people decide whether to work, how much to work, and at what kind of job? How have the roles of unions and management changed in recent years?
Law and economics	analyzes the economic function of legal rules and institutions. How does the law change the behavior of individuals and businesses? Do different liability rules make accidents and injuries more or less likely? What are the economic costs of crime?
Public economics	examines the role of government in the economy. What are the economic functions of government, and what should they be? How should the government finance the services that it provides? What kinds of government programs should confront the problems of poverty, unemployment, and pollution? What problems does government involvement create?
Urban and regional economics	studies the spatial arrangement of economic activity. Why do we have cities? Why are manufacturing firms locating farther and farther from the centers of urban areas?

The Method of Economics

positive economics An approach to economics that seeks to understand behavior and the operation of systems without making judgments. It describes what exists and how it works.

normative economics An approach to economics that analyzes outcomes of economic behavior, evaluates them as good or bad, and may prescribe courses of action. Also called *policy economics*.

Economics asks and attempts to answer two kinds of questions: positive and normative. **Positive economics** attempts to understand behavior and the operation of economic systems *without making judgments* about whether the outcomes are good or bad. It strives to describe what exists and how it works. What determines the wage rate for unskilled workers? What would happen if we abolished the corporate income tax? The answers to such questions are the subject of positive economics.

In contrast, **normative economics** looks at the outcomes of economic behavior and asks whether they are good or bad and whether they can be made better. Normative economics involves judgments and prescriptions for courses of action. Should the government subsidize or regulate the cost of higher education? Should medical benefits to the elderly under Medicare be available only to those with incomes below some threshold? Should the United States allow importers to sell foreign-produced goods that compete with U.S.-made products? Should we reduce or eliminate inheritance taxes? Normative economics is often called *policy economics*.

Of course, most normative questions involve positive questions. To know whether the government *should* take a particular action, we must know first if it *can* and second what the consequences are likely to be. (For example, if we lower import fees, will there be more competition and lower prices?)

Theories and Models

model A formal statement of a theory, usually a mathematical statement of a presumed relationship between two or more variables.

variable A measure that can change from time to time or from observation to observation.

In many disciplines, including physics, chemistry, meteorology, political science, and economics, theorists build formal models of behavior. A **model** is a formal statement of a theory. It is usually a mathematical statement of a presumed relationship between two or more variables.

A **variable** is a measure that can change from time to time or from observation to observation. Income is a variable—it has different values for different people and different values for the same person at different times. The price of a quart of milk is a variable; it has different values at different stores and at different times. There are countless other examples.

Because all models simplify reality by stripping part of it away, they are abstractions. Critics of economics often point to abstraction as a weakness. Most economists, however, see abstraction as a real strength.

The easiest way to see how abstraction can be helpful is to think of a map. A map is a representation of reality that is simplified and abstract. A city or state appears on a piece of paper as a series of lines and colors. The amount of reality that the mapmaker can strip away before the map loses something essential depends on what the map will be used for. If you want to drive from St. Louis to Phoenix, you need to know only the major interstate highways and roads. You lose absolutely nothing and gain clarity by cutting out the local streets and roads. However, if you need to get around Phoenix, you may need to see every street and alley.

Ockham's razor The principle that irrelevant detail should be cut away.

Like maps, economic models are abstractions that strip away detail to expose only those aspects of behavior that are important to the question being asked. The principle that irrelevant detail should be cut away is called the principle of **Ockham's razor** after the fourteenth-century philosopher William of Ockham.

Be careful—although abstraction is a powerful tool for exposing and analyzing specific aspects of behavior, it is possible to oversimplify. Economic models often strip away a good deal of social and political reality to get at underlying concepts. When an economic theory is used to help formulate actual government or institutional policy, political and social reality must often be reintroduced if the policy is to have a chance of working.

The appropriate amount of simplification and abstraction depends on the use to which the model will be put. To return to the map example: You do not want to walk around San Francisco with a map made for drivers—there are too many very steep hills.

All Else Equal: *Ceteris Paribus* It is usually true that whatever you want to explain with a model depends on more than one factor. Suppose, for example, that you want to explain the total number of miles driven by automobile owners in the United States. Obviously, many things might affect total miles driven. First, more or fewer people may be driving. This number, in turn, can be affected by changes in the driving age, by population growth, or by changes in state laws. Other factors might include the price of gasoline, the household's income, the number and age of children in the household, the distance from home to work, the location of shopping facilities, and the availability and quality of public transport. When any of these variables change, the members of the household may drive more or less. If changes in any of these variables affect large numbers of households across the country, the total number of miles driven will change.

Very often we need to isolate or separate these effects. For example, suppose we want to know the impact on driving of a higher tax on gasoline. This increased tax would raise the price of gasoline at the pump, and this could reduce driving.

To isolate the impact of one single factor, we use the device of ***ceteris paribus*, *or* all else equal**. We ask, "What is the impact of a change in gasoline price on driving behavior, *ceteris paribus*, or assuming that nothing else changes?" If gasoline prices rise by 10 percent, how much less driving will there be, assuming no simultaneous change in anything else—that is, assuming that income, number of children, population, laws, and so on, all remain constant? Using the device of *ceteris paribus* is one part of the process of abstraction. In formulating economic theory, the concept helps us simplify reality to focus on the relationships that interest us.

***ceteris paribus*, *or* all else equal** A device used to analyze the relationship between two variables while the values of other variables are held unchanged.

Expressing Models in Words, Graphs, and Equations Consider the following statements: Lower airline ticket prices cause people to fly more frequently. Higher gasoline prices cause people to drive less and to buy more fuel-efficient cars. By themselves, these observations are of some interest. But for a firm, government, or an individual to make good decisions, oftentimes they need to know more. How much does driving fall when prices rise? Quantitative analysis is an important part of economics as well. Throughout this book, we will use both graphs and equations to capture the quantitative side of our economic observations and predictions. The appendix to this chapter reviews some graphing techniques.

Cautions and Pitfalls In formulating theories and models, it is especially important to avoid two pitfalls: the *post hoc* fallacy and the fallacy of composition.

What Is Really Causal? In much of economics, we are interested in cause and effect. But cause and effect are often very hard to figure out. Recently, many people in the United States have begun to worry about consumption of soda and obesity. Some areas have begun taxing soda, trying to raise the price so that people will drink less of it. Is this working? Answering this question turns out to be very hard. Suppose we see that one city raises the tax and at more or less the same time, soda consumption falls. Did the increased tax and price really *cause* all or most of the change in behavior? Or perhaps the city that voted the soda tax increase is more health conscious than its neighbors and it is that health consciousness that accounts for both the town's decision to raise taxes *and* its reduction in soda purchases. In this case, raising taxes on the neighboring towns will not necessarily reduce soda consumption. Sorting out causality is not always easy, particularly when one wants a quantitative answer to a question.

In our everyday lives, we often confuse causality. When two events occur in a sequence, it is natural to think A caused B. I walked under a ladder and subsequently stubbed my toe. Did the ladder cause my bad luck? Most of us would laugh at this. But everyday we hear stock market analysts make a similar causal jump. "Today the Dow Jones industrial average rose 100 points on heavy trading due to progress in talks between Israel and Syria." How do they know this? Investors respond to many news events on any given day. Figuring out which one, if any, causes the stock market to rise is not easy. The error of inferring causality from two events happening