PRINCIPLES OF

MACROECONOMICS

TWELFTH EDITION

CASE · FAIR · OSTER

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Macroeconomics

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Principles of Macroeconomics

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Wellesley College

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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.

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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.

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Preface

Our goal in the 12th 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 12th 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. Some of the many new boxes include:
  - Chapter 3 uses behavioral economics to ask whether having unusually sunny weather increases consumer purchasess of convertible cars.
  - In Chapter 7 we look at new research on how individuals unemployed as a result of a recession spend their time. How much of that new time goes to job search versus other activities?
  - In Chapter 14 we describe recent research on how well recessions can be predicted.
  - In Chapter 20 we describe work that uses children's height in India to examine hunger and gender inequality.
  - Chapter 21, our new chapter, contains three boxes, examining the Moving to Opportunity program, birth weight and infant mortality, and the effects of the minimum wage.

  In other cases we use recent events or common situations to show the power and breadth of economic models. For example:
  - In Chapter 25 we illustrate the role of banks in creating money by describing bank runs in two classic movies and in the legend of Wyatt Earp.

  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, Chapter 20 has been revised to include more of the modern approach to economic development, including discussion of the millennium challenge.
- A major change in macro in the last edition was to replace the LM curve with a Fed interest rate rule, where the money supply now plays a smaller role in the analysis. Continuing in this spirit, in the current edition we have merged the supply of money and demand for money chapters into one chapter, Chapter 10. This streamlines the analysis and eliminates material that is no longer important.
- We have added a new chapter, Chapter 21, "Critical Thinking About Research," which we are quite excited about. It may be the first time a chapter like this has been included in an introductory economics text. This chapter covers the research methodology of economics. We highlight some of the key concerns of empirical economics: selection issues, causality, statistical significance, and regression analysis. Methodology is a key part of economics these days, and we have tried to give the introductory student a sense of what this methodology is.

- All of the macro data have been updated through 2014. The slow recovery from the 2008–2009 recession is still evident in these data, as it was in the 11th edition. 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*, 12th edition, are the same themes of the first eleven 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.

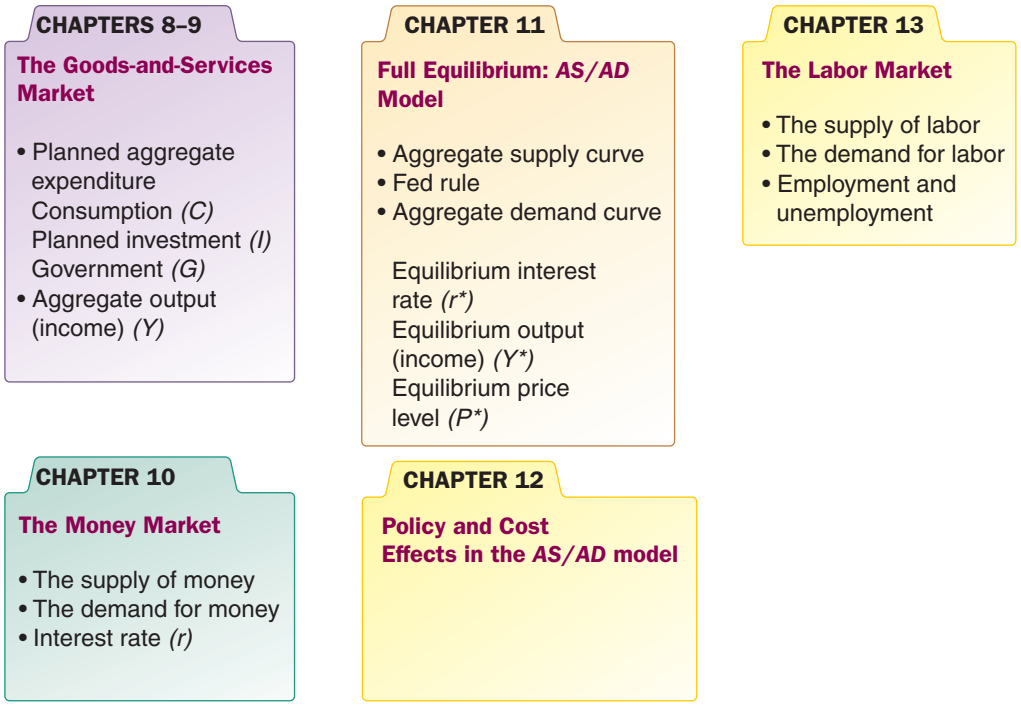
First, we present each concept in the context of a simple intuitive ***story*** or example in words often followed by a table. Second, we use a ***graph*** in most cases to illustrate the story or example. And finally, in many cases where appropriate, we use an ***equation*** to present the concept with 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 Chapter 10 (material behind the Fed rule). Everything comes together in Chapter 11, 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 12 then uses the model in Chapter 11 to analyze policy effects and cost shocks. Chapter 13 then brings in the labor market. The figure at the top of the next page (Figure III.1 on page 139) 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



▲ FIGURE III.1 **The Core of Macroeconomic Theory**

Growth," and highlighted it. However, while we wrote Chapter 16, 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

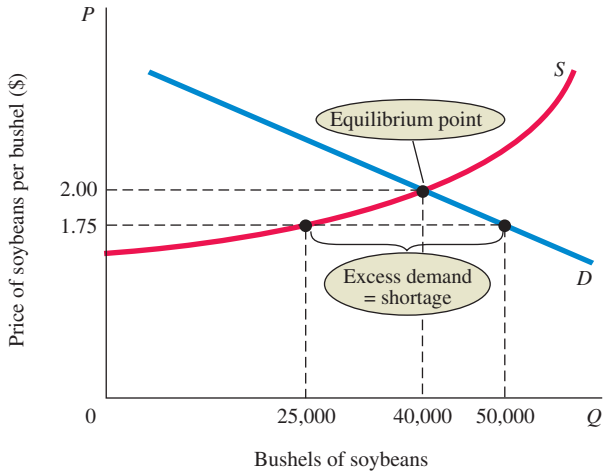


FIGURE 3.9 Excess Demand, or Shortage
At a price of $1.75 per bushel, quantity demanded exceeds quantity supplied. When excess *demand* exists, there is a tendency for price to rise. When quantity demanded equals quantity supplied, excess demand is eliminated and the market is in equilibrium. Here the equilibrium price is $2.00 and the equilibrium quantity is 40,000 bushels.

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.

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.

Digital features located in MyEconLab

MyEconLab is a unique online course management, testing, and tutorial resource. It is included with the eText version of the book or as a supplement to the print book. Students and instructors will find the following online resources to accompany the twelfth edition:

- **Concept Checks:** Each section of each learning objective concludes with an online Concept Check that contains one or two multiple choice, true/false, or fill-in questions. These checks act as "speed bumps" that encourage students to stop and check their understanding of fundamental terms and concepts before moving on to the next section. The goal of this digital resource is to help students assess their progress on a section-by-section basis, so they can be better prepared for homework, quizzes, and exams.
- **Animations:** Graphs are the backbone of introductory economics, but many students struggle to understand and work with them. Select numbered figures in the text have a supporting animated version online. The goal of this digital resource is to help students understand shifts in curves, movements along curves, and changes in equilibrium values. Having an animated version of a graph helps students who have difficulty interpreting the static version in the printed text. Graded practice exercises are included with the animations. Our experience is that many students benefit from this type of online learning.

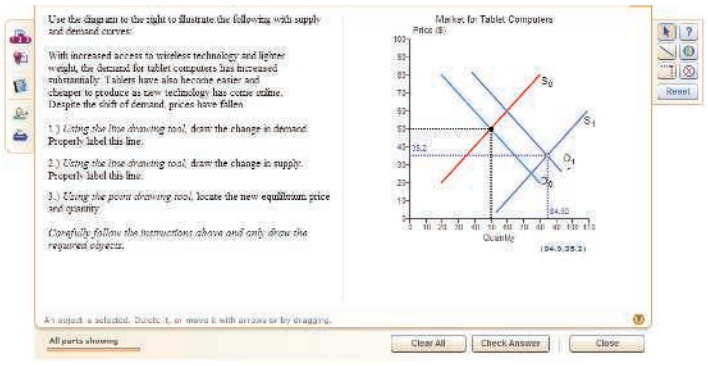
- **Learning Catalytics:** Learning Catalytics is a "bring your own device" Web-based student engagement, assessment, and classroom intelligence system. This system generates classroom discussion, guides lectures, and promotes peer-to-peer learning with real-time analytics. Students can use any device to interact in the classroom, engage with content, and even draw and share graphs.

  To learn more, ask your local Pearson representative or visit www.learningcatalytics.com.
- **Digital Interactives:** Focused on a single core topic and organized in progressive levels, each interactive immerses students in an assignable and auto-graded activity. Digital Interactives are also engaging lecture tools for traditional, online, and hybrid courses, many incorporating real-time data, data displays, and analysis tools for rich classroom discussions.
- **Dynamic Study Modules:** With a focus on key topics, these modules work by continuously assessing student performance and activity in real time and using data and analytics, provide personalized content to reinforce concepts that target each student's particular strengths and weaknesses.
- **NEW: Math Review Exercises:** MyEconLab now offers a rich array of assignable and auto-graded exercises covering fundamental math concepts geared specifically to principles and intermediate economics students. Aimed at increasing student confidence and success, our new math skills review Chapter R is accessible from the assignment manager and contains over 150 graphing, algebra, and calculus exercises for homework, quiz, and test use. Offering economics students warm-up math assignments, math remediation, or math exercises as part of any content assignment has never been easier!
- **Graphs Updated with Real-Time Data from FRED:** Approximately 25 graphs are continuously updated online with the latest available data from FRED (Federal Reserve Economic Data), which is a comprehensive, up-to-date data set maintained by the Federal Reserve Bank of St. Louis. Students can display a pop-up graph that shows new data plotted in the graph. The goal of this digital feature is to help students understand how to work with data and understand how including new data affects graphs.
- **Interactive Problems and Exercises Updated with Real-Time Data from FRED:** The end-of-chapter problems in select chapters include real-time data exercises that use the latest data from FRED.

MyEconLab for the Instructor

Instructors can choose how much or how little time to spend setting up and using MyEconLab. Here is a snapshot of what instructors are saying about MyEconLab:

> MyEconLab offers [students] a way to practice every week. They receive immediate feedback and a feeling of personal attention. As a result, my teaching has become more targeted and efficient.—Kelly Blanchard, Purdue University
>
> Students tell me that offering them MyEconLab is almost like offering them individual tutors.—Jefferson Edwards, Cypress Fairbanks College
>
> MyEconLab's eText is great—particularly in that it helps offset the skyrocketing cost of textbooks. Naturally, students love that.—Doug Gehrke, Moraine Valley Community College



Each chapter contains two preloaded homework exercise sets that can be used to build an individualized study plan for each student. These study plan exercises contain tutorial resources, including instant feedback, links to the appropriate learning objective in the eText,

pop-up definitions from the text, and step-by-step guided solutions, where appropriate. After the initial setup of the course by the instructor, student use of these materials requires no further instructor setup. The online grade book records each student's performance and time spent on the tests and study plan and generates reports by student or chapter.

Alternatively, instructors can fully customize MyEconLab to match their course exactly, including reading assignments, homework assignments, video assignments, current news assignments, and quizzes and tests. Assignable resources include:

- Preloaded exercise assignments sets for each chapter that include the student tutorial resources mentioned earlier
- Preloaded quizzes for each chapter that are unique to the text and not repeated in the study plan or homework exercise sets
- Study plan problems that are similar to the end-of-chapter problems and numbered exactly like the book to make assigning homework easier
- *Real-Time-Data Analysis Exercises*, marked with , allow students and instructors to use the very latest data from FRED. By completing the exercises, students become familiar with a key data source, learn how to locate data, and develop skills in interpreting data.
- In the eText available in MyEconLab, select figures labeled MyEconLab Real-time data allow students to display a pop-up graph updated with real-time data from FRED.
- *Current News Exercises*, provide a turnkey way to assign gradable news-based exercises in MyEconLab. Each week, Pearson scours the news, finds a current microeconomics and macroeconomics article, creates exercises around these news articles, and then automatically adds them to MyEconLab. Assigning and grading current news-based exercises that deal with the latest micro and macro events and policy issues has never been more convenient.
- *Experiments in MyEconLab* are a fun and engaging way to promote active learning and mastery of important economic concepts. Pearson's Experiments program is flexible, easy-to-assign, auto-graded, and available in single- and multiplayer versions.
  - Single-player experiments allow your students to play against virtual players from anywhere at any time so long as they have an Internet connection.
  - Multiplayer experiments allow you to assign and manage a real-time experiment with your class.
  - Pre- and post-questions for each experiment are available for assignment in MyEconLab.
  - For a complete list of available experiments, visit **www.myeconlab.com**.
- Test Item File questions that allow you to assign quizzes or homework that will look just like your exams
- Econ Exercise Builder, which allows you to build customized exercises

Exercises include 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 type except essays, even problems with graphs. When working homework exercises, students receive immediate feedback, with links to additional learning tools.

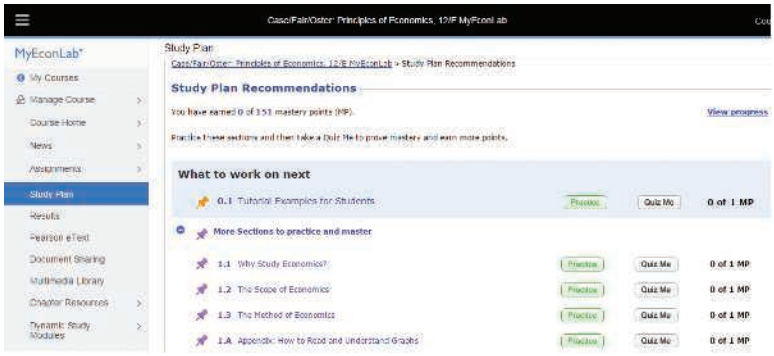
Customization and Communication MyEconLab in MyLab/Mastering provides additional optional customization and communication tools. Instructors who teach distance-learning courses or very large lecture sections find the MyLab/Mastering format useful because they can upload course documents and assignments, customize the order of chapters, and use communication features such as Document Sharing, Chat, ClassLive, and Discussion Board.

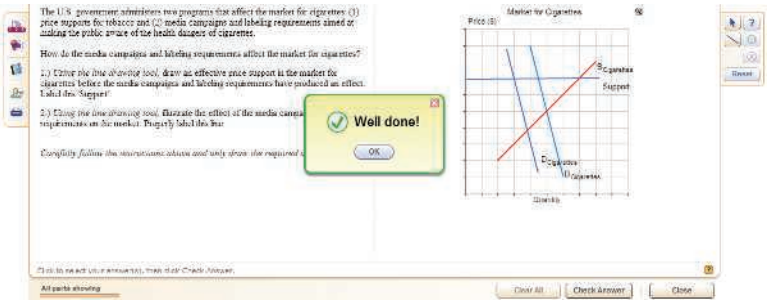
MyEconLab for the Student

MyEconLab puts students in control of their learning through a collection of testing, practice, and study tools tied to the online, interactive version of the textbook and other media resources. Here is a snapshot of what students are saying about MyEconLab:

- It was very useful because it had EVERYTHING, from practice exams to exercises to reading. Very helpful.—student, Northern Illinois University
- I would recommend taking the quizzes on MyEconLab because it gives you a true account of whether or not you understand the material.—student, Montana Tech
- It made me look through the book to find answers, so I did more reading.—student, Northern Illinois University

Students can study on their own or can complete assignments created by their instructor. In 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 from quizzes created by their instructors. In Homework or Study Plan mode, students have access to a wealth of tutorial features, including:





- Instant feedback on exercises that helps students understand and apply the concepts
- Links to the eText to promote reading of the text just when the student needs to revisit a concept or an explanation
- Step-by-step guided solutions that force students to break down a problem in much the same way an instructor would do during office hours
- Pop-up key term definitions from the eText to help students master the vocabulary of economics
- A graphing tool that is integrated into the various exercises to enable students to build and manipulate graphs to better understand how concepts, numbers, and graphs connect

Additional MyEconLab Tools MyEconLab includes the following additional features:

- **Enhanced eText**—Students actively read and learn, and with more engagement than ever before, through embedded and auto-graded practice, real-time data-graph updates, animations, and more.
- **Print upgrade**—For students who wish to complete assignments in MyEconLab but read in print, Pearson offers registered MyEconLab users a loose-leaf version of the print text at a significant discount.
- **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 Chris Annala, State University of New York–Geneseo; Charles Baum, Middle Tennessee State University; Peggy Dalton, Frostburg State University; Carol Dole, Jacksonville University; David Foti, Lone Star College; Sarah Ghosh, University of Scranton; Satyajit Ghosh, Universtity of Scranton; Woo Jung, University of Colorado; Chris Kauffman, University of Tennessee–Knoxville; Russell Kellogg, University of Colorado–Denver; Katherine McCann, University

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Other 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.

Four 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, by Randy Methenitis of Richland College: The Microeconomics Test Item File 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 12th edition of *Principles of Microeconomics* in the first year of publication. It is available in a computerized format using TestGen EQ test-generating software and is included in MyEconLab.

Microeconomics Test Item File Discussion and Short Answer, by Richard Gosselin of Houston Community College: This second 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).

Macroeconomics Test Item File by Randy Methenitis of Richland College: The Macroeconomics Test Item File includes over 2,900 questions. All questions are machine gradable and are either multiple-choice or true/false. This Test Item File is for use with the 12th edition of *Principles of Macroeconomics* in the first year of publication. This Test Item File is available in a computerized format using TestGen EQ test-generating software and included in MyEconLab.

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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 Casey, University of Central Arkansas; 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:

- Written and Oral Communication
- Ethical Understanding and Reasoning

- Analytic Thinking Skills
- Information Technology
- Diverse and Multicultural Work
- Reflective Thinking
- Application of Knowledge

Questions that test skills relevant to these guidelines are tagged with the appropriate standard. For example, a question testing the moral questions associated with externalities would receive the Ethical Understanding and 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 earlier. 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; 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

PowerPoint slides for *Principles of Microeconomics* and *Principles of Macroeconomics*, prepared by Jim Lee of Dickinson State University, are available:

- A comprehensive set of PowerPoint slides can be used by instructors for class presentations or by students for lecture preview or review. These slides include all the figures, photos, tables, key terms, and equations in the textbook. Instructors may download these PowerPoint presentations from the Instructor's Resource Center (**www.pearsonhighered.com/educator**).
- A student version of the PowerPoint slides are available as .pdf files. This version allows students to print the slides and bring them to class for note taking. Instructors can download these PowerPoint presentations from the Instructor's Resource Center. (**www.pearsonhighered.com/educator**).

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TWELFTH EDITION

Principles of
Macroeconomics

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The Scope and Method of Economics

1

CHAPTER OUTLINE AND LEARNING OBJECTIVES

1.1 Why Study Economics? *p. 2*
Identify three key reasons to study economics. Think of an example from your life in which understanding opportunity costs or the principle of efficient markets could make a difference in your decision making.

1.2 The Scope of Economics *p. 4*
Describe microeconomics, macroeconomics, and the diverse fields of economics.

1.3 The Method of Economics *p. 7*
Think about an example of bad causal inference leading to erroneous decision making. Identify the four main goals of economic policy.

Appendix: How to Read and Understand Graphs *p. 14*
Understand how data can be graphically represented.

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. 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. 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. 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, and somehow they got to you.

In the United States, about 150 million people—almost half the total population—work at hundreds of thousands of different jobs producing nearly $18 trillion worth of goods and services every year. Some cannot find work; some choose not to work. The United States imports more than $300 billion worth of automobiles and parts and more than $350 billion worth of petroleum and petroleum products each year; it exports around $140 billion worth of agricultural products, including food. In the modern economy, consumers' choices include products made all over the globe.

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.

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

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?

1.1 LEARNING OBJECTIVE

Identify three key reasons to study economics. Think of an example from your life in which understanding opportunity costs or the principle of efficient markets could make a difference in your decision making.

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. Economic analysis provides a structured way of thinking about these types of decisions.

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

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

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 anyway, the cost of visiting Mom would be only the additional, or *marginal*, time and money cost of getting to Iowa from Kansas City.

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? Clearly you should go to the shortest line! But if everyone thinks this way—as is likely—all the lines will be equally long as people move around. Economists 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 and is powerful in helping to guide decision making.

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.

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.

Societal changes are often driven by economics. Consider the developments in the early years of the World Wide Web. Changes in the ways people communicate with one another and with the rest of the world, largely created by private enterprise seeking profits, have affected

almost every aspect of our lives, from the way we interact with friends and family to the jobs that we have and the way cities and governments are organized.

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 2008 and 2013 much of the world struggled with a major recession and 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? The federal government under President Barack Obama moved toward universal health care for U.S. citizens. What are the pros and cons of this policy? 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.

1.2 LEARNING OBJECTIVE

Describe microeconomics, macroeconomics, and the diverse fields 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. Economists use their tools to study a wide range of topics.

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 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 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.

Another big question addressed by microeconomics is who gets the goods and services that are produced? Understanding the forces that determine the distribution of output is the province of microeconomics. Microeconomics helps us to understand how resources are distributed among households. What determines who is rich and who is poor?

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

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*.

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.

ECONOMICS IN PRACTICE

iPod and the World

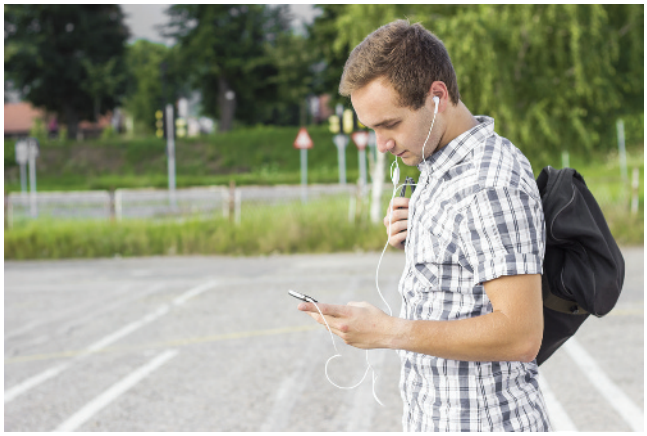
It is impossible to understand the workings of an economy without first understanding the ways in which economies are connected across borders. The United States was importing goods and services at a rate of more than $2.8 trillion per year in 2014 and was exporting at a rate of more than $2.3 trillion 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 U.S. 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 percent 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.

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. The subfields of economics are listed in Table 1.2 along with a sample research or policy question that an economist in this subfield might study.

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	Do aggregate household savings increase when we automatically enroll people in savings programs and let them opt out as opposed to requiring them to sign up?
Comparative economic systems	How does the resource allocation process differ in market versus command and control systems?
Econometrics	What inferences can we make based on conditional moment inequalities?
Economic development	Does increasing employment opportunities for girls in developing nations increase their educational achievement?
Economic history	How did the growth of railroads and improvement in transportation more generally change the U.S. banking systems in the nineteenth century?
Environmental economics	What effect would a tax on carbon have on emissions? Is a tax better or worse than rules?
Finance	Is high frequency trading socially beneficial?
Health economics	Do co-pays by patients change the choice and use of medicines by insured patients?
The history of economic thought	How did Aristotle think about just prices?
Industrial organization	How do we explain price wars in the airline industry?
International economics	What are the benefits and costs of free trade? Does concern about the environment change our views of free trade?
Labor economics	Will increasing the minimum wage decrease employment opportunities?
Law and economics	Does the current U.S. patent law increase or decrease the rate of innovation?
Public economics	Why is corruption more widespread in some countries than in others?
Urban and regional economics	Do enterprise zones improve employment opportunities in central cities?

The Method of Economics

1.3 LEARNING OBJECTIVE

Think about an example of bad causal inference leading to erroneous decision making. Identify the four main goals of economic policy.

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.

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.

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 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*.

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*.

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.

Theories and Models

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.

model A formal statement of a theory, 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.

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

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. However, to travel around Phoenix, you may need to see every street and alley.

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.

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

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 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. Many things might affect total miles driven. 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.

***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.

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.

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 seperate causation from correlation.

What Is Really Causal? In much of economics, we are interested in cause and effect. But cause and effect are often difficult 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 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 in the neighboring towns will not necessarily reduce soda consumption. Sorting out causality from correlation 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 seems 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 one after the other is called the ***post hoc, ergo propter hoc*** fallacy ("after this, therefore because of this"). The *Economics in Practice* box describes a causality confusion in looking at peer effects.

post hoc, ergo propter hoc Literally, "after this (in time), therefore because of this." A common error made in thinking about causation: If Event A happens before Event B, it is not necessarily true that A caused B.

Testing Theories and Models: Empirical Economics In science, a theory is rejected when it fails to explain what is observed or when another theory better explains what is observed. The collection and use of data to test economic theories is called **empirical economics**.

empirical economics The collection and use of data to test economic theories.

Numerous large data sets are available to facilitate economic research. For example, economists studying the labor market can now test behavioral theories against the actual working experiences of thousands of randomly selected people who have been surveyed continuously since the 1960s. Macroeconomists continuously monitoring and studying the behavior of the national economy at the National Bureau of Economic Research (NBER), analyze thousands of items of data, collected by both government agencies and private companies, over the Internet. Firms like Google, Uber, and Amazon have an enormous amount of data about individual consumers that they analyze with the help of PhD economists to understand consumers' buying

ECONOMICS IN PRACTICE

Does Your Roommate Matter for Your Grades?

Most parents are concerned about their children's friends. Often they worry that if one of their children has a misbehaving friend, their own child will be led astray. And, in fact, in many areas of life, there are strong indications that *peer effects* matter. The likelihood that a child will be obese, have difficulties in school, or engage in criminal activity all seem to be higher if their friends also have these issues. And yet, in looking at peer effects, it is not hard to see the problem of causality we described in the text. At least to some extent, children choose their own friends. The father worried about the bad influence of his son's friends on his own son should perhaps be equally worried about what his son's choice of friends says about that son's inclinations. Did the friends cause the misbehavior or did an inclination toward mischief cause the son's choice of friends?

Sorting out causality in peer effects, given that peer groups are oftentimes partially a matter of choice, is difficult. But several recent economics studies of the effect of roommates on college grades do a nice job of sorting out the causality puzzle. Dartmouth college, in common with many other schools, randomly assigns roommates to freshmen. In this case, part of a student's peer group—his or her roommate—is not a matter of choice, but a matter of chance. Bruce Sacerdote, a professor at Dartmouth, used data on freshmen academic and social performance, combined with their background data, to test the peer effects from different types of roommates.[1] Sacerdote found that after taking into account many background characteristics, there were strong roommate effects both on grade point average, effort in school, and fraternity membership.

Of course, a roommate is only part of one's peer group. At the U.S. Air Force Academy, students are assigned to 30-person squadrons with whom they eat, study, live, and do intramural sports. Again, these groups were randomly assigned, so one did not have the problem of similarly inclined people choosing one another. Scott Carrell, Richard Fullerton, and James West found that for this intense peer group, there were strong peer effects on academic effort and performance.[2] The bottom line: Choose your friends wisely!

THINKING PRACTICALLY

1. Would you expect college seniors who choose their own roommates to have more or less similar grades than college freshmen who are assigned as roommates? Why or why not?

[1] Bruce Sacerdote, "Peer Effects with Random Assignment: Results for Dartmouth Roommates," *Quarterly Journal of Economics,* 2001: 681–704.

[2] Scott E. Carrell, Richard L. Fullerton, and James E. West, "Does Your Cohort Matter? Measuring Peer Effects in College Achievement," *Journal of Labor Economics,* 2009: 439–464.

behavior and improve the profitability of their businesses. In doing this analysis, economicsts have learned to be especially careful about causality issues.

In the natural sciences, controlled experiments, typically done in the lab, are a standard way of testing theories. In recent years, economics has seen an increase in the use of experiments, both in the field and in the lab, as a tool to test its theories. One economist, John List of Chicago, tested the effect on prices of changing the way auctions for rare baseball cards were run by sports memorabilia dealers in trade shows. (The experiment used a standard Cal Ripkin Jr. card.) Another economist, Keith Chen of UCLA, has used experiments with monkeys to investigate the deeper biological roots of human decision making.

Economic Policy

Economic theory helps us understand how the world works, but the formulation of *economic policy* requires a second step. We must have objectives. What do we want to change? Why? What is good and what is bad about the way the system is operating? Can we make it better?