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Karl E. Case • Ray C. Fair • Sharon M. Oster



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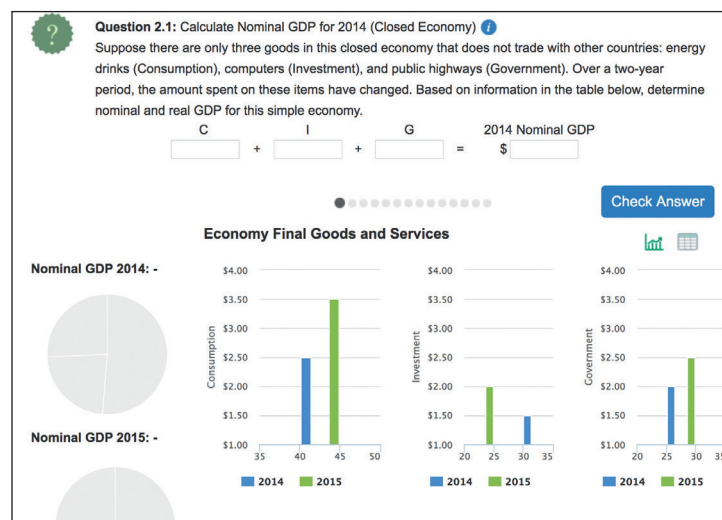
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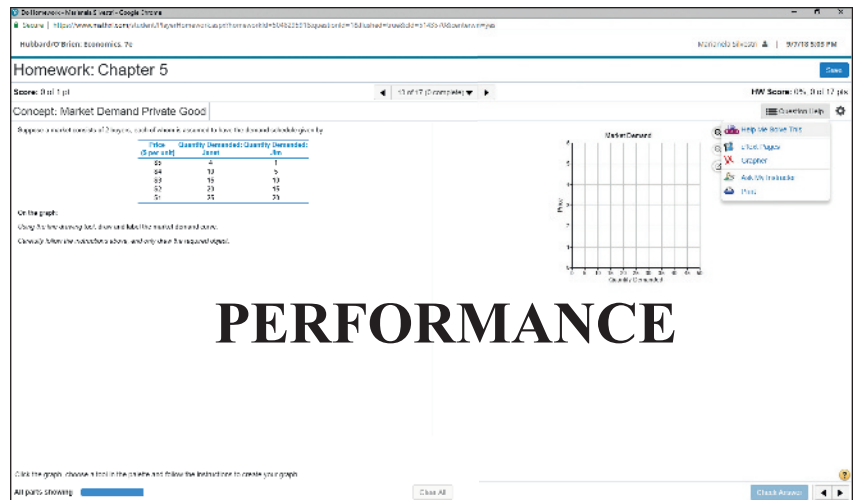
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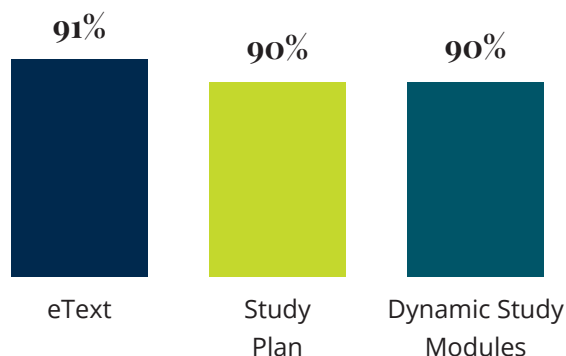
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Principles of **Economics**

Karl E. Case

Wellesley College

Ray C. Fair

Yale University

Sharon M. Oster

Yale University

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This edition is dedicated to Chip Case, a wonderful colleague and friend. He was the inspiration for this textbook some 30 years ago, and he served as an inspiration to study economics for thousands of students.

About the Authors



Karl E. Case, who passed away in July, 2016, was a Professor of Economics Emeritus at Wellesley College where he taught for 34 years, serving several tours of duty as Department Chair. He was 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 served as a member of the Index Advisory Committee of Standard and Poor's, and on the Academic Advisory Board of the Federal Reserve Bank of Boston.

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 was in the areas of real estate, housing, and public finance. He authored or coauthored five books, including *Principles of Economics*, *Economics and Tax Policy*, and *Property Taxation: The Need for Reform*, and published numerous articles in professional journals, focused on real estate markets and prices.

Chip, as he was known to his many friends and colleagues, contributed to this textbook throughout its many editions. In his honor and with respect for his substantial contributions to the text and the discipline of economics, his co-authors plan to keep his name on the text for all future editions.



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. Professor Fair has taught introductory and intermediate macroeconomics at Yale since 1974. He has also taught graduate courses in macroeconomic theory and macroeconometrics.

Professor Fair's research has primarily been in the areas of macroeconomics and econometrics, with particular emphasis on macroeconomic model building. He has also 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); *Estimating How the Macroeconomy Works* (Harvard Press, 2004), and *Predicting Presidential Elections and Other Things* (Stanford University Press, 2012).

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.

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Preface

New to this Edition

Updates for this edition of *Principles of Economics* include:

- 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. The 13th edition has continued the changes in the *Economics in Practice* boxes that we began several editions ago. In these boxes, we aim 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. Here are some examples of the topics we cover in the new boxes:
 - Research on the role weather plays in reducing school achievement in rural India by changing the importance of child labor in agriculture (Chapter 1, “The Scope and Method of Economics”).
 - The strength of the economics major in helping students avoid unemployment in a recession, showing how the skills students learn in an economics class can benefit them regardless of the career path they choose (Chapter 1, “The Scope and Method of Economics”).
 - The role of sugar taxes in determining a customer’s response to price changes in sugary beverages (Chapter 6, “Household Behavior and Consumer Choice”). This is one of the several new behavioral economics boxes we have in the new edition.
 - The Marshall Plan’s effects on managerial training and company productivity (Chapter 7, “The Production Process: The Behavior of Profit-Maximizing Firms”).
 - How researchers can use data on adopted children to explore whether generationally-correlated investing patterns are learned behavior or have some genetic component reflecting risk preference (Chapter 11, “Input Demand: The Capital Market and the Investment Decision”).
 - Most coders are men. How much does this have to do with gender identity? We discuss an experiment in Peru by a nonprofit to see if more women can be encouraged to go into this lucrative field (Chapter 18, “Income Distribution and Poverty”).
 - Whether shareholders or workers benefit from the 2017 Trump tax package’s big reduction in the corporate income tax (Chapter 19, “Public Finance: The Economics of Taxation”).
- We have reworked some of the chapters to streamline them and to improve readability. In the discussions of supply and demand and the discussions of perfect and imperfect competition, we have added simple algebraic material to the graphical, numeric and verbal explanations to aid in clarity of understanding.
 - Chapter 11, “Input Demand: The Capital Market and the Investment Decision,” has been considerably reworked to include a more thorough discussion of finance, that should be especially interesting to students who anticipate a career in the financial sector.
 - Chapter 18, “Income Distribution and Poverty,” has also been substantially reworked to reflect the increased worldwide concern with issues of inequality and economic mobility.
 - In Chapter 32, “Alternative Views in Macroeconomics,” a discussion of behavioral macroeconomics has been added to the Alternative views of macroeconomics.
- We continue to be very excited about Chapter 36, “Critical Thinking About Research.” This material is unique in an introductory economics text. This chapter covers the research methodology of economics, where 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 and how to apply it in class and beyond.
- All of the macro data have been updated through 2018. The slow recovery from the 2008–2009 recession is still evident in these data. This gives students a good idea of what has been happening to the economy since they left high school.

- Many end-of-chapter problems have been revised.
- We have added Critical Thinking questions to each Economics in Practice box and each end-of-chapter section, to reinforce the underlying economic principles and to give students practical application of what they've learned.

The *Principles of Economics* Program

Our goal in the 13th 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. We have prepared this edition of the text and MyLab Economics with this in mind. To improve student results, we recommend pairing the text content with **MyLab Economics**, which is the teaching and learning platform that empowers you to reach every student. By combining trusted author content with digital tools and a flexible platform, MyLab personalizes the learning experience and will help your students learn and retain key course concepts while developing skills that future employers are seeking in their candidates. From **Digital Interactives** to **Real-time Data Analysis Exercises**, MyLab Economics helps you teach your course, your way. Learn more at www.pearson.com/mylab/economics.

Solving Teaching and Learning Challenges

As authors and teachers, we understand the challenges of the principles of economics course. The foundational themes of *Principles of Economics*, 13th edition, 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. There is such volume of material for teachers to cover, and for students to understand. We address this learning challenge through: (1) A three-tiered approach of explaining key concepts through relevant stories, graphs and equations (2) Pedagogical features in the text and accompanying digital resources in MyLab Economics that illustrate and reinforce key concepts through real-world examples and applications that are relevant to students; (3) Graphs and animations; and (4) A wide variety of questions and problems.

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 alike 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. In this edition, we have strengthened this element without greatly increasing mathematical levels needed for the class. For students who would benefit from a math review, MyLab Economics offers math skills review Chapter R, accessible from the assignment manager and containing over 150 graphing, algebra, and calculus exercises for homework, quiz, and test use.

Economics in Practice

We know that students are best motivated when they see the relevance of what they're learning to the world they live in. We've created *Economics in Practice* with a focus 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 Critical Thinking question or two to further connect the material they are learning with their lives.

ECONOMICS IN PRACTICE

Have You Bought This Textbook?

As all of you know full well, college textbooks are expensive. At first, it may seem as though there are few substitutes available for the cash-strapped undergraduate. After all, if your professor assigns Smith's *Principles of Biology* to you, you cannot go out and see if Jones' *Principles of Chemistry* is perhaps cheaper and buy it instead. As it turns out, as some recent work by Judy Chevalier and Austan Goolsbee¹ discovered, even when instructors require particular texts, when prices are high students have found substitutes. Even in the textbook market student demand does slope down!

Chevalier and Goolsbee collected data on textbooks from more than 1600 colleges for the years 1997–2001 to do their research. For that period, the lion's share of both new and used college textbooks was sold in college bookstores. Next, they looked at class enrollments for each college in the large majors: economics, biology, and psychology. In each of those classes they were able to learn which textbook had been assigned. At first, one might think that the total number of textbooks, used plus new, should match the class enrollment. After all, the text is required! In fact, what they found was the higher the textbook price, the more text sales fell below class enrollments.

So what substitutes did students find for the required text? While the paper has no hard evidence on this, students themselves gave them lots of suggestions. Many decide to share books with roommates. Others use the library more. These solutions are not perfect, but when the price is high enough, students find it worth their while to walk to the library!



CRITICAL THINKING

1. If you were to construct a demand curve for a required text in a course, where would that demand curve intersect the horizontal axis?
2. And this much harder question: In the year before a new edition of a text is published, many college bookstores will not buy the older edition. Given this *fact*, what do you think happens to the gap between enrollments and new plus used book sales in the year before a new edition of a text is expected?

¹Judith Chevalier and Austan Goolsbee, "Are Durable Goods Consumers Forward Looking? Evidence From College Textbooks," *Quarterly Journal of Economics*, 2009: 1853–1884.

To further promote the relevance of economics, *Current News Exercises* provide a turn-key way to assign gradable news-based exercises in MyLab Economics. Each week, Pearson scours the news, finds a current microeconomics and macroeconomics news article or video, creates exercises around these news articles, and then automatically adds them to MyLab Economics. Assigning and grading current news-based exercises that deal with the latest micro and macro events and policy issues has never been more convenient.

Pearson Economic News

[Home](#)
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Macroeconomic Weekly News Update

August 25, 2018 – August 31, 2018

What's Really Going On With China's Economy?

[China](#) / [economic growth](#) / [exports](#) / [GDP](#) / [international trade](#)

Microeconomic Weekly News Update

August 25, 2018 – August 31, 2018

Inside the High-Stakes Business of Tracking Space Junk

[externalities](#) / [market failure](#) / [public goods](#) / [space trash](#) / [tragedy of the commons](#)

SEARCH

CATEGORIES

- 01. Introductory Concepts (scarcity, opportunity cost, comparative advantage, and economic models)
- 02. Supply Demand and Market Equilibrium (applications of supply/demand model)
- 03. Market Efficiency and Surplus; Market Failure and Public Goods
- 04. Factors of Production, Labor, Technology and Costs
- 05. Market Structure (pricing, advertising, and game theory)
- 06. Macroeconomic Variables and Policy Goals
- 07. Growth, Development, and Financial Markets (long run)
- 08. Monetary Policy (short-run fluctuations)
- 09. Fiscal Policy (short-run fluctuations)
- 10. International Economics (trade and finance)

Concept Checks

Giving students the opportunity to practice what they are learning along the way is critical to their success in the principles of economics course. New for this edition, each section and subsection of each learning objective, and select key figures, is reinforced with a Concept Check in the eText of MyLab Economics 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 is to help students assess their progress on a section-by-section basis, so they can be better prepared for homework, quizzes, and exams.

Homework: Homework Save

Score: 0 of 1 pt 1 of 3 (0 complete) HW Score: 0%, 0 of 3 pts

Concept Check 2.3 Question Help

Assuming it chooses to produce, a profit-maximizing firm in a perfectly competitive industry will produce output where

- ☐ A. marginal cost equals average total cost.
- ☐ B. the difference between marginal revenue and marginal cost is the greatest.
- ☐ C. marginal revenue equals marginal cost.
- ☐ D. marginal revenue equals average total cost.

Click to select your answer and then click Check Answer.

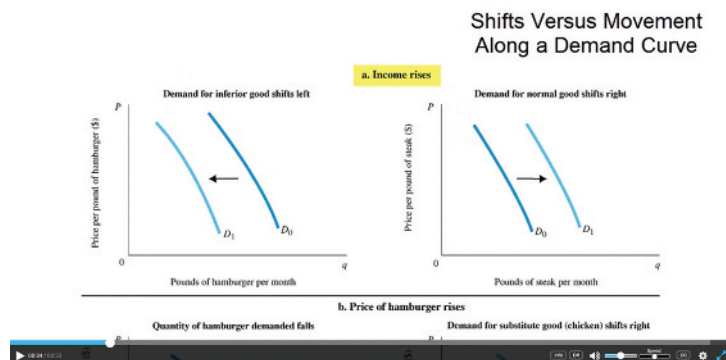
1 part remaining Clear All Check Answer

Graphing Animations

Graphs are the backbone of introductory economics, but many students struggle to understand and work with them. The Chapter 1 Appendix, “How to Read and Understand Graphs,” shows readers how to interpret the over 200 graphs featured in this book. To make interpreting graphs easier for students, we use red curves to illustrate the behavior of firms, blue curves to show the behavior of households, and a different shade of red and blue to signify a shift in a curve.

The figures in the book are also an integral part of our three-tiered approach to explain concepts in words, equations and graphs. They promote learning as students read an example or story, followed by a mathematical representation, and then see a graphical representation.

Select numbered figures in the text have a supporting animated version in MyLab Economics. The goal is to help students understand shifts in curves, movements along curves, and changes in equilibrium values by bringing graphs to life. 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 to give students practice reading and interpreting graphs.



Real-Time Data

Currency is imperative in economics, particularly macroeconomics. We achieve this with real-time data analysis figures and exercises. Many of the key figures in the text have been updated in the MyLab with real-time data from the Federal Reserve's Economic Data (FRED™) — a comprehensive, up-to-date data set maintained by the Federal Reserve Bank of St. Louis. These animated graphs help students understand shifts in curves, movements along curves, and changes in equilibrium values. Easy to assign and automatically graded, Real-Time Data Analysis exercises use up-to-the-minute, real-time macroeconomic data. These exercises communicate directly with the Federal Reserve Bank of St. Louis's FRED™ site, so every time FRED posts new data, students see it.

Homework: Homework

Score: 1 of 1 pt

2 of 3 (1 complete)

HW Score: 33.33%, 1 of 3 pts

RTDA+: Unemployment

Question Help

Real-time data analysis exercise

Click the following link to view unemployment data from [FRED](#). Then use that data to answer the following questions. ?

*Real-time data provided by Federal Reserve Economic Data (FRED), Federal Reserve Bank of Saint Louis.

The data in the table below shows employment data for August 01, 2018. Using the link above, correctly identify the title for each series listed in the table below.

Title	Series ID	Value
Unemployed	UNEMPLOY	6,234
Civilian Labour force	CLF16OV	161,776
Employment level-part-time for economic reasons...	LNS12032195	2,551

Using FRED, the series above are reported monthly, and the values are in thousands of persons.

Use the data in the table above to calculate two different unemployment rates. (Enter your responses rounded to two decimal places.) ?

The civilian unemployment rate is 3.89 %.

The civilian unemployment rate including persons who are underemployed (part-time for economic reasons) is 5.43 %.

Question is complete.

All parts showing

Try Again

Critical Thinking Questions

Throughout the course, and after graduation, students need to demonstrate critical thinking skills in their work and careers. To help develop these essential skills, we've added a new section of Critical Thinking questions to give students practice in higher-order thinking. Available in MyLab Economics, each end-of-chapter problem set ends with a *Critical Thinking Questions* section. These questions ask students to think more deeply about the concepts they've learned in the chapter when answering them. These assignable essay questions can be used on homework, tests, or quizzes. They require manual scoring; however, each essay question includes a sample correct answer to make grading easy.

CRITICAL THINKING QUESTIONS

QUESTION 1 When an unemployed individual gives up looking for work and leaves the labor force, she is no longer considered unemployed. What happens to the unemployment rate as a result? Does this mean that the unemployment rate understates or overstates the problem of joblessness?

QUESTION 2 According to the Efficiency Wage Theory, employers occasionally pay workers more than the equilibrium wage in the market in order to increase productivity. Explain how this would lead to reduced turnover.

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. These problems can be assigned and auto-graded in MyLab Economics and are available with optional just-in-time learning aids to help students

when they need it the most. Students can also practice these problems in the Study Plan. The Study Plan gives students personalized recommendations, practice opportunities, and learning aids to help them stay on track.

Developing Employability Skills

For students to succeed in a rapidly changing job market, they should be aware of their career options and how to go about developing the many skills they will need to do so. We focus on developing these skills in a variety of ways.

In the text, the *Economics in Practice* boxes help students think deeply about concepts and make connections between what they learn in class and how it can apply to their job in the real world. Chapter 1's *Economics in Practice* box explores how majoring in economics can help make students less vulnerable to recession. Chapter 11's *Economics in Practice* boxes highlight investment banking, the stock market, and investing strategies, topics of particular interest and relevance to students studying economics and finance.

In MyLab Economics, the *Critical Thinking Questions* and *Current News* exercises encourage application of skills that will contribute toward success in this course and in the future, regardless of each students' career path.

Table of Contents Overview

Microeconomic Structure

The organization of the microeconomic chapters continues to reflect our belief that the best way to understand how market economies operate—and the best way to understand basic economic theory—is to work through the perfectly competitive model first, including discussions of output markets (goods and services) and input markets (land, labor, and capital), and the connections between them before turning to noncompetitive market structures such as monopoly and oligopoly. When students understand how a simple, perfectly competitive system works, they can start thinking about how the pieces of the economy “fit together.” We think this is a better approach to teaching economics than some of the more traditional approaches, which encourage students to think of economics as a series of disconnected alternative market models. We also make extensive use of concrete examples, designed to help students see the power of the simple economic model. A mastery of this material is invaluable to students interested in careers in business and the public sector. Our core interest is in helping students to think about the world using economics.

Learning perfect competition first also enables students to see the power of the market system. It is impossible for students to discuss the efficiency of markets as well as the problems that arise from markets until they have seen how a simple, perfectly competitive market system produces and distributes goods and services. This is our purpose in Chapters 6 through 11.

Chapter 12, “General Equilibrium and the Efficiency of Perfect Competition,” is a pivotal chapter that links simple, perfectly competitive markets with a discussion of market imperfections and the role of government. Chapters 13 through 15 cover three noncompetitive market structures—monopoly, monopolistic competition, and oligopoly. Chapter 16 covers externalities, public goods, and social choice. Chapter 17 covers uncertainty and asymmetric information. Chapters 18 and 19 cover income distribution as well as taxation and government finance. Figure II.2 from page 142 gives you an overview of our structure.

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 23 and 24 (the *IS* curve). The money market is discussed in Chapter 25 (material behind the Fed rule). Everything comes together in Chapter 26, 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 27 then uses the model in Chapter 26 to analyze policy effects and cost shocks. Chapter 28 then brings in the labor market. Figure V.1 on page 493 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 22, “Unemployment, Inflation, and Long-Run Growth,” and highlighted it. However, while we wrote Chapter 31, 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.

Instructor Teaching Resources

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

This program comes with the following teaching resources:

Supplements available to instructors at www.pearsonglobaleditions.com/case	Features of the Supplement
Instructor’s Manual authored by Tony Lima of California State University, East Bay	<ul style="list-style-type: none"> 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. Solutions are provided for all problems in the book.
Test Bank authored by Randy Methenitis of Richland College and Richard Gosselin of Houston Community College	<ul style="list-style-type: none"> Multiple-choice, true/false, short-answer, and graphing questions with these annotations: Difficulty level (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) Learning outcome AACSB learning standard (Written and Oral Communication; Ethical Understanding and Reasoning; Analytical Thinking; Information Technology; Interpersonal Relations and Teamwork; Diverse and Multicultural Work; Reflective Thinking; Application of Knowledge)
Computerized TestGen	TestGen allows instructors to: <ul style="list-style-type: none"> Customize, save, and generate classroom tests Edit, add, or delete questions from the Test Item Files Analyze test results Organize a database of tests and student results.

PowerPoints

authored by Jim Lee of Dickinson State University

- Slides include all the graphs, tables, and equations in the textbook.
- PowerPoints meet accessibility standards for students with disabilities. Features include, but not limited to:
 - Keyboard and Screen Reader access
 - Alternative text for images
 - High color contrast between background and foreground colors

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University

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Contributors

Andras Tetenyi, Corvinus University of Budapest
Marina Mustapha, Taylor's Business School
Archontis Pantsios, Liverpool Hope University
Natasha Ezrow, University of Essex
Olivier Butzbach, King's College London
Patrick Terroir, Institut D'études Politiques de Paris

Reviewers

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We welcome comments about the 13th edition. Please write to us care of David Alexander, Executive Editor, Pearson, 501 Boylston Street, 8th floor, Boston, MA 02116.

Karl E. Case

Ray C. Fair

Sharon M. Oster

The Scope and Method of Economics



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 in a day. Someone organized men and women and materials to produce and distribute these things. Thousands of decisions went into their completion, and somehow they got to you.

In the United States, more than 160 million people—over half the total population—work at hundreds of thousands of different jobs producing more than \$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.

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?

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

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.

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

scarce Limited.

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

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 [MyLab Economics Concept Check](#)

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.

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.

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. In the Economics in Practice box on page 35, we use the idea of opportunity cost to help explain how rainfall in India affects math scores of rural children. As you will see, opportunity cost is a powerful idea.

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 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 at 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

ECONOMICS IN PRACTICE

Rainfall and Schooling in India

As we indicated in the text, the idea of opportunity cost is one of the fundamental concepts in economics. When we look at the choices people make in the area of employment and education, the role of opportunity cost is especially large. Recent work looking at the effect of rainfall on children's education in India highlights the role that opportunity cost can play.¹

Much of India is still rural and dependent on agriculture. Most adults, both male and female, are engaged in agriculture, and in most families the children also play a role in agricultural production. Irrigation is uncommon, especially in the poorer areas of India, and as a result agricultural production is highly dependent on rainfall. When rains are unusually plentiful, not only are harvests larger, but the gains from having people work the land increase. In a drought there is very little a farm worker can do to increase yields, and there is little produce to harvest. It follows then that when rains are unusually plentiful in an area, the opportunity cost of having someone out of the labor force increases.

Think for a moment about families with children, choosing between sending them to school, which would make them more productive in their later life, or sending them to the fields to help with the current harvest. The opportunity cost of sending your children to school is the loss in current agricultural output. If there have been ample rains, that opportunity cost is high. In a drought, the cost is low.

It follows from this opportunity cost differential that one would expect fewer children at school when the rains have been plentiful in rural India than in a drought. This is precisely what Shah and Steinberg find. Using data from more than 2 million children ages 5–16 across rural India, these economists find that an unusually high rainfall reduces school



enrollments by a significant amount. And, unsurprisingly, these children end up with significantly lower math scores on tests administered by the state. You should be able to see the power of the concept of opportunity cost. In this example, it allows us to see the effect of rainfall on rural math scores.

CRITICAL THINKING

1. For urban children in India, work opportunities are few. What would you expect to see happen to the urban-rural gap in test scores in high rainfall periods?

¹Manisha Shah and Bryce Millett Steinberg, "Drought of Opportunities: Contemporaneous and Long Term Impacts of Rainfall Shocks on Human Capital" *Journal of Political Economy*, April 2017, 527–561.

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.)

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 Economics in Practice box on page 36 describes the way in which learning this way of thinking can pay off in labor market outcomes.

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

ECONOMICS IN PRACTICE

Majoring in Economics Makes You Less Vulnerable to a Recession!

It is well known that a college education, on average, increases one's income. Economists estimate that over one's lifetime, a college degree holder will earn on average almost 70% more than someone with only a high school degree. Part of the returns to a college education come from higher wages and part from being less likely to suffer long spells of unemployment. It is perhaps less well known that both wage and unemployment effects also vary considerably with the majors of college graduates. Economics is, along with engineering, one of the majors with the highest wage premia.

Recent work has shown yet another advantage of the economics major: It helps to protect graduates from the long-term effects of graduating in a recession.¹ As Lisa Kahn found in some of her earlier work, graduating in a recession (a period of high unemployment and low economic growth) has long-term negative effects on one's career. One's first job under these circumstances tends to be worse than otherwise, and this bad placement affects the next few job opportunities and hence one's lifetime earnings. But Kahn's recent work suggests that the extent of this long-term recession handicap varies considerably with one's major. Majors like economics are less hurt by graduating in a recession than sociology or journalism, for example. Learning to think like an economist not only generates a higher wage but provides insurance against volatility in the economy!



CRITICAL THINKING

1. Why does a recent graduate's first job matter for his or her long-term earnings, even if he or she only stays at that job for three years?

¹Joseph Altonji, Lisa Kahn, Jamin Speer, "Cashier or Consultant? Entry Labor Market Conditions, Field of Study and Career Success." *Journal of Labor Economics*, 2016, (34) S361–S401.

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.

To Understand Society [MyLab Economics Concept Check](#)

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 a blink of an eye.

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 MyLab Economics Concept Check

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. In the early years of President Trump's administration, the country grappled with questions of immigration, trade policy, and tax structure. An understanding of economics is fundamental to making national policy in all of these areas.

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, while President Trump moved to limit the Affordable Care Act. What are the pros and cons of these policies? 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. 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, there are two major divisions of economics: microeconomics and macroeconomics.

Microeconomics and Macroeconomics MyLab Economics Concept Check

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. Recent research has shown an increase in income inequality in the United States. Why has this occurred? What determines who is rich and who is poor?

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*.

1.2 LEARNING OBJECTIVE

Describe microeconomics, macroeconomics, and the diverse fields of economics.

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.

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.”

ECONOMICS IN PRACTICE

How Italian Is a Ferrari?

Before we attempt to explain the workings of an economy, it is worthwhile to see the impact of the decisions and operations of individual firms. We need to understand why some companies elect to move part or most of their manufacturing work abroad, even if at the risk of higher shipping costs and manufacturing delays. We need to understand why governments tolerate this behavior even if it deprives their economies of jobs and income.

No nation can operate as a closed economic system that produces all goods or resources necessary for the production of goods and services. Since early times, various nations of the world have exchanged resources and products through trade. But to defend their economies from foreign competition, governments have been protecting domestic industries using tariffs and quotas on imports as well as with restrictions on exporting essential capital equipment and factors of production. The peacekeeping aspiration after World War II made it imperative to move the modern world towards a more cooperative and liberalized trade system. Nations started to sign multilateral free trade agreements (FTAs) in tandem with bilateral, local, and regional FTAs. By 2016–17 the volume of global trade reached nearly €13 trillion, as reported by the World Trade Organization.¹

The European Union (EU) is the largest single market in the world. EU legislation allows its manufacturers to claim items assembled in their country as their own products. Let us take the case of auto producer Ferrari, the flagship of Italian automobile industry. Ferrari has earned itself the reputation of the leading brand, especially in Formula One (F1) auto racing championships, as it has achieved the highest number of F1 championships and produced the largest number of winning drivers. Some would assume that every single component of Ferrari sports cars is from Italy since it carries the sign “Made in Italy”. However, contrary to popular belief, Ferrari parts are produced outside Italy, assembled at the legendary Maranello factory, labelled “Made in Italy”, and then either sold in Italy or exported. While most of the engine is manufactured in Italy, Ferrari uses Japanese NGK spark plugs, German Mahle turbo engine components, and



American Goodyear tyres.² Domestic protection activists supporting Italian manufacturers have argued that by outsourcing these parts, Ferrari moves jobs from Italy to Japan, Germany, and USA. They claim that the success of companies such as Ferrari comes at the expense of the Italian workforce, which in turn hurts Italy's economy.

As you can see, the line between “made” and “assembled” is rather blurred. Consumers do not mind if domestic firms outsource production to foreign producers as long as they provide better quality products at lower prices. So, the next time you see a label that says “Made in Italy”, keep in mind that from an economics point of view, you may need to dig a little deeper to see what is really going on.

CRITICAL THINKING

1. What are the factors that could drive manufacturers' decisions to outsource manufacturing to foreign countries?

¹World Trade Organization, 2017. *Annual Report-2017*, Geneva: WTO.

²Brand Finance, 2017. “Ferrari Brand Speeds Ahead of the Field,” *Brand Finance*.

TABLE 1.1 Examples of Microeconomic and Macroeconomic Concerns

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

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

The Diverse Fields of Economics [MyLab Economics](#) [Concept Check](#)

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 1.2 The Fields of Economics

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

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.

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*.

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.

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

The Method of 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 the United States substantially lowered the corporate profit tax, as it did in 2018? 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 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.

Theories and Models MyLab Economics Concept Check

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. 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**, named after the 14th-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 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.

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, often-times 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 separate 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 the effect of part-time jobs on academic performance.

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**.

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

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

ECONOMICS IN PRACTICE

Does Your Part-time Job Affect Your Academic Performance?

In order to cover the cost of living, getting a part-time job is a common practice among students; however, parents are concerned that combining paid work with academics may jeopardize their child's performance. Evidence from across institutions indicates that a student working a part-time job is more likely to feel stressed, lack a social life, and face difficulties in completing assignments if the job is strenuous or poorly managed. This poses an interesting question on causality: does part-time employment cause poor academic performance or does a student's academic predisposition cause her to choose such a job?

Given that getting a part-time job is often born out of necessity, determining causality in situations that are only partially a matter of choice is difficult. However, some studies, which include the effects of part-time jobs on academic performance, do solve the causality conundrum.

In Canada, university students can choose from various part-time jobs and most students do not complete non-course-related work by their own choice. To test the effects of various types of part-time jobs, a study was conducted by Marsha Barber, a professor at Ryerson University, Canada, and Julia Levitan, a psychology student at the University of Guelph, Canada. They used data on final-year journalism students' academic achievements and well-being at an urban Canadian university, the reason for getting a part-time job, and the number of working hours.¹ The data indicated strong negative employment effects—predominant in students who worked for more than 20 hours a week—on the academic performance, learning engagement, motivation, and well-being of the student. In contrast, students at other universities are randomly assigned various course related part-time jobs within their schools. To test the employment effects on academic performance in such a situation, Mikhail Kouliavtsev, a professor at Stephen F. Austin State University, Texas, used a distinctive student dataset compiled over five years in a business course taught at a U.S. comprehensive regional public university.



Mikhail observed that working smartly does have positive effects on academic performance, while longer working hours have a significant negative effect.² The bottom line: Choose your part-time jobs wisely!

CRITICAL THINKING

1. Do you think the academic performance of university juniors changes when they become seniors if they continue to pursue part-time employment? Why or why not?

¹Marsha Barber and Julia Levitan, "Balancing the Books," *The International Journal of Learning in Higher Education*, 2015, 21, 13–19.

²Mikhail Kouliavtsev, "The Impact of Employment and Extracurricular Involvement on Undergraduates' Performance in a Business Statistics Course," *Journal of Economics and Economic Education Research*, September, 2013, 53–66.

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 Ripken 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 [MyLab Economics Concept Check](#)

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?

Such questions force us to be specific about the grounds for judging one outcome superior to another. What does it mean to be better? Four criteria are frequently applied in judging economic outcomes:

1. Efficiency
2. Equity

3. Growth
4. Stability

Efficiency In physics, “efficiency” refers to the ratio of useful energy delivered by a system to the energy supplied to it. An efficient automobile engine, for example, is one that uses a small amount of fuel per mile for a given level of power.

In economics, **efficiency** means *allocative efficiency*. An efficient economy is one that produces what people want at the least possible cost. If the system allocates resources to the production of goods and services that nobody wants, it is inefficient. If all members of a particular society were vegetarians and somehow half of all that society’s resources were used to produce meat, the result would be inefficient.

The clearest example of an efficient change is a voluntary exchange. If you and I each want something that the other has and we agree to exchange, we are both better off and no one loses. When a company reorganizes its production or adopts a new technology that enables it to produce more of its product with fewer resources, without sacrificing quality, it has made an efficient change. At least potentially, the resources saved could be used to produce more of something else.

Inefficiencies can arise in numerous ways. Sometimes they are caused by government regulations or tax laws that distort otherwise sound economic decisions. Suppose that land in Ohio is best suited for corn production and that land in Kansas is best suited for wheat production. A law that requires Kansas to produce only corn and Ohio to produce only wheat would be inefficient. If firms that cause environmental damage are not held accountable for their actions, the incentive to minimize those damages is lost and the result is inefficient.

Equity While efficiency has a fairly precise definition that can be applied with some degree of rigor, **equity** (fairness) lies in the eye of the beholder. To many, fairness implies a more equal distribution of income and wealth. For others, fairness involves giving people what they earn. In 2013, French economist Thomas Piketty’s popular new book *Capital in the Twenty-First Century*, brought new historical data to our attention on the extent of inequality across the Western world. More recent work by Raj Chetty of Stanford University has greatly improved our understanding of economic mobility in the United States, documenting the extent to which parental and adult children’s incomes are correlated.

Growth As the result of technological change, the building of machinery, and the acquisition of knowledge, societies learn to produce new goods and services and to produce old ones better. In the early days of the U.S. economy, it took nearly half the population to produce the required food supply. Today less than 2 percent of the country’s population works in agriculture.

When we devise new and better ways of producing the goods and services we use now and when we develop new goods and services, the total amount of production in the economy increases.

Economic growth is an increase in the total output of an economy. If output grows faster than the population, output per person rises and standards of living increase. Rural and agrarian societies become modern industrial societies as a result of economic growth and rising per capita output.

Some policies discourage economic growth, and others encourage it. Tax laws, for example, can be designed to encourage the development and application of new production techniques. Research and development in some societies are subsidized by the government. Building roads, highways, bridges, and transport systems in developing countries may speed up the process of economic growth. If businesses and wealthy people invest their wealth outside their country rather than in their country’s industries, growth in their home country may be slowed.

Stability Economic **stability** refers to the condition in which national output is growing steadily, with low inflation and full employment of resources. During the 1950s and 1960s, the U.S. economy experienced a long period of relatively steady growth, stable prices, and low unemployment. The decades of the 1970s and 1980s, however, were not as stable. The United States experienced two periods of rapid price inflation (more than 10 percent) and two periods of severe unemployment. In 1982, for example, 12 million people (10.8 percent of the workforce) were looking for work. The beginning of the 1990s was another period of instability, with a recession occurring in 1990–1991. In 2008–2009, much of the world, including the United States, experienced a large contraction in output and rise in unemployment. The period since 2009 in the United States has been one of modest growth and falling unemployment. The causes of instability and the ways in which governments have attempted to stabilize the economy are the subject matter of macroeconomics.

efficiency The condition in which the economy is producing what people want at the least possible cost.

equity Fairness.

economic growth An increase in the total output of an economy. Growth occurs when a society acquires new resources or when it learns to produce more using existing resources.

stability A condition in which national output is growing steadily, with low inflation and full employment of resources.

1.4 LEARNING OBJECTIVE

Begin to get a sense of the many ways economics touches one's life.

An Invitation

This chapter has prepared you for your study of economics. The first part of the chapter invited you into an exciting discipline that deals with important issues and questions. You cannot begin to understand how a society functions without knowing something about its economic history and its economic system.

The second part of the chapter introduced the method of reasoning that economics requires and some of the tools that economics uses. We believe that learning to think in this powerful way will help you better understand the world.

As you proceed, it is important that you keep track of what you have learned in previous chapters. This book has a plan; it proceeds step-by-step, each section building on the last. It would be a good idea to read each chapter's table of contents at the start of each chapter and scan each chapter before you read it to make sure you understand where it fits in the big picture.

1.5 LEARNING OBJECTIVE

Describe economics as a career and the key skills you can learn from studying economics.

Economic Skills and Economics as a Career

In this book, we will explore economic principles that you will find very useful in understanding what is happening in the world of economics and business and in your everyday life. Individuals use economic principles to improve how they make important decisions, such as what career to pursue or what financial investment to make. Managers in businesses use economic principles to improve how they make important decisions, such as what prices to charge for their products or whether to invest in new software. Government policymakers use economic principles to make decisions, such as how to allocate additional funds to research in certain areas. Whether or not you pursue a career in economics, you can still benefit from the skills learned by taking economics classes.

SUMMARY

1. *Economics* is the study of how individuals and societies choose to use the scarce resources that nature and previous generations have provided.

1.1 WHY STUDY ECONOMICS? p. 34

2. There are many reasons to study economics, including (a) to learn a way of thinking, (b) to understand society, and (c) to be an informed citizen.
3. The best alternative that we forgo when we make a choice or a decision is the *opportunity cost* of that decision.

1.2 THE SCOPE OF ECONOMICS p. 37

4. *Microeconomics* deals with the functioning of individual markets and industries and with the behavior of individual decision-making units: business firms and households.
5. *Macroeconomics* looks at the economy as a whole. It deals with the economic behavior of aggregates—national output, national income, the overall price level, and the general rate of inflation.
6. Economics is a broad and diverse discipline with many special fields of inquiry. These include economic history, international economics, and urban economics.

1.3 THE METHOD OF ECONOMICS p. 40

7. Economics asks and attempts to answer two kinds of questions: positive and normative. *Positive economics* attempts

to understand behavior and the operation of economies without making judgments about whether the outcomes are good or bad. *Normative economics* looks at the results of economic behavior and asks whether they are good or bad and whether they can be improved.

8. An economic *model* is a formal statement of an economic theory. Models simplify an abstract from reality.
9. It is often useful to isolate the effects of one variable on another while holding “all else constant.” This is the device of *ceteris paribus*.
10. Models and theories can be expressed in many ways. The most common ways are in words, in graphs, and in equations.
11. Figuring out causality is often difficult in economics. Because one event happens before another, the second event does not necessarily happen as a result of the first. To assume that “after” implies “because” is to commit the fallacy of *post hoc, ergo propter hoc*.
12. *Empirical economics* involves the collection and use of data to test economic theories. In principle, the best model is the one that yields the most accurate predictions.
13. To make policy, one must be careful to specify criteria for making judgments. Four specific criteria are used most often in economics: *efficiency, equity, growth, and stability*.

MyLab Economics Visit www.pearson.com/mylab/economics to complete these exercises online and get instant feedback. Exercises that update with real-time data are marked with .

REVIEW TERMS AND CONCEPTS

<i>ceteris paribus</i> , or <i>all else equal</i> , p. 41	Industrial Revolution, p. 36	opportunity cost, p. 34
economic growth, p. 43	macroeconomics, p. 37	positive economics, p. 40
economics, p. 33	marginalism, p. 34	<i>post hoc, ergo propter hoc</i> , p. 41
efficiency, p. 43	microeconomics, p. 37	scarce, p. 34
efficient market, p. 35	model, p. 40	stability, p. 43
empirical economics, p. 41	normative economics, p. 40	variable, p. 40
equity, p. 43	Ockham's razor, p. 40	

PROBLEMS

All problems are available on MyLab Economics.

1.1 WHY STUDY ECONOMICS?

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.

- 1.1 One of the scarce resources that constrain our behavior is time. Each of us has only 24 hours in a day. How do you go about allocating your time in a given day among competing alternatives? How do you go about weighing the alternatives? Once you choose a most important use of time, why do you not spend all your time on it? Use the notion of opportunity cost in your answer.
- 1.2 Frank pays an \$80 monthly membership fee to a fitness center for unlimited use of its facilities. On average, he goes to the center 10 times a month. What is the average cost of each visit he makes to the fitness center? What is the marginal cost of an additional workout session?
- 1.3 For each of the following situations, identify the opportunity cost involved:
 - a. Julia decides to volunteer at Amnesty International while she is searching for a job.
 - b. Victor decides to invest €1 million in a Hungarian pharmaceutical company called Gedeon Richter PLC.
 - c. Andrea receives \$2,000 as a graduation gift and decides to use it to buy a 20-year-old Toyota Corolla.
 - d. Karl chooses to walk to work instead of taking the metro.
 - e. After graduating from high school, José decides to work as a waiter instead of pursuing a bachelor's degree in economics.
 - f. Magdalena decides to plant some fresh flowers in her garden.
 - g. Marta decides to hire a professional to clean her apartment.

- 1.4 Andrew "Jack" Whittaker won a \$315 million Powerball jackpot in 2002. Do you think he faced any issue of scarcity?

Source: Teri Pous, "The Tragic Stories of the Lottery's Unluckiest Winners," *TIME*, November 27, 2012.

- 1.5 On the *Forbes* 2018 list of the World's Billionaires, Jeff Bezos, founder and CEO of Amazon, ranks at the top with a net worth of \$112 billion. Does this "richest man in the world" face scarcity, or does scarcity only affect those with more limited incomes and lower net worth?

Source: "The World's Billionaires," *Forbes*, March 6, 2018.

- 1.6 [Related to the *Economics in Practice* on p. 36] The U.S. Bureau of Labor Statistics' Occupational Outlook Handbook provides career information on education, pay, and outlook for hundreds of occupations. Go to www.bls.gov/ooh/occupation-finder.htm and select "Bachelor's degree" from the Entry-Level Education drop down menu. Look up three occupations that interest you and compare the projected number of new jobs, projected growth rate, and median pay for those occupations. How does this information compare to what you expected? Explain how this information might influence your choice of occupation.

1.2 THE SCOPE OF ECONOMICS

LEARNING OBJECTIVE: Describe microeconomics, macroeconomics, and the diverse fields of economics.

- 2.1 [Related to the *Economics in Practice* on p. 38] Visit Fortune's website. You will find a list of the world's 500 largest companies. While going through the list, are you surprised by anything in particular? Is there any firm that interests you? Do you know which goods and services this company produces? Search the Internet to find out where these products are manufactured and assembled. Write a paragraph about this company: products offered, number of employees, and other details you learn about the firm. You might even call the company to obtain the information.

2.2 Explain whether each of the following is an example of a macroeconomic concern or a microeconomic concern.

- In 2018, legislators in Japan's lower house passed an integrated resort (IR) implementation bill to legalize casinos.
- In 2015, the Spanish government reduced income tax rates for every tax bracket by 1 to 2 percentage points.
- Goldman Sachs increased its paid parenting leave for non-primary parents from two weeks to four weeks.
- The British government announced that, starting April 2018, all workers of 25 years and older are legally entitled to at least £7.83 per hour.

1.3 THE METHOD OF ECONOMICS

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

3.1 Prior to 2018, people could deduct the taxes they pay to their home state before calculating their federal tax bill. So, for example, if you earned \$100,000 and paid \$20,000 in state taxes, the federal government would only tax you as if your income was \$80,000. The tax law passed at the end of 2017 reduced that deduction to a maximum of \$10,000. In 2018, we nevertheless saw a growth in population in two high-tax states, New York and California. One observer suggests that this means that the elimination of the deduction had no effect on people's residential choices. Do you agree?

3.2 Which of the following statements are examples of positive economic analysis? Which are examples of normative analysis?

- An effective minimum wage policy in Japan would result in excess labor supply.
- A drought in a rural area of Brazil that produces corn would cause the price of alcohol in the region to increase.
- Germany should remove the taxes imposed on its automobile industry to encourage its development.
- Enhancing the education level in India may increase the productivity of the country.
- Hong Kong's government should push the legislation of standard working hours to protect the rights of low-skilled workers.

3.3 In 2012, Colorado and Washington became the first states to legalize marijuana for recreational use, and have since been joined by a number of other states.

In 2017, Colorado is reported to have received more than \$247 million in tax revenue from the sale of recreational marijuana, much of which was slated to be used to supplement education and public health funding. The potential for increased tax revenues and the benefits these revenues can provide has a number of other states, including New Jersey, contemplating the possible legalization of recreational-use marijuana.

- Recall that efficiency means producing what people want at the least cost. Can you make an efficiency argument in favor of states allowing the recreational use of marijuana?
- What nonmonetary costs might be associated with legalizing marijuana use? Would these costs have an impact on the efficiency argument you presented in part a?
- Using the concept of equity, argue for or against the legalization of recreational-use marijuana.
- What do you think would happen to the flow of tax revenue to state governments if all 50 states legalized marijuana?

3.4 [Related to the Economics in Practice on p. 42] Most college students either currently have, or at one time have had, roommates or housemates. Think about a time when you have shared your living space with one or more students, and describe the effect this person (or people) had on your college experience, such as your study habits, the classes you took, your grade point average, and the way you spent time away from the classroom. Now describe the effect you think you had on your roommate(s). Were these roommates or housemates people you chose to live with, or were they assigned randomly? Explain if you think this made a difference in your or their behavior?

3.5 Explain the pitfalls in the following statements.

- People who play golf are more likely to own a luxury car than people who do not play golf. Therefore, owning a luxury car causes people to play golf.
- Oscar Johansson noted that when he buys new shares of a company's stock listed on Nasdaq Stockholm, the stock price usually increases if he takes a shower after making his decision. Last night, Oscar bought some shares of a company and went home to take a shower and, as he had expected, the stock price increased. Obviously, the stock price increased because Oscar took a shower.
- Cindy's mother found that sending her to tutorial classes for math resulted in a 20 percent improvement in her scores. Based on this success, her mother decided to spend money to send Cindy to tutorial classes for all subjects so that Cindy's academic performance would improve in all.

CRITICAL THINKING QUESTIONS

QUESTION 1 The State of Florida recently decided to substantially increase the funding for the University of Florida, the state's flagship university. This policy was evaluated by various government agencies and independent policy institutes. Identify one positive and one normative question that may have been considered.

QUESTION 2 Economists have identified educational attainment as potential predictor of who marries whom. Highly educated individuals marry other highly educated individuals, and people with less education marry similar people. Explain why this may or may not be a causal relationship.

Chapter 1 Appendix: How to Read and Understand Graphs

Economics is the most quantitative of the social sciences. If you flip through the pages of this or any other economics text, you will see countless tables and graphs. These serve a number of purposes. First, they illustrate important economic relationships. Second, they make difficult problems easier to understand and analyze. Finally, they can show patterns and regularities that may not be discernible in simple lists of numbers.

A **graph** is a two-dimensional representation of a set of numbers, or data. There are many ways that numbers can be illustrated by a graph.

LEARNING OBJECTIVE

Understand how data can be graphically represented.

graph A two-dimensional representation of a set of numbers or data.

Time Series Graphs

It is often useful to see how a single measure or variable changes over time. One way to present this information is to plot the values of the variable on a graph, with each value corresponding to a different time period. A graph of this kind is called a **time series graph**. On a time series graph, time is measured along the horizontal scale and the variable being graphed is measured along the vertical scale. Figure 1A.1 is a time series graph that presents total disposable personal income in the U.S. economy for each year between 1975 and 2017.¹ This graph is based on the data found in Table 1A.1. By displaying these data graphically, we can see that total disposable personal income has increased every year between 1975 and 2017, except for a small dip in 2009.

time series graph A graph illustrating how a variable changes over time.

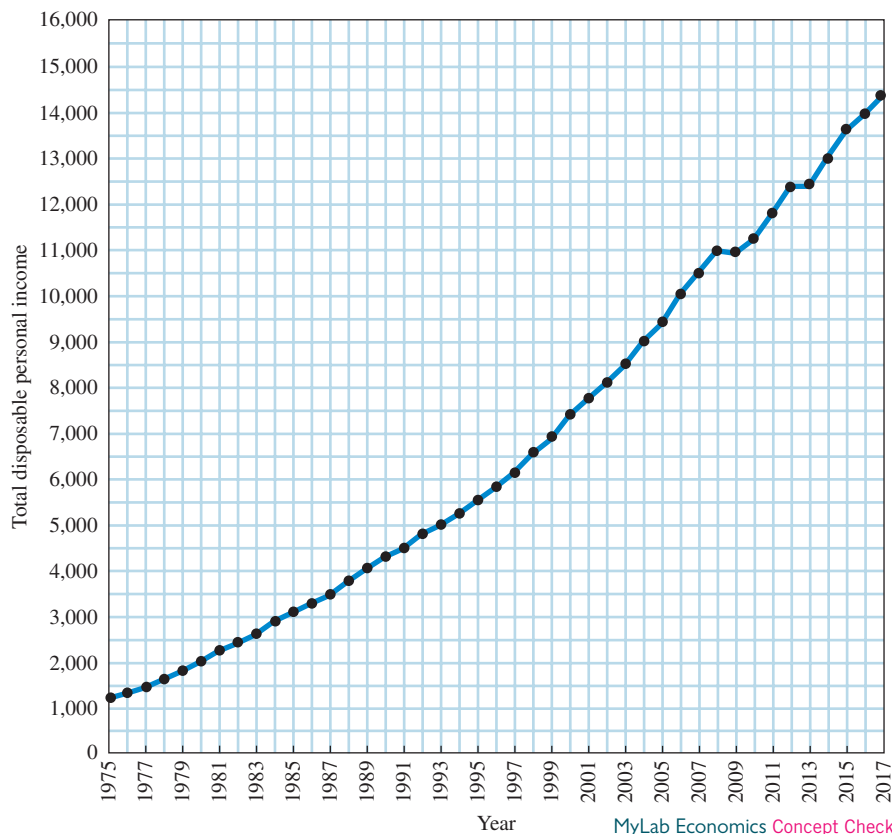


FIGURE 1A.1 Total Disposable Personal Income in the United States: 1975–2017 (in billions of dollars)

Source: See Table 1A.1.

¹The measure of income presented in Table 1A.1 and in Figure 1A.1 is disposable personal income in billions of dollars. It is the total personal income received by all households in the United States minus the taxes that they pay.

TABLE 1A.1 Total Disposable Personal Income in the United States, 1975–2017
(in billions of dollars)

Year	Total Disposable Personal Income	Year	Total Disposable Personal Income
1975	1,219	1997	6,149
1976	1,326	1998	6,561
1977	1,457	1999	6,876
1978	1,630	2000	7,401
1979	1,809	2001	7,752
1980	2,018	2002	8,099
1981	2,251	2003	8,486
1982	2,425	2004	9,002
1983	2,617	2005	9,401
1984	2,904	2006	10,037
1985	3,099	2007	10,507
1986	3,288	2008	10,994
1987	3,466	2009	10,943
1988	3,770	2010	11,238
1989	4,052	2011	11,801
1990	4,312	2012	12,404
1991	4,485	2013	12,396
1992	4,800	2014	13,033
1993	5,000	2015	13,615
1994	5,244	2016	13,969
1995	5,533	2017	14,379
1996	5,830		

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Graphing Two Variables

More important than simple graphs of one variable are graphs that contain information on two variables at the same time. The most common method of graphing two variables is a graph constructed by drawing two perpendicular lines: a horizontal line, or **X-axis**, and a vertical line, or **Y-axis**. The axes contain measurement scales that intersect at 0 (zero). This point is called the **origin**. On the vertical scale, positive numbers lie above the horizontal axis (that is, above the origin) and negative numbers lie below it. On the horizontal scale, positive numbers lie to the right of the vertical axis (to the right of the origin) and negative numbers lie to the left of it. The point at which the graph intersects the Y-axis is called the **Y-intercept**. The point at which the graph intersects the X-axis is called the **X-intercept**. When two variables are plotted on a single graph, each point represents a pair of numbers. The first number is measured on the X-axis, and the second number is measured on the Y-axis.

X-axis The horizontal line against which a variable is plotted.

Y-axis The vertical line against which a variable is plotted.

origin The point at which the horizontal and vertical axes intersect.

Y-intercept The point at which a graph intersects the Y-axis.

X-intercept The point at which a graph intersects the X-axis.

Plotting Income and Consumption Data for Households

Table 1A.2 presents data from the Bureau of Labor Statistics (BLS) for 2016. This table shows average after-tax income and average consumption spending for households ranked by income. For example, the average income for the top fifth (20 percent) of the households was \$157,215 in 2016. The average consumption spending for the top 20 percent was \$112,221.

Figure 1A.2 presents the numbers from Table 1A.2 graphically. Along the horizontal scale, the X-axis, we measure average income. Along the vertical scale, the Y-axis, we measure average consumption. Each of the five pairs of numbers from the table is represented by a point on the graph. Because all numbers are positive numbers, we need to show only the upper right quadrant of the coordinate system.

TABLE 1A.2 Consumption Expenditures and After-Tax Income, 2016

	Average After-Tax Income	Average Consumption Expenditures
Bottom fifth	\$ 11,832	\$ 25,138
2nd fifth	29,423	36,770
3rd fifth	47,681	47,664
4th fifth	75,065	64,910
Top fifth	157,215	112,221

Source: *Consumer Expenditures in 2016*, U.S. Bureau of Labor Statistics.

To help you read this graph, we have drawn a dotted line connecting all the points where consumption and income would be equal. This 45-degree line does not represent any data. Instead, it represents the line along which all variables on the X-axis correspond exactly to the variables on the Y-axis, for example, (10,000, 10,000), (20,000, 20,000), and (37,000, 37,000). The heavy blue line traces the data; the purpose of the dotted line is to help you read the graph.

There are several things to look for when reading a graph. The first thing you should notice is whether the line slopes upward or downward as you move from left to right. The blue line in Figure 1A.2 slopes upward, indicating that there seems to be a **positive relationship** between income and spending: The higher a household's income, the more a household tends to consume. If we had graphed the percentage of each group receiving welfare payments along the Y-axis, the line would presumably slope downward, indicating that welfare payments are lower at higher income levels. The income level/welfare payment relationship is thus a **negative relationship**.

positive relationship A relationship between two variables, X and Y , in which a decrease in X is associated with a decrease in Y , and an increase in X is associated with an increase in Y .

negative relationship A relationship between two variables, X and Y , in which a decrease in X is associated with an increase in Y and an increase in X is associated with a decrease in Y .

Slope

The **slope** of a line or curve is a measure that indicates whether the relationship between the variables is positive or negative and how much of a response there is in Y (the variable on the vertical axis) when X (the variable on the horizontal axis) changes. The slope of a line between two points is the change in the quantity measured on the Y-axis divided by the change in the quantity measured on the X-axis. We will normally use Δ (the Greek letter *delta*) to refer to a change in a variable. In Figure 1A.3, the slope of the line between points A and B is ΔY divided by ΔX . Sometimes it is easy to remember slope as “the rise over the run,” indicating the vertical change over the horizontal change.

slope A measurement that indicates whether the relationship between variables is positive or negative and how much of a response there is in Y (the variable on the vertical axis) when X (the variable on the horizontal axis) changes.

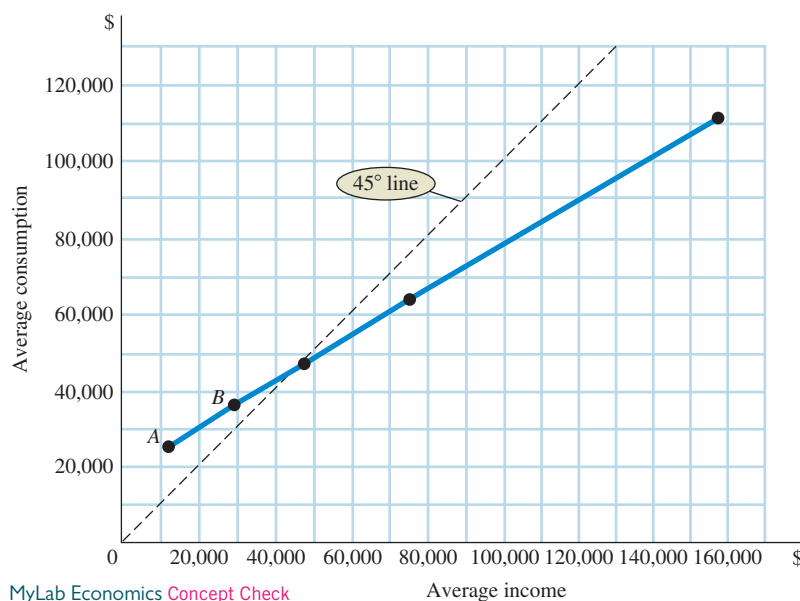
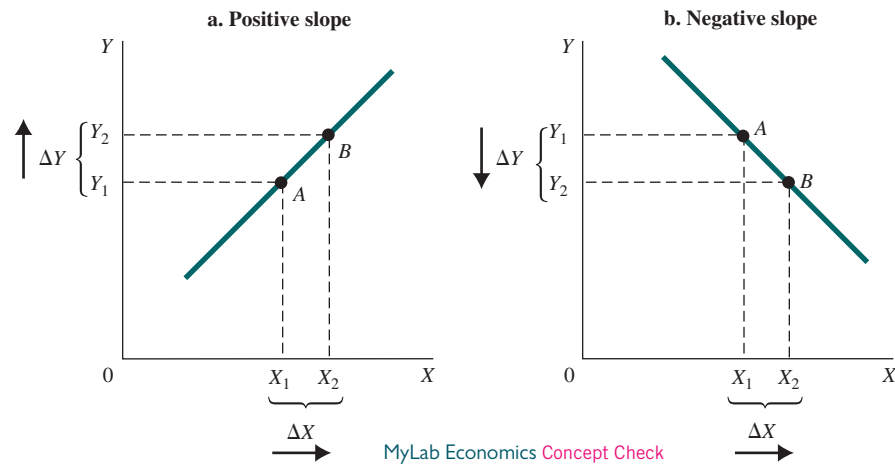


FIGURE 1A.2
Household Consumption and Income

A graph is a simple two-dimensional geometric representation of data. This graph displays the data from Table 1A.2. Along the horizontal scale (X-axis), we measure household income. Along the vertical scale (Y-axis), we measure household consumption.

Note: At point A, consumption equals \$25,138 and income equals \$11,832. At point B, consumption equals \$36,770 and income equals \$29,423.

Source: See Table 1A.2.



▲ FIGURE 1A.3 A Curve with (a) Positive Slope and (b) Negative Slope

A *positive* slope indicates that increases in X are associated with increases in Y and that decreases in X are associated with decreases in Y . A *negative* slope indicates the opposite—when X increases, Y decreases; and when X decreases, Y increases.

To be precise, ΔX between two points on a graph is simply X_2 minus X_1 , where X_2 is the X value for the second point and X_1 is the X value for the first point. Similarly, ΔY is defined as Y_2 minus Y_1 , where Y_2 is the Y value for the second point and Y_1 is the Y value for the first point. Slope is equal to

$$\frac{\Delta Y}{\Delta X} = \frac{Y_2 - Y_1}{X_2 - X_1}.$$

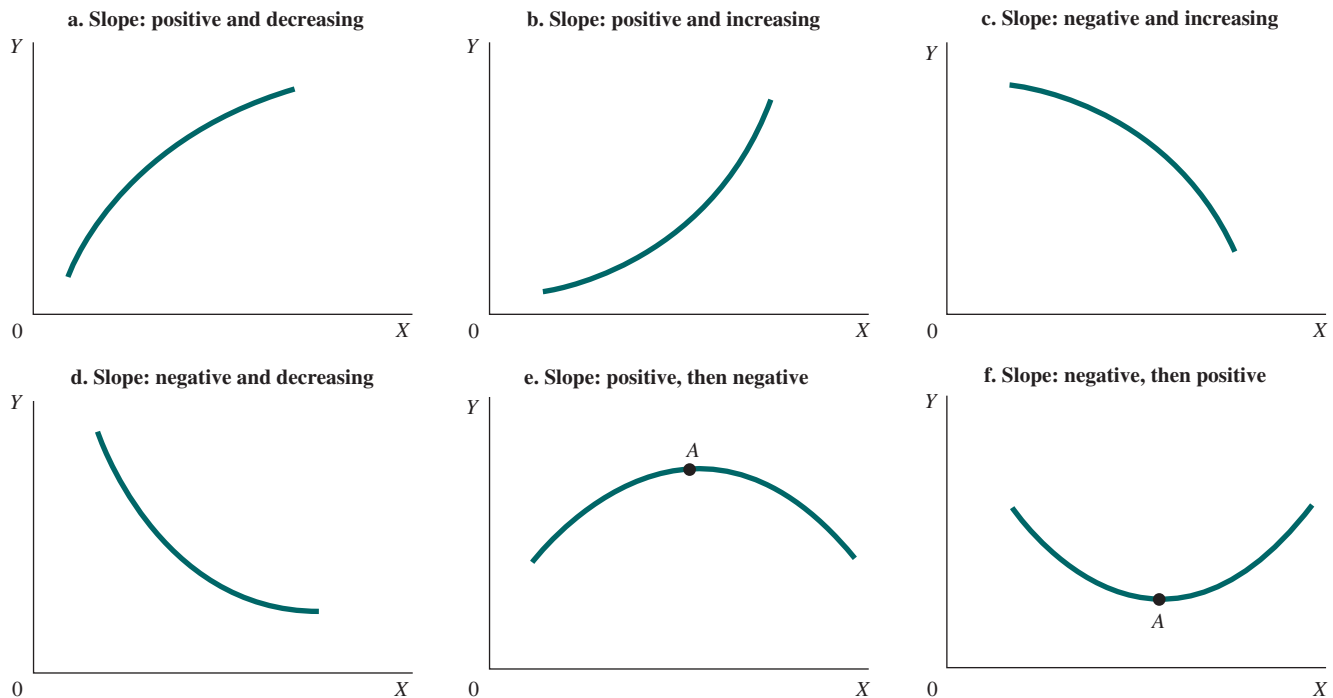
As we move from A to B in Figure 1A.3(a), both X and Y increase; the slope is thus a positive number. However, as we move from A to B in Figure 1A.3(b), X increases [$(X_2 - X_1)$ is a positive number], but Y decreases [$(Y_2 - Y_1)$ is a negative number]. The slope in Figure 1A.3(b) is thus a negative number because a negative number divided by a positive number results in a negative quotient.

To calculate the numerical value of the slope between points A and B in Figure 1A.2, we need to calculate ΔY and ΔX . Because consumption is measured on the Y -axis, ΔY is 11,632 ($Y_2 - Y_1 = (36,770 - 25,138)$). Because income is measured along the X -axis, ΔX is 17,591 ($X_2 - X_1 = (29,423 - 11,832)$). The slope between A and B is

$$\frac{\Delta Y}{\Delta X} = \frac{11,632}{17,591} = +0.66.$$

Another interesting thing to note about the data graphed in Figure 1A.2 is that all the points lie roughly along a straight line. (If you look very closely, however, you can see that the slope declines as you move from left to right; the line becomes slightly less steep.) A straight line has a constant slope. That is, if you pick any two points along it and calculate the slope, you will always get the same number. A horizontal line has a zero slope (ΔY is zero); a vertical line has an “infinite” slope because ΔY is too big to be measured.

Unlike the slope of a straight line, the slope of a *curve* is continually changing. Consider, for example, the curves in Figure 1A.4. Figure 1A.4(a) shows a curve with a positive slope that decreases as you move from left to right. The easiest way to think about the concept of increasing or decreasing slope is to imagine what it is like walking up a hill from left to right. If the hill is steep, as it is in the first part of Figure 1A.4(a), you are moving more in the Y direction for each step you take in the X direction. If the hill is less steep, as it is further along in Figure 1A.4(a), you are moving less in the Y direction for every step you take in the X direction. Thus, when the hill is steep, slope



▲ **FIGURE 1A.4** Changing Slopes Along Curves

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($\Delta Y / \Delta X$) is a larger number than it is when the hill is flatter. The curve in Figure 1A.4(b) has a positive slope, but its slope *increases* as you move from left to right.

The same analogy holds for curves that have a negative slope. Figure 1A.4(c) shows a curve with a negative slope that *increases* (in absolute value) as you move from left to right. This time think about skiing down a hill. At first, the descent in Figure 1A.4(c) is gradual (low slope), but as you proceed down the hill (to the right), you descend more quickly (high slope). Figure 1A.4(d) shows a curve with a negative slope that *decreases* (in absolute value) as you move from left to right.

In Figure 1A.4(e), the slope goes from positive to negative as X increases. In Figure 1A.4(f), the slope goes from negative to positive. At point A in both, the slope is zero. (Remember, slope is defined as $\Delta Y / \Delta X$. At point A, Y is not changing ($\Delta Y = 0$). Therefore, the slope at point A is zero.)

Some Precautions

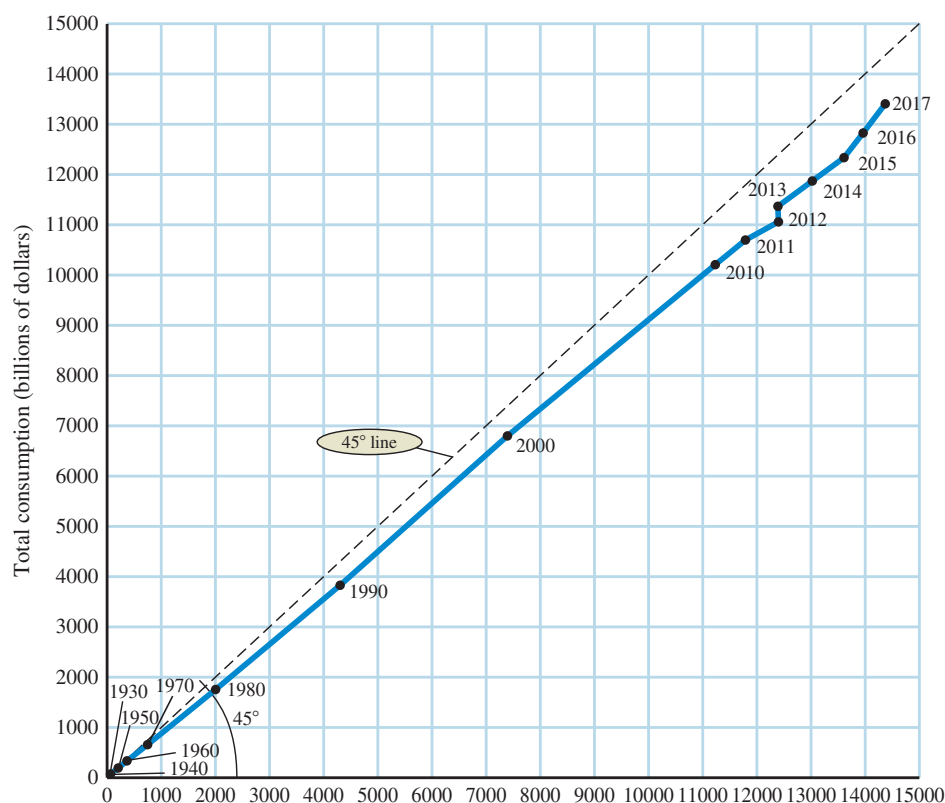
When you read a graph, it is important to think carefully about what the points in the space defined by the axes represent. Table 1A.3 and Figure 1A.5 present a graph of consumption and income that is different from the one in Table 1A.2 and Figure 1A.2. First, each point in Figure 1A.5 represents a different year; in Figure 1A.2, each point represented a different group of households at the *same* point in time (2016). Second, the points in Figure 1A.5 represent *total* consumption and income for the whole nation measured in *billions* of dollars; in Figure 1A.2, the points represented average *household* income and consumption measured in dollars.

It is interesting to compare these two graphs. All points on the total consumption curve in Figure 1A.5 lie below the 45-degree line, which means that total consumption is always less than total income. However, the graph of average household income and consumption in Figure 1A.2 crosses the 45-degree line, implying that for some households, consumption is larger than income.

TABLE 1A.3 Total Disposable Personal Income and Consumption for the United States, 1930–2017 (in billions of dollars)

	Total Disposable Personal Income	Total Consumption
1930	75	70
1940	78	71
1950	215	192
1960	377	332
1970	762	648
1980	2,018	1,755
1990	4,312	3,826
2000	7,401	6,792
2010	11,238	10,202
2011	11,801	10,689
2012	12,404	11,051
2013	12,396	11,361
2014	13,033	11,864
2015	13,615	12,332
2016	13,969	12,821
2017	14,379	13,396

Source: U.S. Department of Commerce, Bureau of Economic Analysis.



MyLab Economics **Concept Check** Total disposable personal income (billions of dollars)

▲ FIGURE 1A.5 Disposable Personal Income and Consumption

It is important to think carefully about what is represented by points in the space defined by the axes of a graph. In this graph, we have graphed income with consumption, as in Figure 1A.2, but here each observation point is total disposable personal income and total consumption in *different years*, measured in billions of dollars.

Source: See Table 1A.3.

APPENDIX SUMMARY

1. A *graph* is a two-dimensional representation of a set of numbers, or data. A *time series graph* illustrates how a single variable changes over time.
2. A graph of two variables includes an *X* (horizontal)-axis and a *Y* (vertical)-axis. The points at which the two axes intersect is called the *origin*. The point at which a graph intersects the *Y*-axis is called the *Y-intercept*. The point at which a graph intersects the *X*-axis is called the *X-intercept*.
3. The *slope* of a line or curve indicates whether the relationship between the two variables graphed is positive or negative and how much of a response there is in *Y* (the variable on the vertical axis) when *X* (the variable on the horizontal axis) changes. The slope of a line between two points is the change in the quantity measured on the *Y*-axis divided by the change in the quantity measured on the *X*-axis.

APPENDIX REVIEW TERMS AND CONCEPTS

graph, p. 47

negative relationship, p. 49

origin, p. 48

positive relationship, p. 49

slope, p. 49

time series graph, p. 47

X-axis, p. 48*X*-intercept, p. 48*Y*-axis, p. 48*Y*-intercept, p. 48

APPENDIX PROBLEMS

All problems are available on MyLab Economics.

CHAPTER 1 APPENDIX: HOW TO READ AND UNDERSTAND GRAPHS

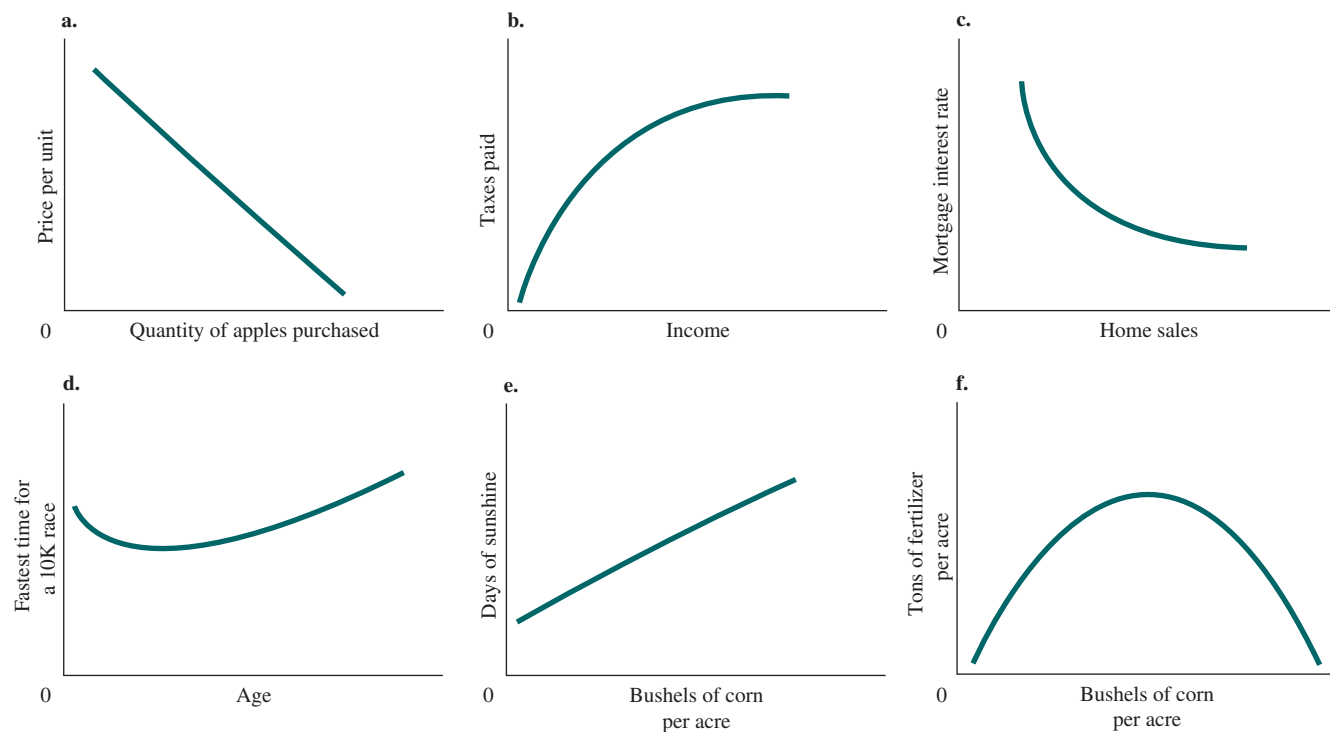
LEARNING OBJECTIVE: Understand how data can be graphically represented.

- 1A.1** Graph each of the following sets of numbers. Draw a line through the points and calculate the slope of each line.

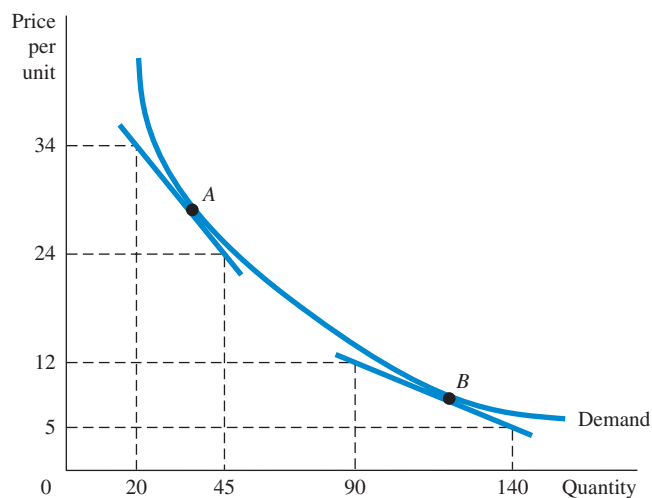
1		2		3		4		5		6	
<i>X</i>	<i>Y</i>	<i>X</i>	<i>Y</i>	<i>X</i>	<i>Y</i>	<i>X</i>	<i>Y</i>	<i>X</i>	<i>Y</i>	<i>X</i>	<i>Y</i>
2	8	2	40	0	0	0	12	0	0	0.1	1.6
4	16	4	32	3	3	3	9	3	3	0.2	1.2
6	24	6	24	6	6	6	6	6	6	0.3	80
8	32	8	16	9	9	9	3	9	3	0.4	40
10	40	10	8	12	12	12	0	12	0	0.5	0

- 1A.2** For each of the graphs in Figure 1, determine whether the curve has a positive or negative slope. Give an intuitive explanation for what is happening with the slope of each curve.
- 1A.3** The following table shows the relationship between the price of airline tickets from London to New York and the number of passengers on the flight.
- a. Is the relationship between the price of tickets from London to New York and the number of passengers a positive or a negative relationship? Explain.
 - b. Plot the data from the table on a graph, draw a line through the points, and calculate the slope of the line.

Price per Ticket	Number of Passengers (millions)	Month
\$ 300	120	June
500	200	July
800	320	August
600	240	September
450	180	October

▲ **FIGURE 1**

1A.4 Calculate the slope of the demand curve at point A and at point B in the following figure.



The Economic Problem: Scarcity and Choice

2



In the last chapter we provided you with some sense of the questions asked by economists and the broad methods that they use. As you read that chapter, some of you may have been surprised by the range of topics covered by economics. A look at the work done by the economists teaching at your own university will likely reveal a similarly broad range of interests. Some of your faculty will study how Apple and Samsung compete in smartphones. Others will look at discrimination in labor markets. Still others may be exploring the effects of micro-finance in India. On the surface, these issues seem quite different from one another. But fundamental to each of these

inquiries is the concern with choice in a world of scarcity. Economics explores how individuals make choices in a world of scarce resources and how those individual's choices come together to determine three key features of their society:

- What gets produced?
- How is it produced?
- Who gets what is produced?

This chapter explores these questions in detail. In a sense, this entire chapter is the definition of economics. It lays out the central problems addressed by the discipline and presents a framework that will guide you through the rest of the book. The starting point is the presumption that *human wants are unlimited but resources are not*. Limited or scarce resources force individuals and societies to choose among competing uses of resources—alternative combinations of produced goods and services—and among alternative final distributions of what is produced among households.

These questions are *positive or descriptive*. Understanding how a system functions is important before we can ask the normative questions of whether the system produces good or bad outcomes and how we might make improvements.

Economists study choices in a world of scarce resources. What do we mean by resources? If you look at Figure 2.1, you will see that resources are broadly defined. They include products of nature like minerals and timber, but also the products of past generations like buildings and factories. Perhaps most importantly, resources include the time and talents of the human population.

CHAPTER OUTLINE AND LEARNING OBJECTIVES

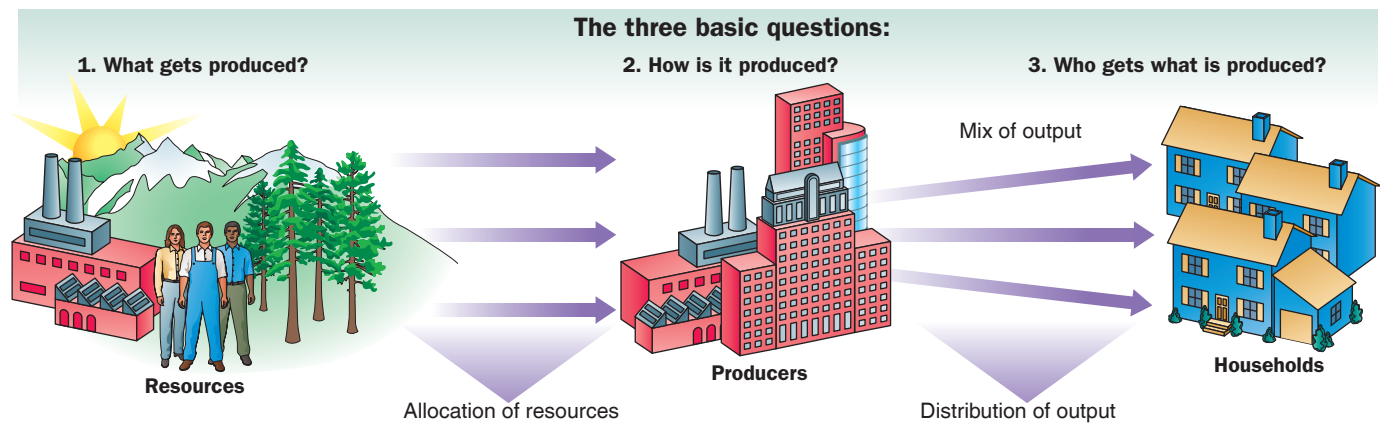
2.1 Scarcity, Choice, and Opportunity Cost p. 56

Understand why even in a society in which one person is better than a second at all tasks, it is still beneficial for the two to specialize and trade.

2.2 Economic Systems and the Role of Government p. 68

Understand the central difference in the way command economies and market economies decide what is produced.

Looking Ahead p. 70



▲ **FIGURE 2.1 The Three Basic Questions**

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Every society has some system or process that transforms its scarce resources into useful goods and services. In doing so, it must decide what gets produced, how it is produced, and to whom it is distributed. The primary resources that must be allocated are land, labor, and capital.

capital Those goods produced by the economic system that are used as inputs to produce other goods and services in the future.

factors of production (or factors) The inputs into the production process. Land, labor, and capital are the three key factors of production.

production The process that transforms scarce resources into useful goods and services.

Things that are produced and then used in the production of other goods and services are called capital resources, or simply **capital**. Buildings, equipment, desks, chairs, software, roads, bridges, and highways are a part of the nation's stock of capital.

The basic resources available to a society are often referred to as **factors of production, or simply factors**. The three key factors of production are land, labor, and capital. The process that transforms scarce resources into useful goods and services is called **production**. In many societies, most of the production of goods and services is done by private firms. Private airlines in the United States use land (runways), labor (pilots and mechanics), and capital (airplanes) to produce transportation services. But in all societies, some production is done by the public sector, or government. Examples of government-produced or government-provided goods and services include national defense, public education, police protection, and fire protection.

Resources or factors of production are the **inputs** into the process of production; goods and services of value to households are the **outputs** of the process of production.

2.1 LEARNING OBJECTIVE

Understand why even in a society in which one person is better than a second at all tasks, it is still beneficial for the two to specialize and trade.

inputs or resources Anything provided by nature or previous generations that can be used directly or indirectly to satisfy human wants.

outputs Goods and services of value to households.

Scarcity, Choice, and Opportunity Cost

In the second half of this chapter we discuss the global economic landscape. Before you can understand the different types of economic systems, it is important to master the basic economic concepts of scarcity, choice, and opportunity cost.

Scarcity and Choice in a One-Person Economy

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The simplest economy is one in which a single person lives alone on an island. Consider Bill, the survivor of a plane crash, who finds himself cast ashore in such a place. Here individual and society are one; there is no distinction between social and private. *Nonetheless, nearly all the same basic decisions that characterize complex economies must also be made in a simple economy.* That is, although Bill will get whatever he produces, he still must decide how to allocate the island's resources, what to produce, and how and when to produce it.

First, Bill must decide *what* he wants to produce. Notice that the word *needs* does not appear here. Needs are absolute requirements; but beyond just enough water, basic nutrition, and shelter to survive, needs are very difficult to define. In any case, Bill must put his wants in some order of priority and make some choices.

Next, he must look at the *possibilities*. What can he do to satisfy his wants given the limits of the island? In every society, no matter how simple or complex, people are constrained in what they can do. In this society of one, Bill is constrained by time, his physical condition, his knowledge, his skills, and the resources and climate of the island.

Given that resources are limited, Bill must decide *how* to best use them to satisfy his hierarchy of wants. Food would probably come close to the top of his list. Should he spend his time gathering fruits and berries? Should he clear a field and plant seeds? The answers to those questions depend on the character of the island, its climate, its flora and fauna (*are* there any fruits and berries?), the extent of his skills and knowledge (does he know anything about farming?), and his preferences (he may be a vegetarian).

Opportunity Cost The concepts of *constrained choice* and *scarcity* are central to the discipline of economics. They can be applied when discussing the behavior of individuals such as Bill and when analyzing the behavior of large groups of people in complex societies.

Given the scarcity of time and resources, if Bill decides to hunt, he will have less time to gather fruits and berries. He faces a trade-off between meat and fruit. There is a trade-off between food and shelter, too. As we noted in Chapter 1, the best alternative that we give up, or forgo, when we make a choice is the **opportunity cost** of that choice.

Bill may occasionally decide to rest, to lie on the beach, and to enjoy the sun. In one sense, that benefit is free—he does not have to buy a ticket to lie on the beach. In reality, however, relaxing does have an opportunity cost. The true cost of that leisure is the value of the other things Bill could have otherwise produced, but did not, during the time he spent on the beach.

The trade-offs that are made in this kind of society are vividly and often comically portrayed in the reality television shows that show groups of strangers competing on some deserted island, all trying to choose whether it is better to fish, hunt for berries, build a hut, or build an alliance. Making one of these choices involves giving up an opportunity to do another, and in many episodes we can see the consequences of those choices.

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

Scarcity and Choice in an Economy of

Two or More [MyLab Economics Concept Check](#)

Now suppose that another survivor of the crash, Colleen, appears on the island. Now that Bill is not alone, things are more complex and some new decisions must be made. Bill's and Colleen's preferences about what things to produce are likely to be different. They will probably not have the same knowledge or skills. Perhaps Colleen is good at tracking animals and Bill has a knack for building things. How should they split the work that needs to be done? Once things are produced, the two castaways must decide how to divide them. How should their products be distributed?

The mechanism for answering these fundamental questions is clear when Bill is alone on the island. The “central plan” is his; he simply decides what he wants and what to do about it. The minute someone else appears, however, a number of decision-making arrangements immediately become possible. One or the other may take charge, in which case that person will decide for both of them. The two may agree to cooperate, with each having an equal say, and come up with a joint plan; or they may agree to split the planning as well as the production duties. Finally, they may go off to live alone at opposite ends of the island. Even if they live apart, however, they may take advantage of each other's presence by specializing and trading.

Modern industrial societies must answer the same questions that Colleen and Bill must answer, but the mechanics of larger economies are more complex. Instead of two people living together, the United States has more than 300 million people. Still, decisions must be made about what to produce, how to produce it, and who gets it.

Specialization, Exchange, and Comparative Advantage The idea that members of society benefit by specializing in what they do best has a long history and is one of the most important and powerful ideas in all of economics. David Ricardo, a major nineteenth-century British economist, formalized the point precisely. According to Ricardo's **theory of comparative advantage**, specialization and free trade will benefit all trading parties, even when some are “absolutely” more efficient producers than others. Ricardo's basic point applies just as much to Colleen and Bill as it does to different nations.

To keep things simple, suppose that Colleen and Bill have only two tasks to accomplish each week: gathering food to eat and cutting logs to burn. If Colleen could cut more logs than Bill in one day and Bill could gather more nuts and berries than Colleen could, specialization would clearly lead to more total production. Both would benefit if Colleen only cuts logs and Bill only gathers nuts and berries, as long as they can trade.

theory of comparative advantage Ricardo's theory that specialization and free trade will benefit all trading parties, even those that may be “absolutely” more efficient producers.

ECONOMICS IN PRACTICE

Frozen Foods and Opportunity Costs

In 2016, \$53 billion of frozen foods were sold in U.S. grocery stores, one quarter of it in the form of frozen dinners and entrées. In the mid-1950s, sales of frozen foods amounted to only \$1 billion, a tiny fraction of the overall grocery store sales. One industry observer attributes this growth to the fact that frozen food tastes much better than it did in the past. Can you think of anything else that might be occurring?

The growth of the frozen dinner entrée market in the last 50 years is a good example of the role of opportunity costs in our lives. One of the most significant social changes in the U.S. economy in this period has been the increased participation of women in the labor force. In 1950, only 24 percent of married women worked; by 2013, that fraction had risen to 58 percent. Producing a meal takes two basic ingredients: food and time. When both husbands and wives work, the opportunity cost of time for housework—including making meals—goes up. This tells us that making a home-cooked meal became more expensive in the last 50 years. A natural result is to shift people toward labor-saving ways to make meals. Frozen foods are an obvious solution to the problem of increased opportunity costs.

Another, somewhat more subtle, opportunity cost story is at work encouraging the consumption of frozen foods. In 1960, the first microwave oven was introduced. The spread of this device into America's kitchens was rapid. The microwave turned out to be a quick way to defrost and cook those frozen entrées. So this technology lowered the opportunity cost of making frozen dinners, reinforcing the advantage these meals had over home-cooked meals. Microwaves made cooking with frozen foods cheaper once opportunity cost was considered while home-cooked meals were becoming more expensive.

The entrepreneurs among you also might recognize that the rise we described in the opportunity cost of the home-cooked meal *contributed* in part to the spread of the microwave, creating a reinforcing cycle. In fact, many entrepreneurs find that the simple tools of economics—like the idea of opportunity costs—help them anticipate what products will be



profitable for them to produce in the future. The growth of the two-worker family has stimulated many entrepreneurs to search for labor-saving solutions to family tasks.

The public policy students among you might be interested to know that some researchers attribute part of the growth in obesity in the United States to the lower opportunity costs of making meals associated with the growth of the markets for frozen foods and the microwave. (See David M. Cutler, Edward L. Glaeser, and Jesse M. Shapiro, "Why Have Americans Become More Obese?" *Journal of Economic Perspectives*, Summer 2003: 93–118.)

CRITICAL THINKING

1. Many people think that soda consumption also leads to increased obesity. Many schools have banned the sale of soda in vending machines. Use the idea of opportunity costs to explain why some people think these bans will reduce consumption. Do you agree?

absolute advantage A producer has an absolute advantage over another in the production of a good or service if he or she can produce that product using fewer resources (a lower absolute cost per unit).

Suppose instead that Colleen is better than Bill both at cutting logs *and* gathering food. In particular, whereas Colleen can gather 10 bushels of food per day, Bill can gather only 8 bushels. Further, while Colleen can cut 10 logs per day, Bill can cut only 4 per day. In this sense, we would say Colleen has an **absolute advantage** over Bill in both activities.

Thinking about this situation and focusing just on the productivity levels, you might conclude that it would benefit Colleen to move to the other side of the island and be by herself. Since she is more productive both in cutting logs and gathering food, would she not be better off on her own? How could she benefit by hanging out with Bill and sharing what they produce? One of Ricardo's lasting contributions to economics has been his analysis of exactly this situation. His analysis, which is illustrated in Figure 2.2, shows both how Colleen and Bill should divide the work of the island and how much they will gain from specializing and exchanging even if, as in this example, one party is absolutely better at everything than the other party.

The key to this question is remembering that Colleen's time is limited: this limit creates an opportunity cost. Though Bill is less able at all tasks than Colleen, having him spend time producing

something frees up Colleen's time and this has value. The value from Bill's time depends on his comparative advantage. A producer has a **comparative advantage** over another in the production of a good or service if he or she can produce the good or service at a lower opportunity cost. First, think about Bill. He can produce 8 bushels of food per day, or he can cut 4 logs. To get 8 additional bushels of food, he must give up cutting 4 logs. Thus, *for Bill, the opportunity cost of 8 bushels of food is 4 logs*. Think next about Colleen. She can produce 10 bushels of food per day, or she can cut 10 logs. She thus gives up 1 log for each additional bushel; so *for Colleen, the opportunity cost of 8 bushels of food is 8 logs*. Bill has a comparative advantage over Colleen in the production of food because he gives up only 4 logs for an additional 8 bushels, whereas Colleen gives up 8 logs.

Think now about what Colleen must give up in terms of food to get 10 logs. To produce 10 logs she must work a whole day. If she spends a day cutting 10 logs, she gives up a day of gathering 10 bushels of food. Thus, *for Colleen, the opportunity cost of 10 logs is 10 bushels of food*. What must Bill give up to get 10 logs? To produce 4 logs, he must work 1 day. For each day he cuts logs, he gives up 8 bushels of food. He thus gives up 2 bushels of food for each log; so *for Bill, the opportunity cost of 10 logs is 20 bushels of food*. Colleen has a comparative advantage over Bill in the production of logs because she gives up only 10 bushels of food for an additional 10 logs, whereas Bill gives up 20 bushels.

Ricardo argued that two parties can benefit from specialization and trade even if one party has an absolute advantage in the production of both goods if each party takes advantage of his or her comparative advantage. Let us see how this works in the current example.

Suppose Colleen and Bill both want equal numbers of logs and bushels of food. If Colleen goes off on her own and splits her time equally, in one day she can produce 5 logs and 5 bushels of food. Bill, to produce equal amounts of logs and food, will have to spend more time on the wood than the food, given his talents. By spending one-third of his day producing food and two-thirds chopping wood, he can produce $2\frac{2}{3}$ units of each. In sum, when acting alone, $7\frac{2}{3}$ logs and bushels of food are produced by our pair of castaways, most of them by Colleen. Clearly Colleen is a better producer than Bill. Why should she ever want to join forces with clumsy, slow Bill?

The answer lies in the gains from specialization, as we can see in Figure 2.2. In block a, we show the results of having Bill and Colleen each working alone chopping logs and gathering food: $7\frac{2}{3}$ logs and an equal number of food bushels. Now, recalling our calculations indicating that Colleen has a comparative advantage in wood chopping, let's see what happens if we assign Colleen to the wood task and have Bill spend all day gathering food. This system is described in block b of Figure 2.2. At the end of the day, the two end up with 10 logs, all gathered by Colleen and 8 bushels of food, all produced by Bill. By joining forces and specializing, the two have increased their production of both goods. This increased production provides an incentive for Colleen and Bill to work together. United, each can receive a bonus over what he or she could produce separately. This bonus—here $2\frac{1}{3}$ extra logs and $\frac{1}{3}$ bushel of food—represent the gains from specialization. Of course if both Bill and Colleen really favor equal amounts of the two goods, they could adjust their work time to get to this outcome; the main point here is that the total production increases with some specialization.

The simple example of Bill and Colleen should begin to give you some insight into why most economists see value in free trade. Even if one country is absolutely better than another country at producing everything, our example has shown that there are gains to specializing and trading.

A Graphical Presentation of the Production Possibilities and Gains from Specialization

Graphs can also be used to illustrate the production possibilities open to Colleen and Bill and the gains they could achieve from specialization and trade.

Figure 2.3(a) shows all of the possible combinations of food and wood Colleen can produce given her skills and the conditions on the island, acting alone. Panel (b) does the same for Bill. If Colleen spends all of her time producing wood, the best she can do is 10 logs, which we show where the line crosses the vertical axis. Similarly, the line crosses the horizontal axis at 10 bushels of food, because that is what Colleen could produce spending full time producing food. We have also marked on the graph possibility C, where she divides her time equally, generating 5 bushels of food and 5 logs of wood.

In panel (b), Bill can get as many as 4 logs of wood or 8 bushels of food by devoting himself full time to either wood or food production. Again, we have marked on his graph a point F, where he produces $2\frac{2}{3}$ bushels of food and $2\frac{2}{3}$ logs of wood. Notice that Bill's production line is lower down than is Colleen's. The further to the right is the production line, the more productive

comparative advantage

The advantage in the production of a good enjoyed by one country over another when that good can be produced at lower cost (in terms of other goods that must be foregone) than it could be in the other country..

► FIGURE 2.2**Comparative Advantage and the Gains from Trade**

Panel (a) shows the best Colleen and Bill can do each day, given their talents and assuming they each wish to consume an equal amount of food and wood.

Notice Colleen produces by splitting her time equally during the day, while Bill must devote two-thirds of his time to wood production if he wishes to equalize his amount produced of the two goods. Panel (b) shows what happens when both parties specialize. Notice more units are produced of each good.

a. Daily production with no specialization, assuming Colleen and Bill each want to consume an equal number of logs and food

	Wood (logs)	Food (bushels)
Colleen	5	5
Bill	$2\frac{2}{3}$	$2\frac{2}{3}$
Total	$7\frac{2}{3}$	$7\frac{2}{3}$

b. Daily Production with Specialization

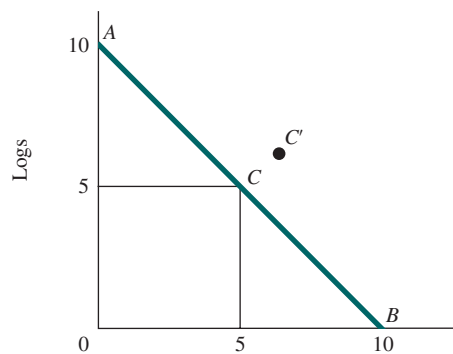
	Wood (logs)	Food (bushels)
Colleen	10	0
Bill	0	8
Total	10	8

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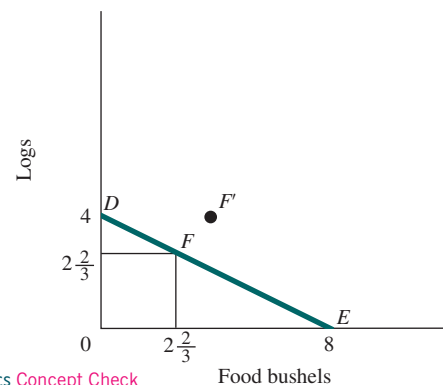
is the individual; that is, the more he or she can produce of the two goods. Also notice that the slope of the two lines is not the same. Colleen trades off one bushel of food for one log of wood, while Bill gives up 2 bushels of food for one log of wood. These differing slopes show the differing opportunity costs faced by Colleen and Bill. They also open up the possibility of gains from specialization. Try working through an example in which the slopes are the same to convince yourself of the importance of differing slopes.

What happens when the possibility of working together and specializing in either wood or food comes up? In Figure 2.2 we have already seen that specialization would allow the pair to go from production of $7\frac{2}{3}$ units of food and wood to 10 logs and 8 bushels of food. Colleen and Bill can split the $2\frac{1}{3}$ extra logs and the $\frac{1}{3}$ extra bushel of food to move to points like C' and F' in Figure 2.3, which were unachievable without cooperation. In this analysis we do not know how

a. Colleen's production possibilities



b. Bill's production possibilities



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▲ FIGURE 2.3 Production Possibilities with and without Trade

This figure shows the combinations of food and wood that Colleen and Bill can each generate in one day of labor, working by themselves. Colleen can achieve independently any point along line ACB, whereas Bill can generate any combination of food and wood along line DFE. Specialization and trade would allow both Bill and Colleen to move to the right of their original lines, to points like C' and F' . In other words, specialization and trade allow both people to be better off than if they were acting alone.

Bill and Colleen will divide the surplus food and wood they have created. But because there is a surplus, both of them can do better than either would alone.

Weighing Present and Expected Future Costs and Benefits Very often we find ourselves weighing benefits available today against benefits available tomorrow. Here, too, the notion of opportunity cost is helpful.

While alone on the island, Bill had to choose between cultivating a field and just gathering wild nuts and berries. Gathering nuts and berries provides food now; gathering seeds and clearing a field for planting will yield food tomorrow if all goes well. Using today's time to farm may well be worth the effort if doing so will yield more food than Bill would otherwise have in the future. By planting, Bill is trading present value for future value.

The simplest example of trading present for future benefits is the act of saving. When you put income aside today for use in the future, you give up some things that you could have had today in exchange for something tomorrow. Because nothing is certain, some judgment about future events and expected values must be made. What will your income be in 10 years? How long are you likely to live?

We trade off present and future benefits in small ways all the time. If you decide to study instead of going to the dorm party, you are trading present fun for the expected future benefits of higher grades. If you decide to go outside on a very cold day and run 5 miles, you are trading discomfort in the present for being in better shape later.

Capital Goods and Consumer Goods A society trades present for expected future benefits when it devotes a portion of its resources to research and development or to investment in capital. As we said previously in this chapter, *capital* in its broadest definition is anything that has already been produced that will be used to produce other valuable goods or services over time.

Building capital means trading present benefits for future ones. Bill and Colleen might trade gathering berries or lying in the sun for cutting logs to build a nicer house in the future. In a modern society, resources used to produce capital goods could have been used to produce **consumer goods**—that is, goods for present consumption. Heavy industrial machinery does not directly satisfy the wants of anyone, but producing it requires resources that could instead have gone into producing things that do satisfy wants directly—for example, food, clothing, toys, or golf clubs.

Capital is everywhere. A road is capital. Once a road is built, we can drive on it or transport goods and services over it for many years to come. A house is also capital. Before a new manufacturing firm can start up, it must put some capital in place. The buildings, equipment, and inventories that it uses comprise its capital. As it contributes to the production process, this capital yields valuable services over time.

Capital does not need to be tangible. When you spend time and resources developing skills or getting an education, you are investing in human capital—your own human capital. This capital will continue to exist and yield benefits to you for years to come. A new app produced by a software company and available online may cost nothing to distribute, but its true intangible value comes from the ideas embodied in the program itself. It too is capital.

The process of using resources to produce new capital is called **investment**. (In everyday language, the term *investment* often refers to the act of buying a share of stock or a bond, as in “I invested in some Treasury bonds.” In economics, however, investment *always* refers to the creation of capital: the purchase or putting in place of buildings, equipment, roads, houses, and the like.) A wise investment in capital is one that yields future benefits that are more valuable than the present cost. When you spend money for a house, for example, presumably you value its future benefits. That is, you expect to gain more in shelter services than you would from the things you could buy today with the same money. Because resources are scarce, the opportunity cost of every investment in capital is forgone present consumption.

consumer goods Goods produced for present consumption.

investment New capital additions to a firm's capital stock. Although capital is measured at a given point in time (a stock), investment is measured over a period of time (a flow). The flow of investment increases the capital stock.

The Production Possibility Frontier [MyLab Economics](#) [Concept Check](#)

A simple graphic device called the **production possibility frontier (ppf)** illustrates the principles of constrained choice, opportunity cost, and scarcity. The ppf is a graph that shows all the combinations of goods and services that can be produced if all of a society's resources are used

production possibility frontier (ppf) A graph that shows all the combinations of goods and services that can be produced if all of society's resources are used efficiently.

efficiently. Figure 2.4 shows a ppf for a hypothetical economy. We have already seen a simplified version of a ppf in looking at the choices of Colleen and Bill in Figure 2.3. Here we will look more generally at the ppf.

On the Y-axis, we measure the quantity of capital goods produced. On the X-axis, we measure the quantity of consumer goods. All points below and to the left of the curve (the shaded area) represent combinations of capital and consumer goods that are possible for the society given the resources available and existing technology. Points above and to the right of the curve, such as point G, represent combinations that cannot currently be realized. You will recall in our example of Colleen and Bill that new trade and specialization possibilities allowed them to expand their collective production possibilities and move to a point like G. If an economy were to end up at point A on the graph, it would be producing no consumer goods at all; all resources would be used for the production of capital. If an economy were to end up at point B, it would be devoting all its resources to the production of consumer goods and none of its resources to the formation of capital.

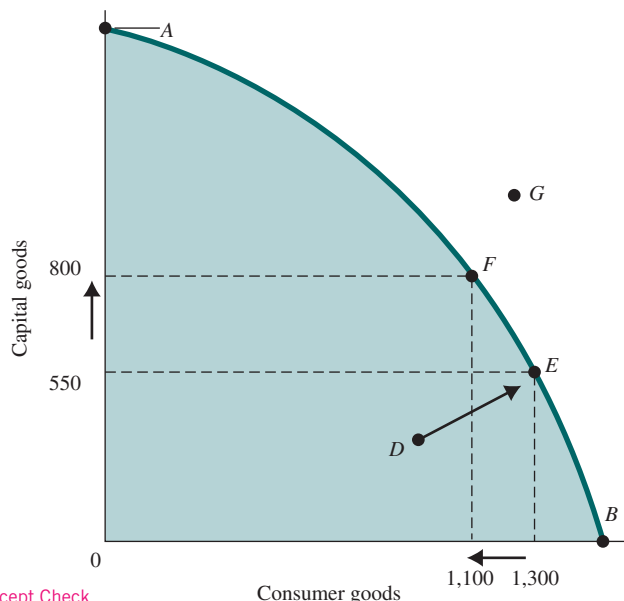
While all economies produce some of each kind of good, different countries emphasize different things. About 16 percent of gross output in the United States in 2017 was new capital. In Japan, capital has historically accounted for a much higher percent of gross output, while in the Congo, the figure is about 7 percent. Japan is closer to point A on its ppf, the Congo is closer to B, and the United States is somewhere in between.

Points that are actually on the ppf are points of both full resource employment and production efficiency. (Recall from Chapter 1 that an efficient economy is one that produces the things that people want at the least cost. *Production efficiency* occurs when a given mix of outputs is produced at the least cost.) Resources are not going unused, and there is no waste. Points that lie within the shaded area but that are not on the frontier represent either unemployment of resources or production inefficiency. An economy producing at point D in Figure 2.4 can produce more capital goods and more consumer goods, for example, by moving to point E. Resources are not fully employed at point D or are not being used efficiently. During the Great Depression of the 1930s, the U.S. economy experienced prolonged unemployment. Millions of workers found themselves without jobs. In 1933, 25 percent of the civilian labor force was unemployed. More recently, between the end of 2007 and 2010, the United States lost more than 8 million payroll jobs and unemployment rose to higher than 15 million. During both of these periods, the economy was at a point like D in Figure 2.4, producing less than it could have. Mismanagement by private firms or the government can also leave an economy underperforming, operating inside the ppf.

Negative Slope and Opportunity Cost The slope of the ppf is negative, reflecting the fact that a society's choices are constrained by available resources and existing technology. When

► FIGURE 2.4 Production Possibility Frontier

The ppf illustrates a number of economic concepts. One of the most important is *opportunity cost*. The opportunity cost of producing more capital goods is fewer consumer goods. Moving from E to F, the number of capital goods increases from 550 to 800, but the number of consumer goods decreases from 1,300 to 1,100.



those resources are fully and efficiently employed, society can produce more capital goods only by reducing production of consumer goods. The opportunity cost of the additional capital is the forgone production of consumer goods.

The fact that scarcity exists is illustrated by the negative slope of the ppf. (If you need a review of slope, see the Appendix to Chapter 1.) In moving from point E to point F in Figure 2.4, capital production *increases* by $800 - 550 = 250$ units (a positive change), but that increase in capital can be achieved only by shifting resources out of the production of consumer goods. Thus, in moving from point E to point F in Figure 2.4, consumer goods production *decreases* by $1,300 - 1,100 = 200$ units (a negative change). The slope of the curve, the ratio of the change in capital goods to the change in consumer goods, is negative.

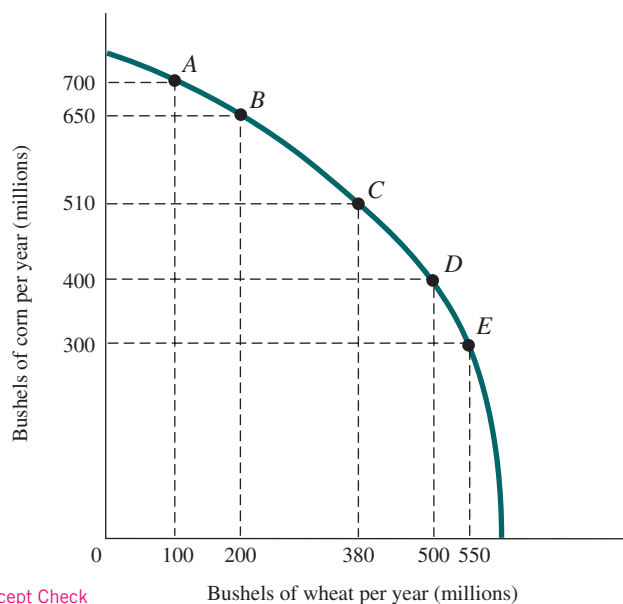
The value of the slope of a society's ppf is called the **marginal rate of transformation (MRT)**. In Figure 2.4, the MRT between points E and F is simply the ratio of the change in capital goods (a positive number) to the change in consumer goods (a negative number). It tells us how much society has to give up of one output to get a unit of a second.

marginal rate of transformation (MRT) The slope of the production possibility frontier (ppf).

The Law of Increasing Opportunity Cost The negative slope of the ppf indicates the trade-off that a society faces between two goods. In the example of Colleen and Bill, we showed the ppf as a straight line. What does it mean that the ppf here is bowed out?

In our simple example, Bill gave up two bushels of food for every one log of wood he produced. Bill's per-hour ability to harvest wood or produce food didn't depend on how many hours he spent on that activity. Similarly, Colleen faced the same trade off of food for wood regardless of how much of either she was producing. In the language we have just introduced, the marginal rate of transformation was constant for Bill and Colleen; hence the straight line ppf. But that is not always true. Perhaps the first bushel of food is easy to produce, low-hanging fruit for example. Perhaps it is harder to get the second log than the first because the trees are farther away. The bowed out ppf tells us that the more society tries to increase production of one good rather than another, the harder it is. In the example in Figure 2.4, the opportunity cost of using society's resources to make capital goods rather than consumer goods increases as we devote more and more resources to capital goods. Why might that be? A common explanation is that when society tries to produce only a small amount of a product, it can use resources—people, land and so on—most well-suited to those goods. As a society spends a larger portion of its resources on one good versus all others, getting more production of that good often becomes increasingly hard.

Let's look at the trade-off between corn and wheat production in Ohio and Kansas as an example. In a recent year, Ohio and Kansas together produced 510 million bushels of corn and 380 million bushels of wheat. Table 2.1 presents these two numbers, plus some hypothetical combinations of corn and wheat production that might exist for Ohio and Kansas together. Figure 2.5 graphs the data from Table 2.1.



◀ **FIGURE 2.5** Corn and Wheat Production in Ohio and Kansas

The ppf illustrates that the opportunity cost of corn production increases as we shift resources from wheat production to corn production. Moving from point E to D, we get an additional 100 million bushels of corn at a cost of 50 million bushels of wheat. Moving from point B to A, we get only 50 million bushels of corn at a cost of 100 million bushels of wheat. The *cost per bushel* of corn—measured in lost wheat—has increased.

TABLE 2.1 Production Possibility Schedule for Total Corn and Wheat Production in Ohio and Kansas

Point on ppf	Total Corn Production (Millions of Bushels per Year)	Total Wheat Production (Millions of Bushels per Year)
A	700	100
B	650	200
C	510	380
D	400	500
E	300	550

Suppose society's demand for corn dramatically increases. If this happens, farmers would probably shift some of their acreage from wheat production to corn production. Such a shift is represented by a move from point C (where corn = 510 and wheat = 380) up and to the left along the ppf toward points A and B in Figure 2.5. As this happens, it becomes more difficult to produce additional corn. The best land for corn production was presumably already in corn, and the best land for wheat production was already in wheat. As we try to produce more corn, the land is less well-suited to that crop. As we take more land out of wheat production, we are taking increasingly better wheat-producing land. In other words, the opportunity cost of more corn, measured in terms of wheat foregone, increases.

Moving from point E to D, Table 2.1 shows that we can get 100 million bushels of corn (400–300) by sacrificing only 50 million bushels of wheat (550–500)—that is, we get 2 bushels of corn for every bushel of wheat. However, when we are already stretching the ability of the land to produce corn, it becomes harder to produce more and the opportunity cost increases. Moving from point B to A, we can get only 50 million bushels of corn (700–650) by sacrificing 100 million bushels of wheat (200–100). For every bushel of wheat given up, we now get only half a bushel of corn. Conversely, if the demand for *wheat* were to increase substantially and we moved down and to the right along the ppf, it would become increasingly difficult to produce wheat and the opportunity cost of wheat, in terms of corn foregone, would increase. This is the *law of increasing opportunity cost*.

The Efficient Mix of Output To be efficient, an economy must produce what people want. This means that in addition to operating *on* the ppf, the economy must be operating at the *right point* on the ppf. This is referred to as *output efficiency*, in contrast to production efficiency. Suppose an economy devotes 100 percent of its resources to beef production and the beef industry runs efficiently using the most modern techniques. If everyone in the society were a vegetarian and there were no trade, resources spent on producing beef would be wasted.

It is important to remember that the ppf represents choices available within the constraints imposed by the current state of agricultural technology. In the long run, technology may improve, and when that happens, we have *growth*.

economic growth An increase in the total output of an economy. Growth occurs when a society acquires new resources or when it learns to produce more using existing resources.

Economic Growth **Economic growth** is characterized by an increase in the total output of an economy. It occurs when a society acquires new resources or learns to produce more with existing resources. New resources may mean a larger labor force or an increased capital stock. The production and use of new machinery and equipment (capital) increase workers' productivity. (Give a man a shovel, and he can dig a bigger hole; give him a steam shovel, and wow!) Improved productivity also comes from technological change and *innovation*, the discovery and application of new, more efficient production techniques.

In the past few decades, the productivity of U.S. agriculture has increased dramatically. Based on data compiled by the Department of Agriculture, Table 2.2 shows that yield per acre in corn production has increased sixfold since the late 1930s, and the labor required to produce it has dropped significantly. Productivity in wheat production has also increased, at only a slightly less remarkable rate: Output per acre has more than tripled, whereas labor requirements are down nearly 90 percent. These increases are the result of more efficient farming techniques,

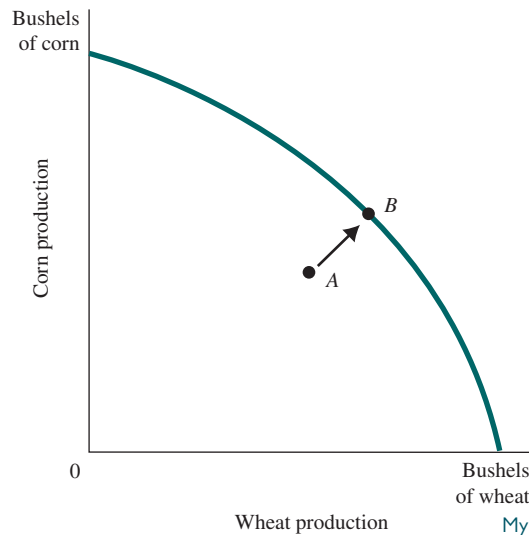


FIGURE 2.6
Inefficiency from Misallocation of Land in Farming

Inefficiency always results in a combination of production shown by a point inside the ppf, like point A. Increasing efficiency will move production possibilities toward a point on the ppf, such as point B.

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more and better capital (tractors, combines, and other equipment), and advances in scientific knowledge and technological change (hybrid seeds, fertilizers, and so on). As you can see in Figure 2.7, changes such as these shift the ppf up and to the right.

Sources of Growth and the Dilemma of Poor Countries Economic growth arises from many sources. The two most important over the years have been the accumulation of capital and technological advances. For poor countries, capital is essential; they must build the

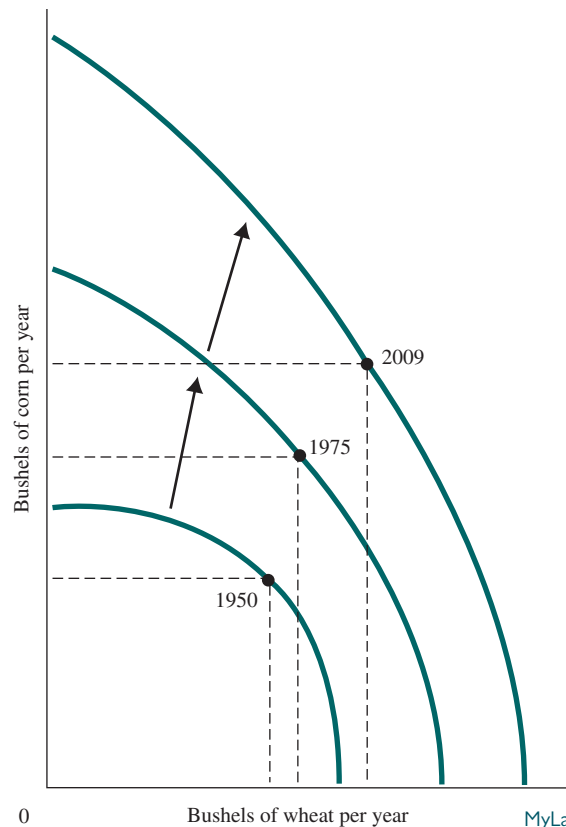
TABLE 2.2 Increasing Productivity in Corn and Wheat Production in the United States, 1935–2017

	Corn	Wheat
	Yield per Acre (Bushels)	Yield per Acre (Bushels)
1935–1939	26.1	13.2
1945–1949	36.1	16.9
1955–1959	48.7	22.3
1965–1969	78.5	27.5
1975–1979	95.3	31.3
1981–1985	107.2	36.9
1985–1990	112.8	38.0
1990–1995	120.6	38.1
1998	134.4	43.2
2001	138.2	43.5
2006	145.6	42.3
2007	152.8	40.6
2008	153.9	44.9
2009	164.9	44.3
2010	152.8	46.4
2011	147.2	43.7
2012	123.4	46.3
2013	158.8	47.2
2014	171.0	43.7
2015	168.4	43.6
2016	174.6	52.7
2017	176.6	46.3

Source: U.S. Department of Agriculture, Economic Research Service, Agricultural Statistics, Crop Summary.

► **FIGURE 2.7 Economic Growth Shifts the PPF Up and to the Right**

Productivity increases have enhanced the ability of the United States to produce both corn and wheat. As Table 2.2 shows, productivity increases were more dramatic for corn than for wheat. Thus, the shifts in the ppf were not parallel.



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communication networks and transportation systems necessary to develop industries that function efficiently. They also need capital goods to develop their agricultural sectors.

Recall that capital goods are produced only at a sacrifice of consumer goods. Technical advances similarly require a present sacrifice in order to fund the research required for such advances.

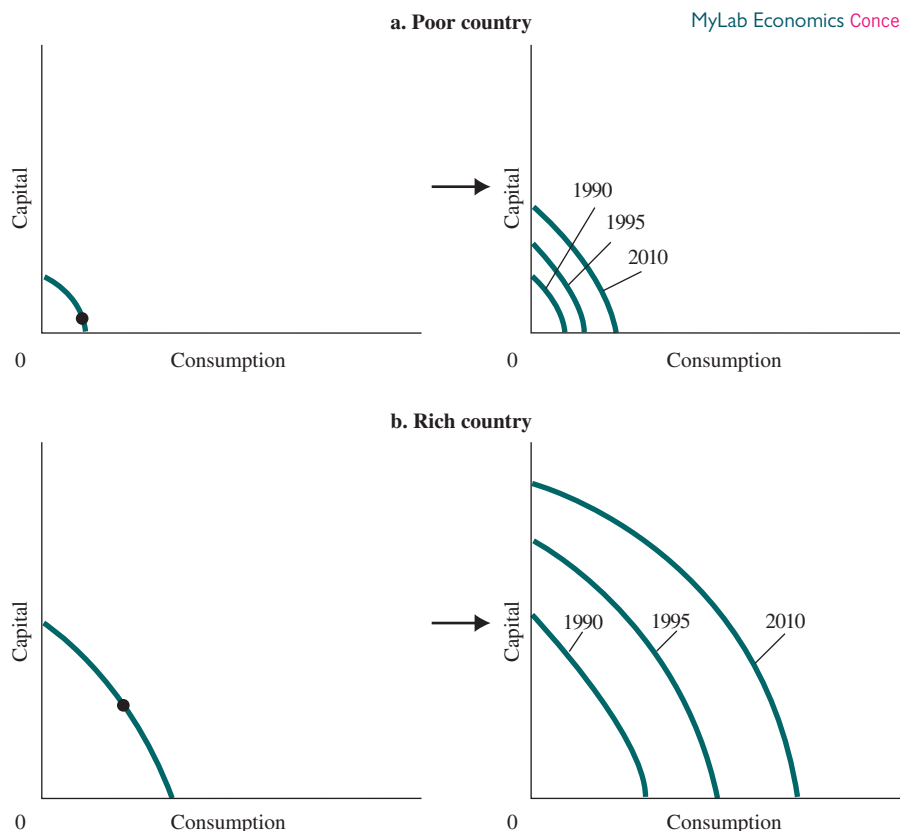
When a large part of a country's population is poor, taking resources out of the production of consumer goods (such as food and clothing) is difficult. In addition, in some countries, people wealthy enough to invest in domestic industries choose instead to invest abroad because of political turmoil at home. As a result, it often falls to the governments of poor countries to generate revenues for capital production and research out of tax collections.

All these factors have contributed to the growing gap between some poor and rich nations. Figure 2.8 shows the result using ppfs. On the bottom left, the rich country devotes a larger portion of its production to capital, whereas the poor country on the top left produces mostly consumer goods. On the right, you see the results: The ppf of the rich country shifts up and out further and faster.

The importance of capital goods and technological developments to the position of workers in less-developed countries is well illustrated by Robert Jensen's study of South India's industry. Conventional telephones require huge investments in wires and towers and, as a result, many less developed areas are without landlines. Mobile phones, on the other hand, require a lower investment; thus, in many areas, people upgraded from no phones directly to cell phones. Jensen found that in small fishing villages, the advent of cell phones allowed fishermen to determine on any given day where to take their catch to sell, resulting in a large decrease in fish wasted and an increase in fishing profits. The ability of newer communication technology to aid development is one of the exciting features of our times.¹

Although it exists only as an abstraction, the ppf illustrates a number of important concepts that we will use throughout the rest of this book: scarcity, unemployment,

¹ See Robert Jensen, "The Digital Divide: Information Technology, Market Performance, and Welfare in the South Indian Fisheries Sector," *Quarterly Journal of Economics*, 2007: 879–924.



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FIGURE 2.8 Capital Goods and Growth in Poor and Rich Countries

Rich countries find it easier than poor countries to devote resources to the production of capital, and the more resources that flow into capital production, the faster the rate of economic growth. Thus, the gap between poor and rich countries has grown over time.

inefficiency, opportunity cost, the law of increasing opportunity cost, economic growth, and the gains from trade.

The Economic Problem MyLab Economics Concept Check

Recall the three basic questions facing all economic systems: (1) What gets produced? (2) How is it produced? and (3) Who gets it?

When Bill was alone on the island, the mechanism for answering those questions was simple: He thought about his own wants and preferences, looked at the constraints imposed by the resources of the island and his own skills and time, and made his decisions. As Bill set about his work, he allocated available resources quite simply, more or less by dividing up his available time. Distribution of the output was irrelevant. Because Bill was the society, he got it all.

Introducing even one more person into the economy—in this case, Colleen—changed all that. Cooperation and coordination may give rise to gains that would otherwise not be possible. When a society consists of millions of people, coordination and cooperation become more challenging, but the potential for gain also grows. In large, complex economies, specialization can grow dramatically. The range of products available in a modern industrial society is beyond anything that could have been imagined a hundred years ago, and so is the range of jobs. Specialization plays a role in this.

The amount of coordination and cooperation in a modern industrial society is almost impossible to imagine. Yet something seems to drive economic systems, if sometimes clumsily and inefficiently, toward producing the goods and services that people want. Given scarce resources, how do large, complex societies go about answering the three basic economic questions? This is the economic problem, which is what this text is about.

ECONOMICS IN PRACTICE

Changing Consumption Patterns in China

In all societies, for all people, resources are limited relative to people's demands. Scarcity of resources is the primary reason we face trade-offs. However, as an economy grows, more resources become available and the trade-offs it faces change.

China is the world's second largest economy and it has been driving global growth for a decade. At the turn of the century, the average Chinese household spent around one-third of its income on food. Since 2015, this proportion has declined to roughly 28 percent as the Chinese are increasingly moving toward the consumption of non-food products. At the same time, the proportion of expenditure on housing in consumer income rose from 13.2 percent to 15.4 percent, health care spending from 10 percent to 11.3 percent, and communications and transport from 10.4 percent to almost 12 percent.¹

You can see that as an economy grows and consumer income increases, food becomes a smaller component of the budget. The change in the pattern of consumption has also had its mark on prices. As the Chinese economy is utilizing more inputs, the cost of each unit of output is becoming more expensive. In 2017, food inflation was much lower than non-food inflation, primarily due to the increase in expenditure on healthcare, communications, clothing, education, and entertainment. This also includes expenditure on additional commodities such as financial services and pets as domestic and foreign firms try to



capitalize on the changes in the consumption patterns of the largest consumer market in the world.

CRITICAL THINKING

1. How does the change in the pattern of consumption expenditure in China relate to the law of increasing opportunity cost?

¹China National Bureau of Statistics, *China Statistical Yearbook* – 2016. Beijing: China Statistics Press.

2.2 LEARNING OBJECTIVE

Understand the central difference in the way command economies and market economies decide what is produced.

Economic Systems and the Role of Government

Thus far we have described the questions that the economic system must answer. Now we turn to the mechanics of the system. What is the role played by government in deciding what and how things are produced? There are many circumstances in which the government may be able to improve the functioning of the market.

Command Economies MyLab Economics Concept Check

command economy An economy in which a central government either directly or indirectly sets output targets, incomes, and prices.

In a pure **command economy**, like the system in place in the Soviet Union or China some years ago, the basic economic questions are answered by a central government. Through a combination of government ownership of state enterprises and central planning, the government, either directly or indirectly, sets output targets, incomes, and prices.

At present, for most countries in the world, private enterprise plays at least some role in production decisions. The debate today is instead about the extent and the character of government's role in the economy. Government involvement, in theory, may improve the efficiency and fairness of the allocation of a nation's resources. At the same time, a poorly functioning

government can destroy incentives, lead to corruption, and result in the waste of a society's resources.

Laissez-Faire Economies: The Free

Market [MyLab Economics](#) [Concept Check](#)

At the opposite end of the spectrum from the command economy is the **laissez-faire economy**. The term *laissez-faire*, which translated literally from French means “allow [them] to do,” implies a complete lack of government involvement in the economy. In this type of economy, individuals and firms pursue their own self-interest without any central direction or regulation; the sum total of millions of individual decisions ultimately determines all basic economic outcomes. The central institution through which a laissez-faire system answers the basic questions is the **market**, a term that is used in economics to mean an institution through which buyers and sellers interact and engage in exchange.

In short:

Some markets are simple and others are complex, but they all involve buyers and sellers engaging in exchange. The behavior of buyers and sellers in a laissez-faire economy determines what gets produced, how it is produced, and who gets it.

The following chapters explore market systems in great depth. A quick preview is worthwhile here, however.

Consumer Sovereignty In a free, unregulated market, goods and services are produced and sold only if the supplier can make a profit. In simple terms, making a *profit* means selling goods or services for more than it costs to produce them. You cannot make a profit unless someone wants the product that you are selling. The mix of output found in any free market system is dictated ultimately by the tastes and preferences of consumers who “vote” by buying or not buying. Economists call this **consumer sovereignty**. Businesses rise and fall in response to consumer demands. No central directive or plan is necessary.

Individual Production Decisions: Free Enterprise Under a free market system, individual producers must also determine how to organize and coordinate the actual production of their products or services. In a free market economy, producers may be small or large. One person who is good with computers may start a business designing Web sites. On a larger scale, a group of furniture designers may put together a large portfolio of sketches, raise several million dollars, and start a bigger business. At the extreme are huge corporations such as Microsoft, Mitsubishi, Apple, and Intel, each of which sells tens of billions of dollars' worth of products every year. Whether the firms are large or small, however, production decisions in a market economy are made by separate private organizations acting in what they perceive to be their own interests.

Proponents of free market systems argue that the use of markets leads to more efficient production and better response to diverse and changing consumer preferences. If a producer is inefficient, competitors will come along, fight for the business, and eventually take it away. Thus, in a free market economy, competition forces producers to use efficient techniques of production and to produce goods that consumers want.

Distribution of Output In a free market system, the distribution of output—who gets what—is also determined in a decentralized way. To the extent that income comes from working for a wage, it is at least in part determined by individual choice. You will work for the wages available in the market only if these wages (and the products and services they can buy) are sufficient to compensate you for what you give up by working. You may discover that you can increase your income by getting more education or training.

laissez-faire economy

Literally from the French: “allow [them] to do.” An economy in which individual people and firms pursue their own self-interest without any government direction or regulation.

market The institution through which buyers and sellers interact and engage in exchange.

consumer sovereignty The idea that consumers ultimately dictate what will be produced (or not produced) by choosing what to purchase (and what not to purchase).

Price Theory The basic coordinating mechanism in a free market system is price. A price is the amount that a product sells for per unit, and it reflects what society is willing to pay. Prices of inputs—labor, land, and capital—determine how much it costs to produce a product. Prices of various kinds of labor, or *wage rates*, determine the rewards for working in different jobs and professions. Many of the independent decisions made in a market economy involve the weighing of prices and costs, so it is not surprising that much of economic theory focuses on the factors that influence and determine prices. This is why microeconomic theory is often simply called *price theory*.

In sum:

In a free market system, the basic economic questions are answered without the help of a central government plan or directives. This is what the “free” in free market means—the system is left to operate on its own with no outside interference. Individuals pursuing their own self-interest will go into business and produce the products and services that people want. Other individuals will decide whether to acquire skills; whether to work; and whether to buy, sell, invest, or save the income that they earn. The basic coordinating mechanism is price.

Mixed Systems, Markets, and Governments

MyLab Economics [Concept Check](#)

The differences between command economies and laissez-faire economies in their pure forms are enormous. In fact, these pure forms do not exist in the world; all real systems are in some sense “mixed.” That is, individual enterprise exists and independent choice is exercised even in economies in which the government plays a major role.

Conversely, no market economies exist without government involvement and government regulation. The United States has basically a free market economy, but government purchases accounted for slightly more than 17 percent of the country’s total production in 2017. Governments in the United States (local, state, and federal) directly employ about 14 percent of all workers. They also redistribute income by means of taxation and social welfare expenditures, and they regulate many economic activities.

One of the major themes in this book, and indeed in economics, is the tension between the advantages of free, unregulated markets and the desire for government involvement. Identifying what the market does well, and where it potentially fails, and exploring the role of government in dealing with market failure is a key topic in policy economics. We return to this debate many times throughout this text.

Looking Ahead

This chapter described the economic problem in broad terms. We outlined the questions that all economic systems must answer. We also discussed broadly the two kinds of economic systems. In the next chapter, we analyze the way market systems work.

SUMMARY

1. Every society has some system or process for transforming into useful form what nature and previous generations have provided. Economics is the study of that process and its outcomes.
2. *Producers* are those who take resources and transform them into usable products, or *outputs*. Private firms, households, and governments all produce something.
- 2.1 **SCARCITY, CHOICE, AND OPPORTUNITY COST** *p. 56*
3. All societies must answer *three basic questions*: What gets produced? How is it produced? Who gets what is produced? These three questions make up the *economic problem*.
4. One person alone on an island must make the same basic decisions that complex societies make. When a society

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consists of more than one person, questions of distribution, cooperation, and specialization arise.

5. Because resources are scarce relative to human wants in all societies, using resources to produce one good or service implies *not* using them to produce something else. This concept of *opportunity cost* is central to understanding economics.
6. Using resources to produce *capital* that will in turn produce benefits in the future implies *not* using those resources to produce consumer goods in the present.
7. Even if one individual or nation is absolutely more efficient at producing goods than another, all parties will gain if they specialize in producing goods in which they have a *comparative advantage*.
8. A *production possibility frontier* (ppf) is a graph that shows all the combinations of goods and services that can be produced if all of society's resources are used efficiently. The ppf illustrates a number of important economic concepts: scarcity, unemployment, inefficiency, increasing opportunity cost, and economic growth.
9. *Economic growth* occurs when society produces more, either by acquiring more resources or by learning to produce more with existing resources. Improved productivity may come from additional capital or from the discovery and application of new, more efficient techniques of production.

2.2 ECONOMIC SYSTEMS AND THE ROLE OF GOVERNMENT p. 68

10. In some modern societies, government plays a big role in answering the three basic questions. In pure *command economies*, a central authority directly or indirectly sets output targets, incomes, and prices.
11. A *laissez-faire economy* is one in which individuals independently pursue their own self-interest, without any central direction or regulation, and ultimately determine all basic economic outcomes.
12. A *market* is an institution through which buyers and sellers interact and engage in exchange. Some markets involve simple face-to-face exchange; others involve a complex series of transactions, often over great distances or through electronic means.
13. There are no purely planned economies and no pure *laissez-faire* economies; all economies are mixed. Individual enterprise, independent choice, and relatively free markets exist in centrally planned economies; there is significant government involvement in market economies such as that of the United States.
14. One of the great debates in economics revolves around the tension between the advantages of free, unregulated markets and the desire for government involvement in the economy. Free markets produce what people want, and competition forces firms to adopt efficient production techniques. The need for government intervention arises because free markets are characterized by inefficiencies and an unequal distribution of income and experience regular periods of inflation and unemployment.

REVIEW TERMS AND CONCEPTS

absolute advantage, p. 58

capital, p. 56

command economy, p. 68

comparative advantage, p. 59

consumer goods, p. 61

consumer sovereignty, p. 69

economic growth, p. 64

factors of production (or factors), p. 56

inputs or resources, p. 56

investment, p. 61

laissez-faire economy, p. 69

marginal rate of transformation (MRT), p. 63

market, p. 69

opportunity cost, p. 57

outputs, p. 56

production, p. 56

production possibility frontier (ppf), p. 61

theory of comparative advantage, p. 57

PROBLEMS

All problems are available on MyLab Economics.

2.1 SCARCITY, CHOICE, AND OPPORTUNITY COST

LEARNING OBJECTIVE: Understand why even in a society in which one person is better than a second at all tasks, it is still beneficial for the two to specialize and trade.

- 1.1 For each of the following, describe some of the potential opportunity costs:
 - a. Visiting your parents over the weekend
 - b. Exercising an hour every other day

- c. The government of your country renovating a 1,000-year-old monument
- d. The local town subsidizing public transport to keep ticket prices down
- e. Flying business class on a holiday
- f. Binge-watching a new show on Netflix

- 1.2 “As long as all resources are fully employed and every firm in the economy is producing its output using the best available technology, the result will be efficient.” Do you agree or disagree with this statement? Explain your answer.

MyLab Economics Visit www.pearson.com/mylab/economics to complete these exercises online and get instant feedback. Exercises that update with real-time data are marked with .

1.3 You are an intern at the Shanghai Morning Post. The editor-in-chief asks you to write the first draft of an editorial for next week's edition. Your assignment is to describe the costs and benefits of building a new high-speed rail from Shanghai to Hong Kong. It takes 19 hours to drive from Shanghai to Hong Kong, and people usually face a lot of traffic congestion. The high-speed rail will cost around HK\$84.4 billion and the funds may come from the government or the private sector. What are the opportunity costs of building the high-speed rail? What are some of the benefits that citizens will enjoy if the railway is built? What other factors would you consider in writing this editorial?

1.4 Alexi and Tony own a food truck that serves only two items, street tacos and Cuban sandwiches. As shown in the table, Alexi can make 80 street tacos per hour but only 20 Cuban sandwiches. Tony is a bit faster and can make 100 street tacos or 30 Cuban sandwiches in an hour. Alexi and Tony can sell all the street tacos and Cuban sandwiches that they are able to produce.

	Output Per Hour	
	Street Tacos	Cuban Sandwiches
Alexi	80	20
Tony	100	30

- For Alexi and for Tony, what is the opportunity cost of a street taco? Who has a comparative advantage in the production of street tacos? Explain your answer.
- Who has a comparative advantage in the production of Cuban sandwiches? Explain your answer.
- Assume that Alexi works 20 hours per week in the business. Assuming Alexi is in business on her own, graph the possible combinations of street tacos and Cuban sandwiches that she could produce in a week. Do the same for Tony.
- If Alexi devoted half of her time (10 out of 20 hours) to making street tacos and half of her time to making Cuban sandwiches, how many of each would she produce in a week? If Tony did the same, how many of each would he produce? How many street tacos and Cuban sandwiches would be produced in total?
- Suppose that Alexi spent all 20 hours of her time on street tacos and Tony spent 17 hours on Cuban Sandwiches and 3 hours on street tacos. How many of each item would be produced?
- Suppose that Alexi and Tony can sell all their street tacos for \$2 each and all their Cuban Sandwiches for \$7.25 each. If each of them worked 20 hours per week, how should they split their time between the production of street tacos and Cuban sandwiches? What is their maximum joint revenue?

1.5 Briefly describe the trade-offs involved in each of the following decisions. List some of the opportunity costs associated with each decision, paying particular attention to the trade-offs between present and future consumption.

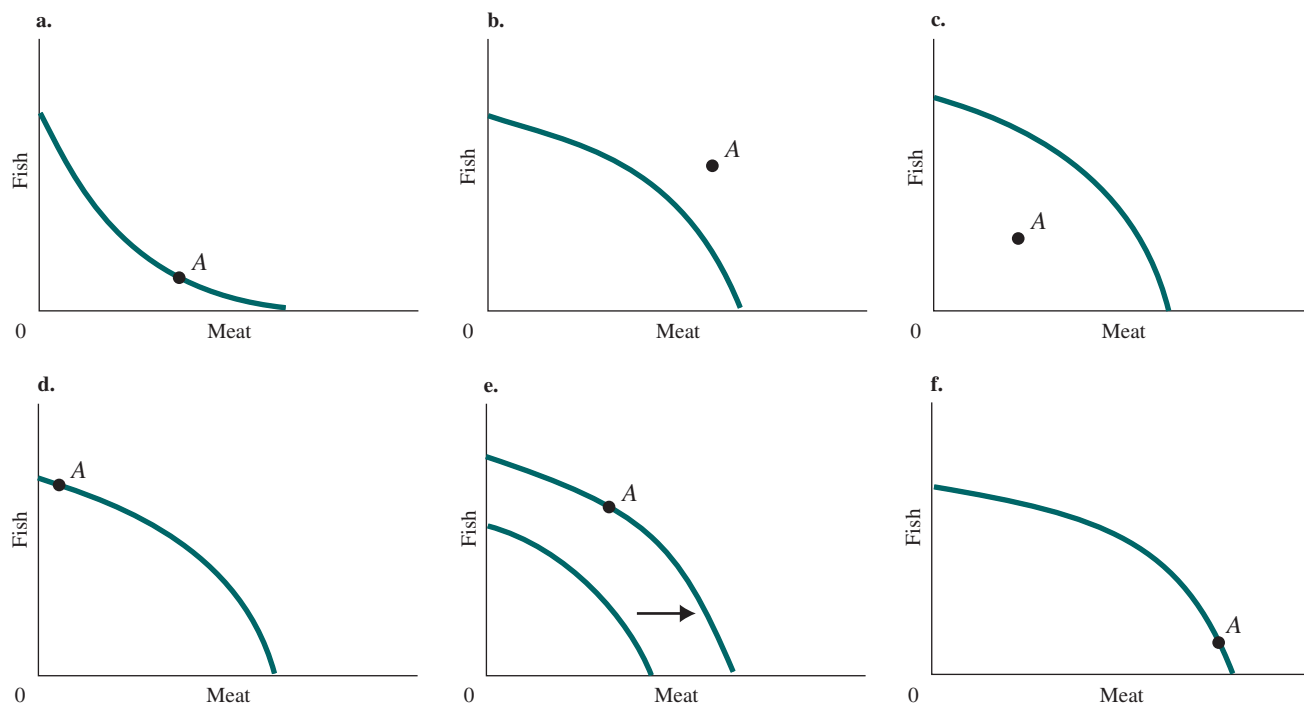
- After graduating from university, Victor decides to take a gap year instead of getting a graduate job.
- Alia decides to practice math every day and take tuitions.
- Mary takes her dog to the pet shop every week for grooming even though it takes two hours of her time and costs £45 for every session.
- Shanchai is in a hurry to catch her flight. She drives over the posted speed limit on her way to the airport.

***1.6** The countries of Orion and Scorpius are small mountainous nations. Both produce granite and blueberries. Each nation has a labor force of 800. The following table gives production per month for each worker in each country. Assume productivity is constant and identical for each worker in each country.

	Tons of Granite	Bushels of Blueberries
Orion workers	6	18
Scorpius workers	3	12

Productivity of one worker for one month

- Which country has an absolute advantage in the production of granite? Which country has an absolute advantage in the production of blueberries?
 - Which country has a comparative advantage in the production of granite? of blueberries?
 - Sketch the ppf's for both countries.
 - Assuming no trading between the two, if both countries wanted to have equal numbers of tons of granite and bushels of blueberries, how would they allocate workers to the two sectors?
 - Show that specialization and trade can move both countries beyond their ppf's.
- *1.7** Match each diagram in Figure 1 with its description here. Assume that the economy is producing or attempting to produce at point A and that most members of society like meat and not fish. Some descriptions apply to more than one diagram, and some diagrams have more than one description.
- Inefficient production of meat and fish
 - Productive efficiency
 - An inefficient mix of output
 - Technological advances in the production of meat and fish
 - The law of increasing opportunity cost
 - An impossible combination of meat and fish



- 1.8** A nation with fixed quantities of resources is able to produce any of the following combinations of carpet and carpet looms:

Yards of carpet (Millions)	Carpet looms (Thousands)
0	45
12	42
24	36
36	27
48	15
60	0

These figures assume that a certain number of previously produced looms are available in the current period for producing carpet.

- Using the data in the table, graph the ppf (with carpet on the vertical axis).
 - Does the principle of “increasing opportunity cost” hold in this nation? Explain briefly. (Hint: What happens to the opportunity cost of carpet—measured in number of looms—as carpet production increases?)
 - If this country chooses to produce both carpet and looms, what will happen to the ppf over time? Why?
- Now suppose that a new technology is discovered that allows an additional 50 percent of yards of carpet to be produced by each existing loom.
- Illustrate (on your original graph) the effect of this new technology on the ppf.
 - Suppose that before the new technology is introduced, the nation produces 15 thousand looms. After the new technology is introduced, the nation produces 27 thousand looms. What is the effect of the new technology on the production of carpet? (Give the number of yards before and after the change.)

- 1.9** [Related to the *Economics in Practice* on p. 58] An analysis of a large-scale survey of consumer food purchases by Mark Aguiar and Erik Hurst indicates that retired people spend less for the same market basket of food than working people do. Use the concept of opportunity cost to explain this fact.

Source: Mark Aguiar and Erik Hurst, “Consumption versus Expenditure,” *Journal of Political Economy*, October 2005.

- *1.10** Betty Lou has a car washing and detailing business. She charges \$20 to wash a car, a process that takes her 20 minutes and requires no help or materials. For car detailing, a process requiring 1 hour, she charges \$50 net of materials. Again, no help is required. Is anything puzzling about Betty Lou’s pricing pattern? Explain your answer.
- 1.11** Established in 1903 by Cecil Rhodes, the Rhodes Scholarship is considered as one of the world’s most prestigious awards, presented to select foreign students for postgraduate studies at the University of Oxford. A Rhodes Scholarship covers all university and college fees, offers a personal stipend, and airfare for a round trip to Oxford. Suppose you are selected as a recipient of this scholarship in 2019. Would you face any type of economic cost, discussed in the chapter, if you attended the program in 2019?
- 1.12** Punting is arguably more popular in Cambridge and Oxford than in any other region of the United Kingdom. During the warmer seasons, it is common to see rivers filled with punts—flat-bottomed boats that are square at both ends propelled by a long pole. Considering that Cambridge and Oxford are more than a hundred

*Note: Problems with an asterisk are more challenging.

kilometers away from any large cities, what might be an economic explanation for the popularity of punting in these universities?

- 1.13** The nation of Temeria is able to produce ships and raise horses in combinations represented by the data in the following table. Each number represents hundreds of units. Explain why the data shows that Temeria experiences increasing opportunity costs.

	A	B	C	D	E
Horses	1,000	900	700	400	0
Ships	0	3	6	9	12

- 1.14** Explain how each of the following situations would affect a nation's production possibilities curve.
- A group of vocational schools is established for training low-skilled adults.
 - A drought hits the rural areas of Australia.
 - The people of a country migrate to other countries because of an unstable political environment.
 - The government of a country increases the allowance for unemployed workers by 20 percent, resulting in more workers being unemployed and remaining so for longer periods.
 - An innovation in solar technology allows for more efficient conversion of solar power to electricity.
 - An earthquake destroys the infrastructure of a province, significantly reducing the nation's production capacity.

2.2 ECONOMIC SYSTEMS AND THE ROLE OF GOVERNMENT

LEARNING OBJECTIVE: Understand the central difference in the way command economies and market economies decide what is produced.

- 2.1** Describe a command economy and a laissez-faire economy. Do any economic systems in the world reflect the purest forms of command or laissez-faire economies? Explain.
- 2.2** Suppose that a simple society has an economy with only one resource, labor. Labor can be used to produce only two commodities—X, a necessity good (food), and Y, a luxury good (music and merriment). Suppose the labor force consists of 100 workers. One laborer can produce either 5 units of necessity per month (by hunting and gathering) or 10 units of luxury per month (by writing songs, playing the guitar, dancing, and so on).
- On a graph, draw the economy's ppf. Where does the ppf intersect the Y-axis? Where does it intersect the X-axis? What meaning do those points have?
 - Suppose the economy produced at a point *inside* the ppf. Give at least two reasons why this could occur. What could be done to move the economy to a point *on* the ppf?
 - Suppose you succeeded in lifting your economy to a point on its ppf. What point would you choose? How might your small society decide the point at which it wanted to be?
 - Once you have chosen a point on the ppf, you still need to decide how your society's production will be divided. If you were a dictator, how would you decide? What would happen if you left product distribution to the free market?

CRITICAL THINKING QUESTIONS

QUESTION 1 Economic growth leads the PPF to shift outward. Explain whether a decrease in the unemployment rate would similarly lead the PPF to shift outward.

QUESTION 2 Earlier in the chapter, we discussed the tradeoff between producing consumer goods and physical capital, as well as the importance of mobile phone technology to developing countries. How would introducing mobile phones in a poorer country affect its PPF between consumer goods and physical capital?

Demand, Supply, and Market Equilibrium

3



Chapters 1 and 2 introduced the discipline, methodology, and subject matter of economics. We now begin the task of analyzing how a market economy actually works. This chapter and the next present an overview of the way individual markets work, introducing concepts used in both microeconomics and macroeconomics.

In the simple island society discussed in Chapter 2, Bill and Colleen solved the economic problem directly. They allocated their time and used the island's resources to satisfy their wants. Exchange occurred in a relatively simple way. In larger societies, with people typically operating at some distance from one another, exchange can be more complex. *Markets* are the institutions through which exchange typically takes place.

This chapter begins to explore the basic forces at work in market systems. How do the individual decisions of households and firms together, without any central planning or direction, answer the three basic questions: What gets produced? How is it produced? Who consumes what is produced?

CHAPTER OUTLINE AND LEARNING OBJECTIVES

3.1 Firms and Households: The Basic Decision-Making Units p. 76

Understand the roles of firms, entrepreneurs, and households in the market.

3.2 Input Markets and Output Markets: The Circular Flow p. 76

Understand the role of households as both suppliers to firms and buyers of what firms produce.

3.3 Demand in Product/Output Markets p. 78

Understand what determines the position and shape of the demand curve and what factors move you along a demand curve and what factors shift the demand curve.

3.4 Supply in Product/Output Markets p. 88

Be able to distinguish between forces that shift a supply curve and changes that cause a movement along a supply curve.

3.5 Market Equilibrium p. 93

Be able to explain how a market that is not in equilibrium responds to restore an equilibrium.

Demand and Supply in Product Markets: A Review p. 99

Looking Ahead: Markets and the Allocation of Resources p. 101

3.1 LEARNING OBJECTIVE

Understand the roles of firms, entrepreneurs, and households in the market.

firm An organization that comes into being when a person or a group of people decides to produce a good or service to meet a perceived demand.

entrepreneur A person who organizes, manages, and assumes the risks of a firm, taking a new idea or a new product and turning it into a successful business.

households The consuming units in an economy.

Firms and Households: The Basic Decision-Making Units

Throughout this book, we discuss and analyze the behavior of two fundamental decision-making units: *firms*—the primary producing units in an economy—and *households*—the consuming units in an economy. Firms and households are made up of people performing different functions and playing different roles. Economics is concerned with how those people behave, and the interaction among them.

A **firm** exists when a person or a group of people decides to produce a product or products by transforming *inputs*—that is, resources in the broadest sense—into *outputs*, the products that are sold in the market. Some firms produce goods; others produce services. Some are large, many are small, and some are in between. All firms exist to transform resources into goods and services that people want. The Colorado Symphony Orchestra takes labor, land, a building, musically talented people, instruments, and other inputs and combines them to produce concerts. The production process can be extremely complicated. For example, the first flautist in the orchestra combines training, talent, previous performance experience, score, instrument, conductor's interpretation, and personal feelings about the music to produce just one contribution to an overall performance.

Most firms exist to make a profit for their owners, but some do not. Columbia University, for example, fits the description of a firm: It takes inputs in the form of labor, land, skills, books, and buildings and produces a service that we call *education*. Although the university sells that service for a price, it does not exist to make a profit; instead, it exists to provide education and research of the highest quality possible.

Still, most firms exist to make a profit. They engage in production because they can sell their product for more than it costs to produce it. The analysis of a firm's behavior that follows rests on the assumption that *firms make decisions to maximize profits*. Sometimes firms suffer losses instead of earning profits. When firms suffer losses, we will assume that they act to minimize those losses.

When a new firm is created, someone must organize the new firm, arrange financing, hire employees, and take risks. That person is an **entrepreneur**. Sometimes existing firms introduce new products, and sometimes new firms develop or improve on an old idea, but at the root of it all is entrepreneurship.

The consuming units in an economy are **households**. A household may consist of any number of people: a single person living alone, a married couple with four children, or 15 unrelated people sharing a house. Household decisions are based on individual tastes and preferences. The household buys what it wants and can afford. In a large, heterogeneous, and open society such as the United States, wildly different tastes find expression in the marketplace. A six-block walk in any direction on any street in Manhattan or a drive from the Chicago Loop south into rural Illinois should be enough to convince anyone that it is difficult to generalize about what people do and do not like.

Even though households have wide-ranging preferences, they also have some things in common. All—even the very rich—have ultimately limited incomes, and all must pay in some way for the goods and services they consume. Although households may have some control over their incomes—they can work more hours or fewer hours—they are also constrained by the availability of jobs, current wages, their own abilities, and their accumulated and inherited wealth (or lack thereof).

3.2 LEARNING OBJECTIVE

Understand the role of households as both suppliers to firms and buyers of what firms produce.

product or output markets The markets in which goods and services are exchanged.

Input Markets and Output Markets: The Circular Flow

Households and firms interact in two basic kinds of markets: product (or output) markets and input (or factor) markets. Goods and services that are intended for use by households are exchanged in **product or output markets**. In output markets, firms *supply* and households *demand*.

To produce goods and services, firms must buy resources in **input or factor markets**. Firms buy inputs from households, which supply these inputs. When a firm decides how much to produce (supply) in output markets, it must simultaneously decide how much of each input it

needs to produce the desired level of output. To produce smartphones Samsung and Apple need many inputs, including hardware and software and a variety of types of labor, both skilled and unskilled.

Figure 3.1 shows the *circular flow* of economic activity through a simple market economy. Note that the flow reflects the direction in which goods and services flow through input and output markets. For example, real goods and services flow from firms to households through output—or product—markets. Labor services flow from households to firms through input markets. Payment (most often in money form) for goods and services flows in the opposite direction.

In input markets, households *supply* resources. Most households earn their incomes by working—they supply their labor in the **labor market** to firms that demand labor and pay workers for their time and skills. Households may also loan their accumulated or inherited savings to firms for interest or exchange those savings for claims to future profits, as when a household buys shares of stock in a corporation. In the **capital market**, households supply the funds that firms use to buy capital goods. Households may also supply land or other real property in exchange for rent in the **land market**.

Inputs into the production process are also called **factors of production**. Land, labor, and capital are the three key factors of production. Throughout this text, we use the terms *input* and *factor of production* interchangeably. Thus, input markets and factor markets mean the same thing.

The supply of inputs and their prices ultimately determine household income. Thus, the amount of income a household earns depends on the decisions it makes concerning what types of inputs it chooses to supply. Whether to stay in school, how much and what kind of training

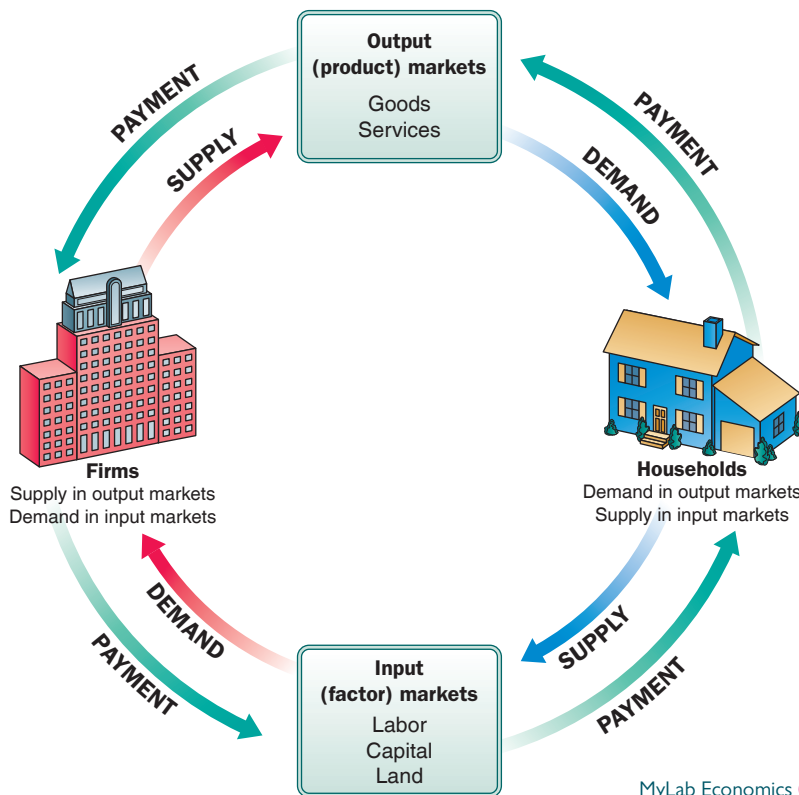
input or factor markets The markets in which the resources used to produce goods and services are exchanged.

labor market The input/factor market in which households supply work for wages to firms that demand labor.

capital market The input/factor market in which households supply their savings, for interest or for claims to future profits, to firms that demand funds to buy capital goods.

land market The input/factor market in which households supply land or other real property in exchange for rent.

factors of production The inputs into the production process. Land, labor, and capital are the three key factors of production.



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▲ FIGURE 3.1 The Circular Flow of Economic Activity

Diagrams like this one show the circular flow of economic activity, hence the name *circular flow diagram*. Here goods and services flow clockwise: Labor services supplied by households flow to firms, and goods and services produced by firms flow to households. Payment (usually money) flows in the opposite (counterclockwise) direction: Payment for goods and services flows from households to firms, and payment for labor services flows from firms to households.

Note: Color Guide—In Figure 3.1 households are depicted in blue and firms are depicted in red. From now on all diagrams relating to the behavior of households will be blue or shades of blue and all diagrams relating to the behavior of firms will be red or shades of red. The green color indicates a monetary flow.

to get, whether to start a business, how many hours to work, whether to work at all, and how to invest savings are all household decisions that affect income.

As you can see:

Input and output markets are connected through the behavior of both firms and households. Firms determine the quantities and character of outputs produced and the types and quantities of inputs demanded. Households determine the types and quantities of products demanded and the quantities and types of inputs supplied.¹

In 2018 a 12-pack of 12 oz. soda costs about \$5, and many of you likely have one somewhere in your dormitory room. What determines the price of that soda? How can I explain how much soda you will buy in a given month or year? By the end of this chapter you will see the way in which prices in the market are determined by the interaction of buyers like you and suppliers like Coca-Cola and Pepsi. The model of supply and demand covered in this chapter is the most powerful tool of economics. By the time you finish this chapter we hope you will look at shopping in a different way.

3.3 LEARNING OBJECTIVE

Understand what determines the position and shape of the demand curve and what factors move you along a demand curve and what factors shift the demand curve.

quantity demanded The amount (number of units) of a product that a household would buy in a given period if it could buy all it wanted at the current market price.

Demand in Product/Output Markets

Every week you make hundreds of decisions about what to buy. Your choices likely look different from those of your friends or your parents. For all of you, however, the decision about what to buy and how much of it to buy ultimately depends on six factors:

- The *price of the product* in question.
- The *income available* to the household.
- The household's *amount of accumulated wealth*.
- The *prices of other products* available to the household.
- The household's *tastes and preferences*.
- The household's *expectations* about future income, wealth, and prices.

Quantity demanded is the amount (number of units) of a product that a household would buy in a given period *if it could buy all it wanted at the current market price*. Of course, the amount of a product that households finally purchase depends on the amount of product actually available in the market. The expression *if it could buy all it wanted* is critical to the definition of quantity demanded because it allows for the possibility that quantity supplied and quantity demanded are unequal.

Changes in Quantity Demanded versus Changes in Demand

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In our list of what determines how much you buy of a product, the price of that product comes first. This is no accident. The most important relationship in individual markets is between market price and quantity demanded. So that is where we will start our work. In fact, we begin by looking at what happens to the quantity a typical individual demands of a product when all that changes is its price. Economists refer to this device as *ceteris paribus*, or “all else equal.” We will be

¹Our description of markets begins with the behavior of firms and households. Modern orthodox economic theory essentially combines two distinct but closely related theories of behavior. The “theory of household behavior,” or “consumer behavior,” has its roots in the works of nineteenth-century utilitarians such as Jeremy Bentham, William Jevons, Carl Menger, Leon Walras, Vilfredo Pareto, and F. Y. Edgeworth. The “theory of the firm” developed out of the earlier classical political economy of Adam Smith, David Ricardo, and Thomas Malthus. In 1890, Alfred Marshall published the first of many editions of his *Principles of Economics*. That volume pulled together the main themes of both the classical economists and the utilitarians into what is now called *neoclassical economics*. Although there have been many changes over the years, the basic structure of the model that we build can be found in Marshall’s work.

looking at the relationship between quantity demanded of a good by an individual or household when its price changes, holding income, wealth, other prices, tastes, and expectations constant. If the price of that 12-pack of soda were cut in half, how many more cases would you buy in a given week?

In thinking about this question it is important to focus on the price change alone and to maintain the all else equal assumption. If next week you suddenly found yourself with more money than you expected (perhaps a windfall from an aunt), you might well find yourself buying an extra 12-pack of soda even if the price did not change at all. To be sure that we distinguish clearly between changes in price and other changes that affect demand, throughout the rest of the text we will be precise about terminology. Specifically:

Changes in the price of a product affect the *quantity demanded* per period. Changes in any other factor, such as income or preferences, affect *demand*. Thus, we say that an increase in the price of Coca-Cola is likely to cause a decrease in the *quantity of Coca-Cola demanded*. However, we say that an increase in income is likely to cause an increase in the *demand* for most goods.

Price and Quantity Demanded: The Law of Demand MyLab Economics Concept Check

A **demand schedule** shows how much of a product a person or household is willing to purchase per time period (each week or each month) at different prices. Clearly that decision is based on numerous interacting factors. Consider Alex who just graduated from college with an entry-level job at a local bank. During her senior year, Alex got a car loan and bought a used Mini Cooper. The Mini gets 25 miles per gallon of gasoline. Alex lives with several friends in a house 10 miles from her workplace and enjoys visiting her parents 50 miles away.

How often Alex will decide to drive herself to work and parties, visit her family, or even go joy riding depends on many things, including her income and whether she likes to drive. But the price of gasoline also plays an important role, and it is this relationship between price and quantity demanded that we focus on in the law of demand. With a gasoline price of \$3.00 a gallon, Alex might decide to drive herself to work every day, visit her parents once a week, and drive another 50 miles a week for other activities. This driving pattern would add up to 250 miles a week, which would use 10 gallons of gasoline in her Mini. The demand schedule in Table 3.1 thus shows that at a price of \$3.00 per gallon, Alex is willing to buy 10 gallons of gasoline. We can see that this demand schedule reflects a lot of information about Alex including where she lives and works and what she likes to do in her spare time.

Now suppose an international crisis in the Middle East causes the price of gasoline at the pump to rise to \$5.00 per gallon. How does this affect Alex's demand for gasoline, assuming that everything else remains the same? Driving is now more expensive, and we would not be surprised if Alex decided to take the bus some mornings or share a ride with friends. She might visit her parents less

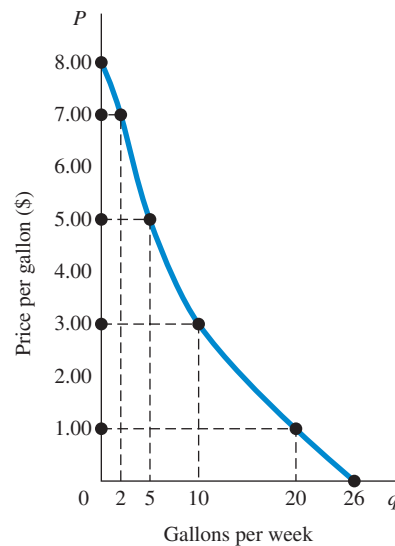
demand schedule Shows how much of a given product a household would be willing to buy at different prices for a given time period.

TABLE 3.1 Alex's Demand Schedule for Gasoline

Price (per Gallon)	Quantity Demanded (Gallons per Week)
\$ 8.00	0
7.00	2
6.00	3
5.00	5
4.00	7
3.00	10
2.00	14
1.00	20
0.00	26

► FIGURE 3.2 Alex's Demand Curve

The relationship between price (P) and quantity demanded (q) presented graphically is called a demand curve. Demand curves have a negative slope, indicating that lower prices cause quantity demanded to increase. Note that Alex's demand curve is blue; demand in product markets is determined by household choice.



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demand curve A graph illustrating how much of a given product a household would be willing to buy at different prices.

law of demand The negative relationship between price and quantity demanded: *Ceteris paribus*, as price rises, quantity demanded decreases; as price falls, quantity demanded increases during a given period of time, all other things remaining constant.

frequently as well. On the demand schedule given in Table 3.1, Alex cuts her desired consumption of gasoline by half to 5 gallons when the price goes to \$5.00. If, instead, the price of gasoline fell substantially, Alex might spend more time driving, and that is in fact the pattern we see in the table. This same information presented graphically is called a **demand curve**. Alex's demand curve is presented in Figure 3.2. You will note in Figure 3.2 that *quantity* (q) is measured along the horizontal axis and *price* (P) is measured along the vertical axis. This is the convention we follow throughout this book.

Demand Curves Slope Downward The data in Table 3.1 show that at lower prices, Alex buys more gasoline; at higher prices, she buys less. Thus, there is a *negative, or inverse, relationship between quantity demanded and price*. When price rises, quantity demanded falls, and when price falls, quantity demanded rises. Thus, demand curves always slope downward. This negative relationship between price and quantity demanded is often referred to as the **law of demand**, a term first used by economist Alfred Marshall in his 1890 textbook.

Some people are put off by the abstraction of demand curves. Of course, we do not actually draw our own demand curves for products. When we want to make a purchase, we usually face only a single price and how much we would buy at other prices is irrelevant. However, demand curves help analysts understand the kind of behavior that households are *likely* to exhibit if they are actually faced with a higher or lower price. We know, for example, that if the price of a good rises enough, the quantity demanded must ultimately drop to zero. The demand curve is thus a tool that helps us explain economic behavior and predict reactions to possible price changes.

Marshall's definition of a social "law" captures the idea:

The term "law" means nothing more than a general proposition or statement of tendencies, more or less certain, more or less definite... a *social law* is a statement of social tendencies; that is, that a certain course of action may be expected from the members of a social group under certain conditions.²

It seems reasonable to expect that consumers will demand more of a product at a lower price and less of it at a higher price. Households must divide their incomes over a wide range of goods and services. At \$3.00 per gallon and 25 miles to a gallon, driving the 20 miles round trip to work costs Alex \$2.40. It may look like a good deal relative to taking a bus. At \$5.00 per gallon, the trip now costs \$4.00. With the higher prices, Alex may have to give up her morning latte if she drives, and that may turn out to be too big a sacrifice for her. Now the bus may look better. As the price of gasoline rises, the opportunity cost of driving in terms of other types of consumption also rises and that is why Alex ends up driving less as the price of gasoline rises. Goods compete with one another for our spending.

²Alfred Marshall, *Principles of Economics*, 8th ed. (New York: Macmillan, 1948), p. 33. (The first edition was published in 1890.)