macroeconomics

A CONTEMPORARY INTRODUCTION 11e

William A. McEachern

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William A. McEachern

University of Connecticut

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Macroeconomics: A Contemporary Introduction, 11e

William A. McEachern

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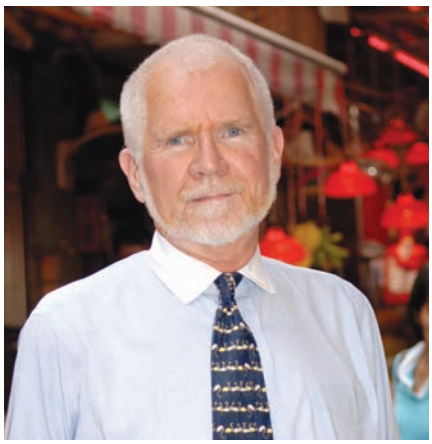
About the Author



Will McEachern started teaching large sections of economic principles shortly after joining the University of Connecticut. Not long after that, he began offering teaching workshops around the country. And Will created *The Teaching Economist*, now in its third decade, a newsletter that focuses on making teaching more effective and more fun.

His research in public finance, public policy, and industrial organization has appeared in a variety of journals, including *Economic Inquiry, National Tax Journal, Journal of Industrial Economics, Quarterly Review of Economics and Finance, Southern Economic Journal,* and *Public Choice*. His books and monographs include *Managerial Control and Performance* (D.C. Heath), *School Finance Reform* (CREUES), and *Tax-Exempt Property and Tax Capitalization in Metropolitan Areas* (CREUES). He has also contributed chapters to edited volumes such as *Rethinking Economic Principles* (Irwin Publishing), *Impact Evaluations of Vertical Restraint Cases* (Federal Trade Commission), *Readings in Public Choice Economics* (University of Michigan Press), and *International Handbook on Teaching and Learning Economics* (Edward Elgar Publishing).

This principles textbook has been translated into Spanish, Chinese, and Bahasa Indonesia, and has been adapted for students in Australia and in India. Will has also written a high school principles textbook, now in its third edition.

Professor McEachern has been quoted in or written for the *Times* of London, *New York Times, Wall Street Journal, Christian Science Monitor, USA Today, Challenge Magazine,* and *Reader's Digest*.

Professor McEachern won the University of Connecticut Alumni Association's Faculty Award for Distinguished Public Service as well as the Association's Faculty Award for Excellence in Undergraduate Teaching. He is the only person in UConn history to be awarded both. He was born in Portsmouth, N.H., earned an undergraduate degree with honors from College of the Holy Cross, served three years as a U.S. Army officer, and earned an M.A. and Ph.D. from the University of Virginia.

To Pat

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Brief Contents

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Preface

Economics has a short history but a long past. As a distinct discipline, economics has been around for only a few hundred years, yet civilizations have confronted the economic problem of scarce resources and unlimited wants for millennia. Economics, the discipline, may be centuries old, but it's new every day, with fresh evidence that refines and extends economic theory. For example, what could be newer than how technological change is reshaping the way we live? In this edition of *Economics: A Contemporary Introduction*, I draw on more than three decades of teaching and research to convey the vitality, timeliness, and relevance of economics.

Lead by Example

Remember the last time you were in unfamiliar parts and had to ask for directions? Along with the directions came the standard comment, "You can't miss it!" So how come you missed it? Because the "landmark," so obvious to locals, was invisible to you, a stranger. Writing a principles textbook is much like giving directions. Familiarity is a must, but that very familiarity can cloud the author's ability to see the material through the fresh eyes of a new student. One could revert to a tell-all approach, but that will bury students in information. An alternative is to opt for the minimalist approach, writing abstractly about good x and good y, units of labor and units of capital, or the proverbial widget. But that shorthand turns economics into a foreign language.

Good directions rely on landmarks familiar to us all—a stoplight, a fork in the road, a white picket fence. Likewise, a good textbook builds bridges from the familiar to the new. That's what I try to do—*lead by example*. By beginning with examples that draw on common experience, I try to create graphic images that need little explanation, thereby eliciting from the reader that light of recognition, that "Aha!" I believe that the shortest distance between an economic principle and student comprehension is a lively example. Examples should convey the point quickly and directly. Having to explain an example is like having to explain a joke—the point gets lost. Throughout the book, I try to provide just enough intuition and institutional detail to get the point across. But my emphasis is on economic ideas, not economic jargon.

Students show up the first day of class with at least 17 years of experience with economic choices, economic institutions, and economic events. Each grew up in a household—the most important economic institution in a market economy. As consumers, students become well acquainted with fast-food outlets, cineplexes, car dealerships, online retailers, and scores of stores at the mall. Most students have supplied labor to the job market—more than half had jobs in high school. Students also have interacted with government—they know about sales taxes, driver's licenses, speed limits, public schools, and laws about texting while driving. And students have a growing familiarity with the rest of the world. Thus, students have abundant experience with economics. This rich lode of personal experience offers a perfect starting point. Rather than try to create for students a new world of economics—a new way of thinking, my approach is to build on student experience—on what Alfred Marshall called "the ordinary business of life." I frequently remind students how much they already know.

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This book starts with what students bring to the party. For example, to explain resource substitution, rather than rely on abstract units of labor and capital, I begin with washing a car, where the mix can vary from a drive-through car wash (much capital and little labor) to a Saturday morning charity car wash (much labor and little capital). Down-to-earth examples turn the abstract into the concrete to help students learn and remember. In this edition of *Macroeconomics: A Contemporary Introduction*, I add about 140 fresh examples to the exposition, bringing the total number of examples to about 300. Because instructors can cover only a portion of a textbook in the classroom, material should be self-contained and self-explanatory. This gives instructors the flexibility to emphasize in class topics of special interest.

What's New With the Eleventh Edition

If there is one overarching theme with this edition, it's the impact of technological change on all aspects of economic life. From Spotify, to smart apps, to Uber, to bitcoin, to interactive learning software, I underscore how technological change is affecting the way we work, learn, play, and live. This edition builds on previous success with additional examples, more questions along the way, and frequent summaries as a chapter unfolds. By making the material both more natural and more personal, I try to engage students in a collaborative discussion. Chapters have been streamlined for a clearer, more intuitive presentation, with fresh examples, new research findings, revised case studies, and additional exhibits to crystallize key points.

Recent research suggests that students learn best by trying to recall what they have just read. In that spirit, I pose "Checkpoint" questions after each section of a chapter. And to help students grasp the material, I also break down each chapter into at least four sections. As with the previous edition, each chapter includes a relevant case study integrated into the narrative flow, not isolated from the mainstream. New with this edition is an additional case study per chapter available on the companion site at www.cengagebrain.com. Questions at the end of each chapter and after each online case study aid student comprehension.

It goes without saying that I revised all data to reflect the most recent figures available. Time-sensitive examples and discussions have also been updated. To make economic principles richer and more interesting, this edition of *Macroeconomics: A Contemporary Introduction* places greater emphasis on recent research. I report on findings from 94 additional studies, nearly all appearing since my previous edition went to press. This brings the total number of studies cited and discussed in this edition to 174. In the following chapter-by-chapter summaries, I will note the number of fresh examples added and the number of new studies reported. I will then sample new material and outline changes to the coverage.

Introductory Chapters: 1–4

As with earlier editions, background material common to both macro- and microeconomics is covered in the first four chapters. Limiting introductory material to four chapters saves precious class time, particularly at those institutions where students may take macro and micro courses in either order (and so must cover introductory chapters twice). New or revised features in the introductory chapters include:

Ch. 1: *The Art and Science of Economic Analysis* I add nine fresh examples and report on three new studies. This chapter provides more detail on the implications of

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rational self-interest. For example, a physician who owns a pharmacy prescribes more medication than other physicians, and a physician who owns a nuclear scanner is seven times more likely to prescribe such a scan.

Ch. 2: *Economic Tools and Economic Systems* I add seven fresh examples and report on four new studies. I note that an economy's productive capacity depends not only on the *state of technology* but also on the *level of know-how.* Know-how can boost production even if technology and resources are unchanged. By improved know-how, a steel minimill, for example, doubled production with no change in technology or the work force. The significance of know-how carries throughout this revision.

Ch. 3: *Economic Decision Makers* I add four fresh examples and report on three new studies. Unlike other principles books, I discuss the role of cooperatives, such as Sunkist, and the not-for-profit sector more generally, such as the Texas Medical Center, which employs more than 100,000 people, exceeding employment at major corporations such as Apple, Google, and Chevron.

Ch. 4: *Demand, Supply, and Markets* I add eight fresh examples and report on two new studies. In explaining the effect of a price change on quantity demanded, I note that the more important the item is as a share of the consumer's budget, the bigger the income effect. That's why, for example, consumers increase other purchases when the price of gasoline plunges, as happened in 2015.

Macroeconomic Chapters: 5–16

Rather than focus on the differences among competing schools of thought, I use the aggregate demand and aggregate supply model to underscore the fundamental distinction between the *active approach*, which views the economy as unstable and in need of government intervention when it gets off track, and the *passive approach*, which views the economy as essentially stable and self-correcting. Again, all macro data have been updated to reflect the most recent figures available. Equilibrium values for real GDP and the price level used in theoretical models throughout the macro chapters match actual values prevailing in the U.S. economy.

Wherever possible, I rely on student experience and intuition to help explain macroeconomic abstractions such as aggregate demand and aggregate supply. For example, to explain how employment can temporarily exceed its natural rate, I note how students, as the term draws to a close, can temporarily shift into a higher gear, studying for exams and finishing term papers. To reinforce the link between income and consumption, I point out how easy it is to figure out the relative income of a neighborhood just by driving through it. And to offer students a feel for the size of the federal budget, I note that if all 4.6 thousand tons of gold stored in Fort Knox could be sold at prevailing prices, the proceeds would run the federal government for about two weeks.

Chapters in this edition follow the same order as in the previous edition. New or revised features in the macroeconomics chapters include:

Ch. 5: *Introduction to Macroeconomics* I add four fresh examples. A new section, "The Global Economy," discusses the interdependence among national economies over the last three decades.

Ch. 6: *Tracking the U.S. Economy* I add five fresh examples and report on a new study. I note that in 2014 the United Kingdom and Italy began counting spending on prostitution and illegal drugs in their GDP estimates. I also add a pie chart showing the composition of the CPI.

Ch. 7: *Unemployment and Inflation* I add six fresh examples and report on 13 new studies. I also add a bar chart showing that the unemployment rate declines as the level of education increases. (But graduating from college is key, because college dropouts have the same unemployment rate as high school graduates.)

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Ch. 8: *Productivity and Growth* I add eight fresh examples and report on 15 new studies. As an example of technological progress, I note that putting an hour of video online cost about $400 in the late 1990s but less than two cents today. To elevate the importance of *social capital*, I move that discussion from the final chapter to this chapter.

Ch. 9: *Aggregate Demand* I add three fresh examples and report on five new studies. I simplify the chapter title from "Aggregate Expenditure and Aggregate Demand," to "Aggregate Demand," to reflect the content and match the title of the next chapter, "Aggregate Supply." I add "The Life-Cycle Hypothesis" as a new section and key term, but include evidence from behavioral economics at odds with this hypothesis.

Ch. 10: *Aggregate Supply* I add two fresh examples and report on a new study. "Hysteresis and the Natural Rate of Unemployment" is a new section, with *hysteresis* as a key term.

Ch. 11: *Fiscal Policy* I add two fresh examples and report on four new studies. "Fiscal Policy from 2007 to 2014" is a new section discussing the effects of federal spending and deficits on jobs and economic growth. This section includes a new exhibit showing deficit financing by year as a share of federal outlays by year. After the spike in federal spending in 2009, that spending remained flat over the next five years even in nominal dollars.

Ch. 12: *Federal Budgets and Public Policy* I add two fresh examples and report on three new studies. I have a new subsection on federal budget *sequestration* and include that as a key term.

Ch. 13: *Money and the Financial System* I add five fresh examples and report on six new studies. An exhibit shows that China is now home to four of the world's five largest banks. While the United States may have some financial institutions considered "too big to fail," only one U.S. bank ranks among the world's ten largest.

Ch. 14: *Banking and the Money Supply* I add three fresh examples and report on two new studies. Two new pie charts now show consumer payment systems in 2013 and projected in 2018. In keeping with an emphasis on technological change, I add a section entitled "Is Bitcoin Money?" examining this digital currency.

Ch. 15: *Monetary Theory and Policy* I add two fresh examples and report on a new study. I say more about quantitative easing and about the Fed's payment of interest on bank reserves held at the Fed.

Ch. 16: *Macro Policy Debate: Active or Passive* I add three fresh examples and report on three new studies. A new section discusses "Active Policies, Passive Policies, and Presidential Politics."

International Chapters: 17–19

This edition reflects the growing impact of the world economy on U.S. economic welfare. International issues are introduced early and discussed often. For example, the rest of the world is introduced in Chapter 1 and profiled in Chapter 3. Comparative advantage and the production possibilities frontier are discussed from a global perspective in Chapter 2. International coverage is woven throughout the text. By comparing the U.S. experience with that of other countries around the world, students gain a better perspective about such topics as unionization trends, antitrust policies, pollution, conservation, environmental laws, research and development, tax rates, the distribution of income, economic growth, productivity, unemployment, inflation, central bank independence, government spending, and federal debt. Exhibits show comparisons across countries of various economic measures—everything from the percentage of paper that gets recycled to public outlays relative to GDP. International references are scattered throughout the book, including a number of relevant case studies.

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Again, every effort is made to give students a feel for the numbers. For example, to convey the importance of U.S. consumers in the world economy, I note that Americans represent less than 5 percent of the world's population but buy 38 percent of the diamond jewelry sold worldwide. New or revised features in the international chapters include:

Ch. 17: *International Trade* I add 12 fresh examples and report on eight new studies. People prefer having a choice of products, and international trade helps broaden that choice. Yet another benefit of international trade is that trading partners are less likely to go to war because war with trading partners would involve more economic loss. *Bilateral agreement, multilateral agreement,* and *common market* are upgraded to key terms.

Ch. 18: *International Finance* I add three fresh examples and report on two new studies. Foreigners find America an attractive place to invest because U.S. capital markets are the deepest and most liquid in the world. Fiscal problems in eurozone nations such as Greece have taken some of the shine off the euro. I note that arbitrage opportunities are short lived; most are available for less than a second. High-speed computers act on such opportunities instantly.

Ch. 19: *Economic Development* I add 12 fresh examples and report on 18 new studies. Education is valued more in some economies than in others. For example, some teachers in Mexico can legally sell their tenured positions or pass them on to their children.

Student-Friendly Features

In some principles textbooks, chapters are broken up by boxed material, qualifying footnotes, and other distractions that disrupt the flow of the material. Students aren't sure when or if they should read such segregated elements. But this book has a natural flow. Each chapter opens with a few off-beat questions and then follows with a logical narrative. Case studies appear in the natural sequence of the chapter. Students can thus read each chapter from the opening questions to the conclusion and summary. I also adhere to a "just-in-time" philosophy, introducing material just as it's needed to build an argument. Footnotes are used to cite sources, not to qualify or extend material in the text.

This edition is more visual than its predecessors, with more exhibits to reinforce key findings. Exhibit titles convey the central points, and more exhibits now have summary captions. Captions have been edited for clarity and brevity. The point is to make the exhibits more self-contained. Students learn more if concepts are presented both in words and in exhibits.

Additional summary paragraphs have been added throughout each chapter; these summaries begin with the bold-faced identifier "**To Review**." As noted earlier, each section now is followed by "Checkpoint" questions. Economic jargon has been reduced. Although the number of terms defined in the margin has increased modestly, definitions have been pared to make them clearer and less like entries from a dictionary. In short, economic principles are now more transparent (a textbook should not be like some giant Easter egg hunt, where it's up to the student to figure out what the author is trying to say). Overall, the eleventh edition is a cleaner presentation, a straighter shot into the student's brain.

Color is used systematically within graphs, charts, and tables to ensure that students can easily see what's going on. Throughout the book, demand curves are blue and supply curves are red. Color shading distinguishes key areas of many graphs, and color identifies outcomes in others. For example, economic profit and welfare gains are always shaded blue and economic loss and welfare losses are always shaded pink. In short, color is more than mere eye candy—it is coordinated consistently and with forethought to help students learn (a dyslexic student once told me she found the book's color guide quite helpful). Students benefit from these visual cues.

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The Support Package

The teaching and learning support package that accompanies *Economics: A Contemporary Introduction* provides instructors and students with focused, accurate, and innovative supplements to the textbook.

Instructor's Manual The *Instructor's Manual* provides chapter outlines, teaching ideas, experiential exercises for many chapters, and solutions to all end-of-chapter problems.

Instructor Resources on the Product Support Web Site. This site at www.cengagebrain.com features the essential resources for instructors, password protected, in downloadable format: the *Instructor's Manual in Word*, the *Teaching Assistance Manual* (discussed next), the online case studies, the test banks, and PowerPoint lecture and exhibit slides.

Teaching Assistance Manual Written and revised by me, the *Teaching Assistance Manual* provides additional support beyond the *Instructor's Manual*. It is especially useful to new instructors, graduate assistants, and teachers interested in generating more class discussion. This manual offers (1) overviews and outlines of each chapter, (2) chapter objectives and quiz material, (3) material for class discussion, (4) topics warranting special attention, (5) supplementary examples, and (6) "What if?" discussion questions. Appendices provide guidance on (1) presenting material; (2) generating and sustaining class discussion; (3) preparing, administering, and grading quizzes; and (4) coping with the special problems confronting foreign graduate assistants.

Test Banks Thoroughly revised for currency and accuracy, the microeconomics and macroeconomics test banks contain over 6,000 questions in multiple-choice and true-false formats. All multiple-choice questions are rated by degree of difficulty, and are labeled with learning outcomes tags.

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- Cross-compatible capability. Import and export content into other systems.

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Microsoft PowerPoint Lecture Slides Lecture slides contain tables and graphs from the textbook, and are intended to enhance lectures and help integrate technology into the classroom.

Microsoft PowerPoint Figure Slides These PowerPoint slides contain key figures from the text. Instructors who prefer to prepare their own lecture slides can use these figures as an alternative to the text's PowerPoint lecture slides.

The Teaching Economist Since 1990, I have edited *The Teaching Economist*, a newsletter aimed at making teaching more interesting and more fun. The newsletter discusses imaginative ways to present topics—for example, how to "sensationalize" economic concepts, useful resources on the Internet, economic applications from science fiction, recent research in teaching and learning, and more generally, ways to teach just for the fun of it. A regular feature of *The Teaching Economist*, "The Grapevine," offers teaching ideas suggested by colleagues from across the country. The latest issue—and back issues—of *The Teaching Economist* are available online at cengage.com/economics/mceachern/theteachingeconomist.

Additional Case Studies Online As mentioned earlier, this edition's companion site now includes an additional case study for each chapter followed by a Checkpoint question. To access this material, log into www.cengagebrain.com, search for McEachern, then find the 11th edition.

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The Art and Science of Economic Analysis

1

Bernd Vogel/AGE Fotostock

- *In what way are people who pound on vending machines relying on theory?*
- *Why are comic-strip and TV characters like those in* FoxTrot, The Simpsons, *and* Family Guy *missing a finger on each hand? And where is* Dilbert's *mouth?*
- *Which college majors pay the most?*
- *Why is a good theory like a California Closet?*
- *What's the big idea with economics?*
- *Finally, how can it be said that in economics "what goes around comes around"?*

These and other questions are answered in this chapter, which introduces the art and science of economic analysis.

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You have been reading and hearing about economic issues for years—unemployment, inflation, poverty, recessions, federal deficits, college tuition, airfares, stock prices, computer prices, smartphone prices, gas prices. When explanations of such issues go into any depth, your eyes may glaze over and you may tune out, the same way you do when a weather forecaster tries to explain high-pressure fronts colliding with moisture carried in from the coast.

What many people fail to realize is that economics is livelier than the dry accounts offered by the news media. Economics is about making choices, and you make economic choices every day—choices about whether to get a part-time job or focus on your studies, live in a dorm or off campus, take a course in accounting or one in history, get married or stay single, pack a lunch or buy a sandwich. You already know much more about economics than you realize. You bring to the subject a rich personal experience, an experience that will be tapped throughout the book to reinforce your understanding of the basic ideas.

Topics discussed in this chapter include:

- The economic problem
- Marginal analysis
- Rational self-interest
- The scientific method
- Normative versus positive analysis
- Some pitfalls of economic thinking

1-1 The Economic Problem: Scarce Resources, Unlimited Wants

Would you like a new car, a nicer home, a smarter phone, tastier meals, more free time, a more interesting social life, more spending money, more leisure, more sleep? Who wouldn't? But even if you can satisfy some of these desires, others keep popping up. *The problem is that, although your wants, or desires, are virtually unlimited, the resources available to satisfy these wants are scarce.* A resource is *scarce* when it is not freely available—that is, when its price exceeds zero. Because resources are scarce, you must choose from among your many wants, and whenever you choose, you must forgo satisfying some other wants. The problem of scarce resources but unlimited wants exists to a greater or lesser extent for each of the 7.4 billion people on Earth. Everybody—cab driver, farmer, brain surgeon, dictator, shepherd, student, politician—faces the problem. For example, a cab driver uses time and other scarce resources, such as the taxi, knowledge of the city, driving skills, and gasoline, to earn income. That income, in turn, buys housing, groceries, clothing, trips to Disney World, and thousands of other goods and services that help satisfy some of the driver's unlimited wants. **Economics** examines how people use their scarce resources to satisfy their unlimited wants. Let's pick apart

economics
The study of how people use their scarce resources to satisfy their unlimited wants

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the definition, beginning with resources, then goods and services, and finally focus on the heart of the matter—economic choice, which results from scarcity.

1-1a Resources

Resources are the inputs, or factors of production, used to produce the goods and services that people want. *Goods and services are scarce because resources are scarce.* Resources sort into four broad categories: labor, capital, natural resources, and entrepreneurial ability. **Labor** is human effort, both physical and mental. Labor includes the effort of the cab driver and the brain surgeon. Labor itself comes from a more fundamental resource: *time*. Without time we can accomplish nothing. We allocate our time to alternative uses: We can *sell* our time as labor, or we can *spend* our time doing other things, like sleeping, eating, studying, playing sports, going online, attending class, watching TV, or just relaxing with friends.

Capital includes all human creations used to produce goods and services. Economists often distinguish between physical capital and human capital. *Physical capital* consists of factories, tools, machines, computers, buildings, airports, highways, and other human creations used to produce goods and services. Physical capital includes the cab driver's taxi, the surgeon's scalpel, and the building where your economics class meets (or, if you are taking this course online, your computer and online connectors). *Human capital* consists of the knowledge and skill people acquire to increase their productivity, such as the cab driver's knowledge of city streets, the surgeon's knowledge of human anatomy, and your knowledge of economics.

Natural resources include all *gifts of nature,* such as bodies of water, trees, oil reserves, minerals, even animals. Natural resources can be divided into renewable resources and exhaustible resources. A *renewable resource* can be drawn on indefinitely if used conservatively. Thus, timber is a renewable resource if felled trees are replaced to regrow a steady supply. The air and rivers are renewable resources if they are allowed sufficient time to cleanse themselves of any pollutants. More generally, biological resources such as fish, game, livestock, forests, rivers, groundwater, grasslands, and soil are renewable if managed properly. An *exhaustible resource*—such as oil or coal—does not renew itself and so is available in a limited amount. Once burned, each barrel of oil or ton of coal is gone forever. The world's oil and coal deposits are exhaustible.

A special kind of human skill called **entrepreneurial ability** is the talent required to dream up a new product or find a better way to produce an existing one, organize production, and assume the risk of profit or loss. This special skill comes from an entrepreneur. An **entrepreneur** is a profit-seeking decision maker who starts with an idea, organizes an enterprise to bring that idea to life, and then assumes the risk of operation. An entrepreneur pays resource owners for the opportunity to employ their resources in the firm. Every firm in the world today, such as Ford, Microsoft, Google, and Facebook, began as an idea in the mind of an entrepreneur.

Resource owners are paid **wages** for their labor, **interest** for the use of their capital, and **rent** for the use of their natural resources. Entrepreneurial ability is rewarded by **profit**, which equals the *revenue* from items sold minus the *cost* of the resources employed to make those items. Sometimes the entrepreneur suffers a loss. Resource earnings are usually based on the *time* these resources are employed. Resource payments therefore have a time dimension, as in a wage of $10 *per hour,* interest of 6 percent *per year,* rent of $600 *per month,* or profit of $10,000 *per year.*

resources
The inputs, or factors of production, used to produce the goods and services that people want; consist of labor, capital, natural resources, and entrepreneurial ability

labor
The physical and mental effort used to produce goods and services

capital
The buildings, equipment, and human skills used to produce goods and services

natural resources
All gifts of nature used to produce goods and services; includes renewable and exhaustible resources

entrepreneurial ability
The imagination required to develop a new product or process, the skill needed to organize production, and the willingness to take the risk of profit or loss

entrepreneur
A profit-seeking decision maker who starts with an idea, organizes an enterprise to bring that idea to life, and assumes the risk of the operation

wages
Payment to resource owners for their labor

interest
Payment to resource owners for the use of their capital

rent
Payment to resource owners for the use of their natural resources

profit
Reward for entrepreneurial ability; sales revenue minus resource cost

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1-1b Goods and Services

Resources are combined in a variety of ways to produce goods and services. A farmer, a tractor, 50 acres of land, seeds, and fertilizer combine to grow the good: corn. One hundred musicians, musical instruments, chairs, a conductor, a musical score, and a music hall combine to produce the service: Beethoven's *Fifth Symphony*. Corn is a **good** because it is something you can see, feel, and touch; it requires scarce resources to produce; and it satisfies human wants. The book you are now holding, the chair you are sitting in, the clothes you are wearing, and your next meal are all goods. The performance of the *Fifth Symphony* is a **service** because it is intangible, yet it uses scarce resources to satisfy human wants. Lectures, movies, concerts, phone service, wireless connections, yoga lessons, dry cleaning, and haircuts are all services.

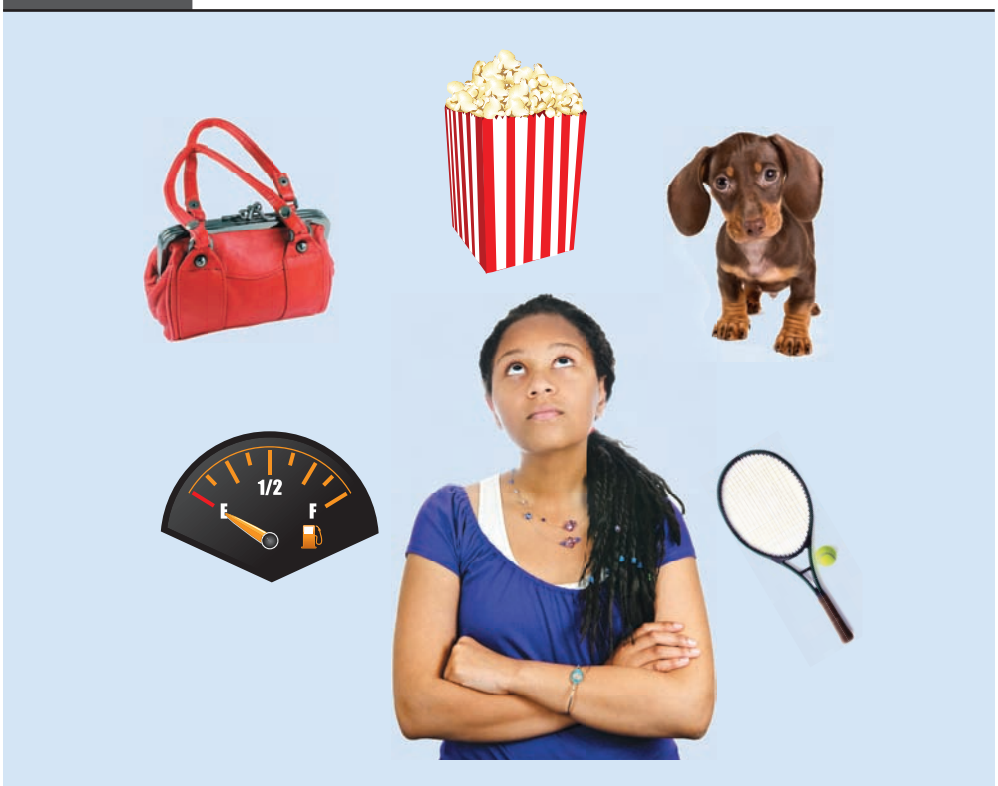
good
A tangible product used to satisfy human wants

service
An activity, or intangible product, used to satisfy human wants

Because goods and services are produced using scarce resources, they are themselves scarce. *A good or service is scarce if the amount people desire exceeds the amount available at a zero price.* Because we cannot have all the goods and services we would like, we must continually choose among them. We must choose among more pleasant living quarters, better meals, nicer clothes, more reliable transportation, faster computers, smarter phones, and so on. Making choices in a world of **scarcity** means we must pass up some goods and services. Exhibit 1 shows the options of one individual facing scarcity. But not everything is scarce. In fact, some things we would prefer to have less of. For example, we would prefer to have less garbage, less spam email, fewer telemarketing calls, and less pollution. Things we want none of even at a zero price are called *bads*, the opposite of goods.

scarcity
Occurs when the amount people desire exceeds the amount available at a zero price

EXHIBIT 1 Scarcity Means You Must Choose Among Options



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A few goods and services seem *free* because the amount available at a zero price exceeds the amount people want. For example, air and seawater often seem free because we can breathe all the air we want and have all the seawater we can haul away. Yet, despite the old saying "The best things in life are free," most goods and services are scarce, not free, and even those that appear to be free come with strings attached. For example, *clean* air and *clean* seawater have become scarce. *Goods and services that are truly free are not the subject of economics. Without scarcity, there would be no economic problem and no need for prices.*

Sometimes we mistakenly think of certain goods as free because they involve no apparent cost to us. Napkins seem to be free at Starbucks. Nobody stops you from taking a fistful. Supplying napkins, however, costs the company millions each year and prices reflect that cost. Some restaurants make special efforts to keep napkin use down—such as packing them tightly into the dispenser or making you ask for them. And Starbucks recently reduced the thickness of its napkins.

You may have heard the expression "There is no such thing as a free lunch." *There is no free lunch because all goods and services involve a cost to someone.* The lunch may seem free to you, but it draws scarce resources away from the production of other goods and services, and whoever provides a free lunch often expects something in return. A Russian proverb makes a similar point but with a bit more bite: "The only place you find free cheese is in a mousetrap." Albert Einstein once observed, "Sometimes one pays the most for things one gets for nothing."

1-1c Economic Decision Makers and Markets

There are four types of decision makers in the economy: households, firms, governments, and the rest of the world. Their interaction determines how an economy's resources are allocated. *Households* play the starring role. As consumers, households demand the goods and services produced. As resource owners, households supply labor, capital, natural resources, and entrepreneurial ability to firms, governments, and the rest of the world. *Firms, governments,* and *the rest of the world* demand the resources that households supply and then use these resources to supply the goods and services that households demand. The rest of the world includes foreign households, foreign firms, and foreign governments that supply resources and products to U.S. demanders and demand resources and products from U.S. suppliers.

Markets are the means by which buyers and sellers carry out exchange at mutually agreeable terms. By bringing together the two sides of exchange, markets determine price, quantity, and quality. Markets are often physical places, such as supermarkets, department stores, shopping malls, yard sales, flea markets, and swap meets. But markets also include other mechanisms by which buyers and sellers communicate, such as classified ads, radio and television ads, telephones, bulletin boards, online sites, and face-to-face bargaining. These market mechanisms provide information about the quantity, quality, and price of products offered for sale. Goods and services are bought and sold in **product markets**. Resources are bought and sold in **resource markets**. The most important resource market is the labor, or job, market. Think about your own experience looking for a job, and you'll already have some idea of that market.

market
A set of arrangements by which buyers and sellers carry out exchange at mutually agreeable terms

product market
A market in which a good or service is bought and sold

resource market
A market in which a resource is bought and sold

1-1d A Simple Circular-Flow Model

Now that you have learned a bit about economic decision makers and markets, consider how all these interact. Such a picture is conveyed by the **circular-flow model**, which describes the flow of resources, products, income, and revenue among economic

circular-flow model
A diagram that traces the flow of resources, products, income, and revenue among economic decision makers

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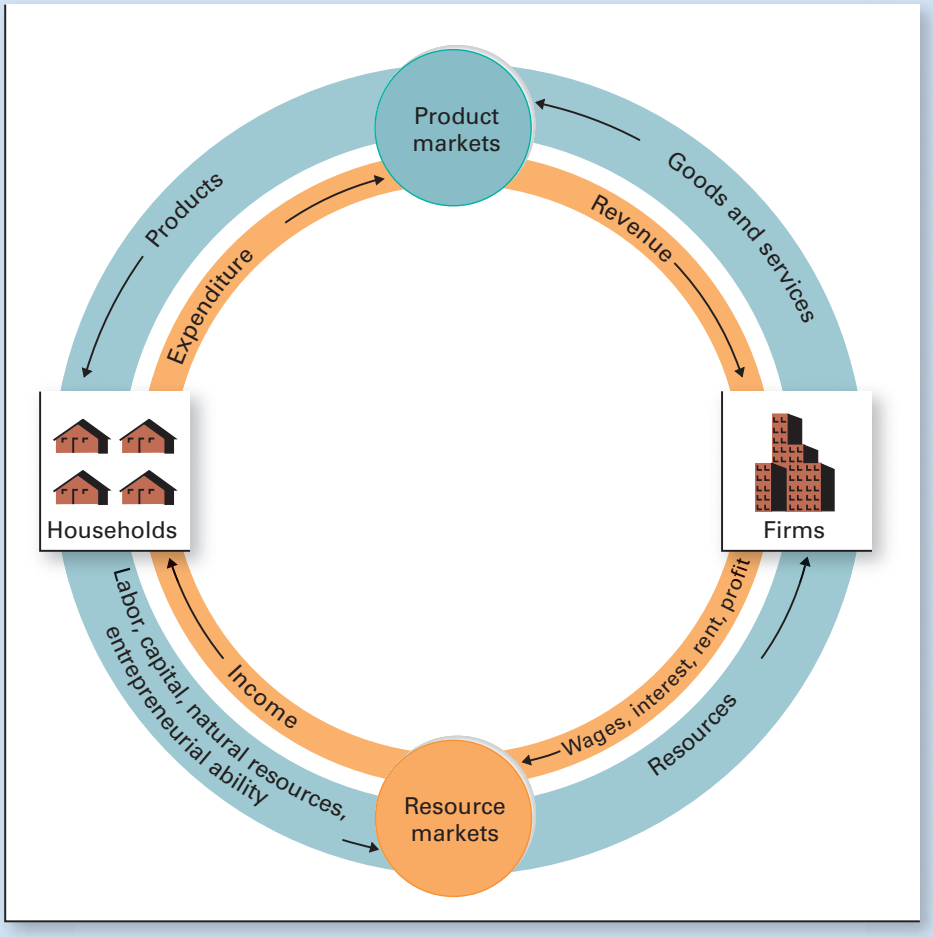
decision makers. The simple circular-flow model focuses on the primary interaction in a market economy—that between households and firms. Exhibit 2 shows households on the left and firms on the right; please take a look.

Households supply labor, capital, natural resources, and entrepreneurial ability to firms through resource markets, shown in the lower portion of the exhibit. In return, households demand goods and services from firms through product markets, shown on the upper portion of the exhibit. Viewed from the business end, firms demand labor, capital, natural resources, and entrepreneurial ability from households through resource markets, and firms supply goods and services to households through product markets.

The flows of resources and products are supported by the flows of income and expenditure—that is, by the flow of money. So let's add money. The demand and supply of resources come together in resource markets to determine what firms pay for

EXHIBIT 2 **The Simple Circular-Flow Model for Households and Firms**



Households earn income by supplying resources to resource markets, as shown in the lower portion of the model. Firms demand these resources to produce goods and services, which they supply to product markets, as shown in the upper portion of the model. Households spend their income to demand these goods and services. This spending flows through product markets as revenue to firms.

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resources. These resource prices—wages, interest, rent, and profit—flow as *income* to households. The demand and supply of products come together in product markets to determine what households pay for goods and services. This *expenditure* on goods and services flows as *revenue* to firms. Resources and products flow in one direction—in this case, counterclockwise—and the corresponding payments flow in the other direction—clockwise. What goes around comes around. Take a little time now to trace the logic of the circular flows.

CHECKPOINT

Identify and describe the movement of resources and products through the circular-flow model.

1-2 The Art of Economic Analysis

An economy results as millions of individuals attempt to satisfy their unlimited wants. Because their choices lie at the heart of the economic problem—coping with scarce resources but unlimited wants—these choices deserve a closer look. Learning about the forces that shape economic choices is the first step toward understanding the art of economic analysis.

1-2a Rational Self-Interest

A key economic assumption is that individuals, in making choices, rationally select what they perceive to be in their best interests. By *rational,* economists mean simply that people try to make the best choices they can, given the available time and information. People may not know with certainty which alternative will turn out to be the best. They simply select the alternatives they *expect* will yield the most satisfaction and happiness. In general, **rational self-interest** means that each individual tries to maximize the expected benefit achieved with a given cost or to minimize the expected cost of achieving a given benefit. Thus, economists begin with the assumption that people look out for their self-interest. For example, a physician who owns a pharmacy prescribes 8 percent more drugs on average than a physician who does not own a pharmacy.[1] A physician who owns a nuclear scanner (used to look inside the human body) is seven times more likely to recommend a scan than a physician who does not own a nuclear scanner.[2] And as one more example of self-interest, the *USA Today* weekly football poll asks coaches to list the top 25 teams in the country. It is no surprise that coaches distort their selections to favor their own teams and their own conferences. And, to make their own records look better, coaches inflate the rankings of teams they have beaten.[3]

rational self-interest
Each individual tries to maximize the expected benefit achieved with a given cost or to minimize the expected cost of achieving a given benefit

Rational self-interest should not necessarily be viewed as blind materialism, pure selfishness, or greed. We all know people who are tuned to radio station WIIFM (What's In It For Me?). For most of us, however, self-interest often includes the welfare of our family, our friends, and perhaps the poor of the world. Even so, our concern for others

1. Brian Chen, Paul Gertler, and Chuh-Yuh Yang, "Moral Hazard and Economies of Scope in Physician Ownership of Complementary Medical Services," NBER Working Paper No. 19622 (November 2013).
2. Sandeep Jouhar, *Doctored: The Disillusionment of an American Physician* (Farrar, Straus, and Giroux, 2014), p. 96.
3. Matthew Kotchen and Matthew Potoski, "Conflicts of Interest Distort Public Evaluations: Evidence from the Top 25 Ballots of NCAA Football Coaches," *Journal of Economic Behavior & Organization*, 107 (November 2014): 51–63.

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is influenced by our personal cost of that concern. We may readily volunteer to drive a friend to the airport on Saturday afternoon but are less likely to offer a ride if the flight leaves at 6:00 A.M. When we donate clothes to an organization such as Goodwill Industries, they are more likely to be old and worn than brand new. People tend to give more to charities when their contributions are tax deductible and when contributions garner social approval in the community (as when contributor names are made public or when big donors get buildings named after them).[4] Managers donate more company funds to charitable causes when they own less of the company (and, thus, when their personal cost of contributing is lower).[5] TV stations are more likely to donate airtime for public-service announcements during the dead of night than during prime time (which is why 80 percent of such announcements air between 11:00 P.M. and 7:00 A.M.). In Asia some people burn money to soothe the passage of a departed loved one. But they burn fake money, not real money.

The notion of self-interest does not rule out concern for others; it simply means that concern for others is influenced by the same economic forces that affect other economic choices. *The lower the personal cost of helping others, the more help we offer*. We don't like to think that our behavior reflects our self-interest, but it usually does. As Jane Austen wrote in *Pride and Prejudice*, "I have been a selfish being all my life, in practice, though not in principle."

1-2b Choice Requires Time and Information

Rational choice takes time and requires information, but time and information are themselves scarce and therefore valuable. If you have any doubts about the time and information needed to make choices, talk to someone who recently purchased a home, a car, or a personal computer. Talk to a corporate official trying to decide whether to introduce a new product, sell online, build a new factory, or buy another firm. Or think back to your own experience in choosing a college. You probably talked to friends, relatives, teachers, and guidance counselors. You likely used school catalogs, college guides, and Web sites. You may have even visited some campuses to meet the admissions staff and anyone else willing to talk. The decision took time and money, and it probably involved aggravation and anxiety.

Because information is costly to acquire, we are often willing to pay others to gather and digest it for us. College guidebooks, stock analysts, travel agents, real estate brokers, career counselors, restaurant critics, movie reviewers, specialized Web sites, and *Consumer Reports* magazine attest to our willingness to pay for information that improves our choices. As we'll see next, *rational decision makers continue to acquire information as long as the additional benefit expected from that information exceeds the additional cost of gathering it*.

1-2c Economic Analysis Is Marginal Analysis

Economic choice usually involves some adjustment to the existing situation, or status quo. Amazon.com must decide whether to add a new line of products. The school superintendent must decide whether to hire another teacher. Your favorite jeans are on sale, and you must decide whether to buy another pair. You are wondering whether to carry an extra course next term. You just finished lunch and are deciding whether to order dessert.

4. Dean Karlan and Margaret McConnell, "Hey Look at Me: The Effect of Giving Circles on Giving," *Journal of Economic Behavior & Organization* (forthcoming).
5. Ing-Haw Cheng, Harrison Hong, and Kelly Shue, "Do Managers Do Good with Other People's Money?" NBER Working Paper No. 19432 (September 2013).

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Economic choice is based on a comparison of the *expected marginal benefit* and the *expected marginal cost* of the action under consideration. **Marginal** means incremental, additional, or extra. Marginal refers to a change in an economic variable, a change in the status quo. *A rational decision maker changes the status quo if the expected marginal benefit from the change exceeds the expected marginal cost.* For example, Amazon.com compares the marginal benefit expected from adding a new line of products (the additional sales revenue) with the marginal cost (the additional cost of the resources required). Likewise, you compare the marginal benefit you expect from eating dessert (the additional pleasure or satisfaction) with its marginal cost (the additional money, time, and calories).

marginal
Incremental, additional, or extra; used to describe a change in an economic variable

Typically, the change under consideration is small, but a marginal choice can involve a major economic adjustment, as in the decision to quit school and find a job. For a firm, a marginal choice might mean building a plant in Mexico or even filing for bankruptcy. By focusing on the effect of a marginal adjustment to the status quo, the economist is able to cut the analysis of economic choice down to a manageable size. Rather than confront a bewildering economic reality head-on, the economist begins with a marginal choice to see how this choice affects a particular market and shapes the economic system as a whole. Incidentally, to the noneconomist, *marginal* usually means relatively inferior, as in "a movie of marginal quality." Forget that meaning for this course and instead think of *marginal* as meaning incremental, additional, or extra.

1-2d Microeconomics and Macroeconomics

Although you have made thousands of economic choices, you probably seldom think about your own economic behavior. For example, why are you reading this book right now rather than doing something else? **Microeconomics** is the study of your economic behavior and the economic behavior of others who make choices about such matters as how much to study and how much to party, how much to borrow and how much to save, what to buy and what to sell. Microeconomics examines individual economic choices and how markets coordinate the choices of various decision makers. Microeconomics explains how price and quantity are determined in individual markets—the market for breakfast cereal, sports equipment, or used cars, for instance.

microeconomics
The study of the economic behavior in particular markets, such as that for computers or unskilled labor

You have probably given little thought to what influences your own economic choices. You have likely given even less thought to how your choices link up with those made by millions of others in the U.S. economy to determine economy-wide measures such as total production, employment, and economic growth. **Macroeconomics** studies the performance of the economy as a whole. Whereas microeconomics studies the individual pieces of the economic puzzle, as reflected in particular markets, macroeconomics puts all the pieces together to focus on the big picture. Macroeconomics sees the forest, not the trees; the beach, not the grains of sand; and the Rose Bowl parade float, not the individual flowers that shape and color that float.

macroeconomics
The study of the economic behavior of entire economies, as measured, for example, by total production and employment

The national economy usually grows over time, but along the way it sometimes stumbles, experiencing *recessions* in economic activity, as reflected by a decline in production, employment, and other aggregate measures. **Economic fluctuations** are the rise and fall of economic activity relative to the long-term growth trend of the economy. These fluctuations, or *business cycles,* vary in length and intensity, but they usually involve the entire nation and often other nations too. For example, the U.S. economy now produces more than four times as much as it did in 1960, despite experiencing eight recessions since then, including the Great Recession of 2007–2009.

economic fluctuations
The rise and fall of economic activity relative to the long-term growth trend of the economy; also called business cycles

To Review: The art of economic analysis focuses on how people use their scarce resources in an attempt to satisfy their unlimited wants. Rational self-interest guides individual choice. Choice requires time and information and involves a comparison of

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the expected marginal benefit and the expected marginal cost of alternative actions. Microeconomics looks at the individual pieces of the economic puzzle; macroeconomics fits the pieces together to form the big picture.

CHECKPOINT

What two measures are compared when making an economic choice?

1-3 The Science of Economic Analysis

economic theory, or economic model
A simplification of reality used to make predictions about cause and effect in the real world

Economists use scientific analysis to develop theories, or models, that help explain economic behavior. An **economic theory**, or **economic model**, is a simplification of economic reality that *is used to make predictions about cause and effect in the real world.* A theory, or model, such as the circular-flow model, captures the important elements of the problem under study but need not spell out every detail and interrelation. In fact, adding more details may make a theory more unwieldy and, therefore, less useful. For example, a wristwatch is a model that tells time, but a watch festooned with extra features is harder to read at a glance and is therefore less useful as a time-telling model. The world is so complex that we must simplify it to make sense of things. Store mannequins simplify the human form (some even lack arms and heads). Comic strips and cartoons simplify a character's anatomy—leaving out fingers (in the case of *FoxTrot*, *The Simpsons*, and *Family Guy*) or a mouth (in the case of *Dilbert*), for instance. You might think of economic theory as a stripped-down, or streamlined, version of economic reality.

A good theory helps us understand a messy and confusing world. Lacking a theory of how things work, our thinking can become cluttered with facts, one piled on another, as in a messy closet. You could think of a good theory as a closet organizer for the mind, similar to the organizing service offered by California Closets. A good theory offers a helpful guide to sorting, saving, and understanding information.


Siri Stafford/Getty Images

1-3a The Role of Theory

Most people don't understand the role of theory. Perhaps you have heard, "Oh, that's fine in theory, but in practice it's another matter." The implication is that the theory in question provides little aid in practical matters. People who say this fail to realize that they are merely substituting their own theory for a theory they either do not believe or do not understand. They are really saying, "I have my own theory that works better."

All of us employ theories, however poorly defined or understood. Someone who pounds on the Pepsi machine that just ate a quarter has a crude theory about how that machine works. One version of that theory might be, "The quarter drops through a series of *whatchamacallits,* but sometimes it gets stuck. *If* I pound on the machine, *then* I can free up the quarter and send it on its way." Evidently, this theory is widespread enough that people continue to pound on machines that fail to perform (a real problem for the vending machine industry and one reason newer machines are fronted with glass). Yet, if you were to ask these mad pounders to explain their "theory" about how the machine works, they would look at you as if you were crazy.

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1-3b The Scientific Method

To study economic problems, economists employ a process called the *scientific method*, which consists of four steps, as outlined in Exhibit 3.

Step One: Identify the Question and Define Relevant Variables

The scientific method begins with curiosity: Someone wants to answer a question. Thus, the first step is to identify the economic question and define the variables relevant to a solution. For example, the question might be, "What is the relationship between the price of Pepsi and the quantity of Pepsi purchased?" In this case, the relevant variables are price and quantity. A **variable** is a measure that can take on different values at different times. The variables of concern become the elements of the theory, so they must be selected with care.

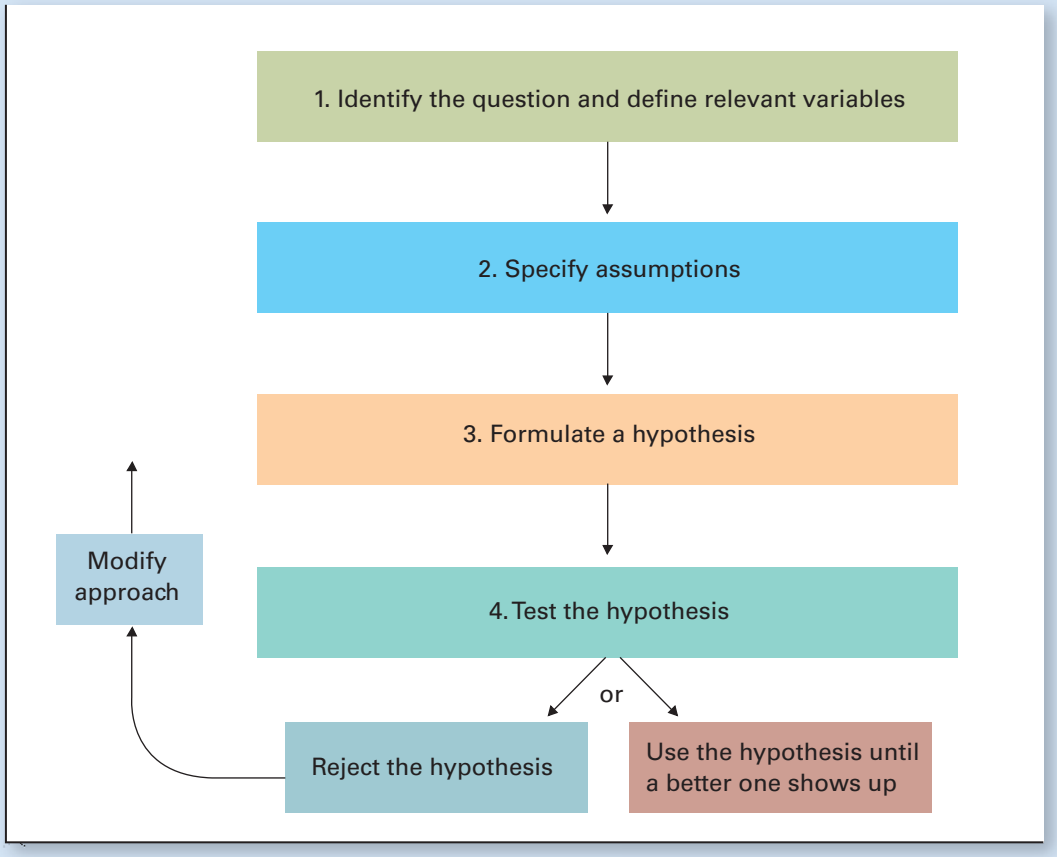
variable
A measure, such as price or quantity, that can take on different values at different times

other-things-constant assumption
The assumption, when focusing on the relation among key economic variables, that other variables remain unchanged; in Latin, *ceteris paribus*

Step Two: Specify Assumptions

The second step is to specify the assumptions under which the theory is to apply. One major category of assumptions is the **other-things-constant assumption**—in Latin, the

EXHIBIT 3 The Scientific Method: Step by Step



The steps of the scientific method are designed to develop and test hypotheses about how the world works. The objective is a theory that predicts outcomes more accurately than the best alternative theory.

A hypothesis is rejected if it does not predict as accurately as the best alternative. A rejected hypothesis can be modified or reworked in light of the test results.

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ceteris paribus assumption. The idea is to identify the variables of interest and then focus exclusively on the relationships among them, assuming that nothing else important changes—that other things remain constant. Again, suppose we are interested in how the price of Pepsi influences the amount purchased. To isolate the relation between these two variables, we assume that there are no changes in other relevant variables such as consumer income, the average daytime temperature, or the price of Coke.

behavioral assumption
An assumption that describes the expected behavior of economic decision makers—what motivates them

We also make assumptions about how people behave; these are called **behavioral assumptions**. The primary behavioral assumption is rational self-interest. Earlier we assumed that each decision maker pursues self-interest rationally and makes choices accordingly. Rationality implies that each consumer buys the products expected to maximize his or her level of satisfaction. Rationality also implies that each firm supplies the products expected to maximize the firm's profit. These kinds of assumptions are called behavioral assumptions because they specify how we expect economic decision makers to behave—what makes them tick, so to speak.

Step Three: Formulate a Hypothesis

hypothesis
A theory about how key variables relate

The third step in the scientific method is to formulate a **hypothesis**, which is a theory about how key variables relate to each other. For example, one hypothesis holds that if the price of Pepsi goes up, other things constant, then the quantity purchased declines. The hypothesis becomes a prediction of what happens to the quantity purchased if the price increases. *The purpose of this hypothesis, like that of any theory, is to help make predictions about cause and effect in the real world.*

Step Four: Test the Hypothesis

In the fourth step, by comparing its predictions with evidence, we test the validity of a hypothesis. To test a hypothesis, we must focus on the variables in question, while carefully controlling for other effects assumed not to change. The test leads us either to (1) reject the hypothesis, or theory, if it predicts worse than the best alternative theory or (2) use the hypothesis, or theory, until a better one comes along. If we reject the hypothesis, we can try to go back and modify our approach in light of the results. Please spend a moment now reviewing the steps of the scientific method in Exhibit 3.

1-3c Normative Versus Positive

Economists usually try to explain how the economy works. Sometimes they concern themselves not with how the economy *does* work but how it *should* work. Compare these two statements: "The U.S. unemployment rate is 5.6 percent," and "The U.S. unemployment rate should be lower." The first, called a **positive economic statement**, is an assertion about economic reality that can be supported or rejected by reference to the facts. Positive economics, like physics or biology, attempts to understand the world around us as it is. The second, called a **normative economic statement**, reflects an opinion. And an opinion is merely that—it cannot be shown to be true or false by reference to the facts. Positive statements concern what *is;* normative statements concern what, in someone's opinion, *should be*. Positive statements need not necessarily be true, but they must be subject to verification or refutation by reference to the facts. Theories are expressed as positive statements such as "If the price of Pepsi increases, then the quantity demanded decreases."

positive economic statement
A statement that can be proved or disproved by reference to facts

normative economic statement
A statement that reflects an opinion, which cannot be proved or disproved by reference to the facts

Most of the disagreement among economists involves normative debates—such as the appropriate role of government—rather than statements of positive analysis. To be sure, many theoretical issues remain unresolved, but economists generally agree on most fundamental theoretical principles—that is, about positive economic analysis. For example, in a survey of 464 U.S. economists, only 6.5 percent disagreed with the statement "A ceiling on rents reduces the quantity and quality of housing available." This is a positive statement

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because it can be shown to be consistent or inconsistent with the evidence. In contrast, there was much less agreement on normative statements such as "The distribution of income in the United States should be more equal." Half the economists surveyed "generally agreed," a quarter "generally disagreed," and a quarter "agreed with provisos."[6]

Normative statements, or value judgments, have a place in a policy debate such as the proper role of government, provided that statements of opinion are distinguished from statements of fact. In such policy debates, you are entitled to your own opinion, but you are not entitled to your own facts.

1-3d Economists Tell Stories

Despite economists' reliance on the scientific method for developing and evaluating theories, economic analysis is as much art as science. Formulating a question, isolating the key variables, specifying the assumptions, proposing a theory to answer the question, and devising a way to test the predictions all involve more than simply an understanding of economics and the scientific method. Carrying out these steps requires good intuition and the imagination of a storyteller. Economists explain their theories by telling stories about how they think the economy works. To tell a compelling story, an economist relies on case studies, anecdotes, parables, the personal experience of the listener, and supporting data. Throughout this book, you'll hear stories that bring you closer to the ideas under consideration. These stories, such as the one about the Pepsi machine, breathe life into economic theory and help you personalize abstract ideas.

1-3e Predicting Average Behavior

Economic theory is used to predict the impact of an economic event on economic choices and, in turn, the effect of these choices on particular markets or on the economy as a whole. Does this mean that economists try to predict the behavior of particular consumers or producers? Not necessarily, because a specific individual may behave in an unpredictable way. But the unpredictable actions of numerous individuals tend to cancel one another out, so the *average behavior* of groups can be predicted more accurately. For example, if the federal government cuts personal income taxes, certain households might save the entire tax cut. On average, however, household spending would increase. Likewise, if Burger King cuts the price of Whoppers, the manager can better predict how much sales will increase than how a specific customer coming through the door will respond. *The random actions of individuals tend to offset one another, so the average behavior of a large group can be predicted more accurately than the behavior of a particular individual.* Consequently, economists tend to focus on the average, or typical, behavior of people in groups—for example, as average taxpayers or average Whopper consumers—rather than on the behavior of a specific individual.

1-3f Some Pitfalls of Faulty Economic Analysis

Economic analysis, like other forms of scientific inquiry, is subject to common mistakes in reasoning that can lead to faulty conclusions. Here are three sources of confusion.

The Fallacy That Association Is Causation

In the past two decades, the number of physicians specializing in cancer treatment increased sharply. At the same time, the incidence of some cancers increased. Can we

[6] Richard M. Alston et al. "Is There a Consensus among Economists in the 1990s?" *American Economic Review*, 82 (May 1992): 203–209, Table 1.

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conclude that physicians cause cancer? No. To assume that event A caused event B simply because the two are associated in time is to commit the **association-is-causation fallacy**, a common error. The fact that one event precedes another or that the two events occur simultaneously does not necessarily mean that one causes the other. Remember: Association is not necessarily causation.

association-is-causation fallacy
The incorrect idea that if two variables are associated in time, one must necessarily cause the other

The Fallacy of Composition

Perhaps you have been to a rock concert where everyone stands to get a better view. At some concerts, most people even stand on their chairs. But even standing on chairs does not improve your view if others do the same, unless you are quite tall. Likewise, arriving early to buy concert tickets does not work if many have the same idea. Earning a college degree to get a better job does not work as well if everyone earns a college degree. These are examples of the **fallacy of composition**, which is an erroneous belief that what is true for the individual, or the part, is also true for the group, or the whole.

fallacy of composition
The incorrect belief that what is true for the individual, or part, must necessarily be true for the group, or the whole

The Mistake of Ignoring the Secondary Effects

In many cities, public officials have imposed rent controls on apartments. The primary effect of this policy, the effect policy makers focus on, is to keep rents from rising. Over time, however, fewer new apartments get built because renting them becomes less profitable. Moreover, existing rental units deteriorate because owners have plenty of customers anyway. Thus, the quantity and quality of housing may decline as a result of what appears to be a reasonable measure to keep rents from rising. The mistake was to ignore the **secondary effects**, or the unintended consequences, of the policy. Economic actions have secondary effects that often turn out to be more important than the primary effects. Secondary effects may develop more slowly and may not be immediately obvious, but good economic analysis tries to anticipate them and take them into account.

secondary effects
Unintended consequences of economic actions that may develop slowly over time as people react to events

1-3g If Economists Are So Smart, Why Aren't They Rich?

Why aren't economists rich? Well, some are, earning over $25,000 per appearance on the lecture circuit. Others top $2 million a year as consultants and expert witnesses.[7] Economists have been appointed to federal cabinet posts, as secretaries of commerce, defense, labor, state, and treasury, for example, and to head the U.S. Federal Reserve System. Economics is the only social science and the only business discipline for which the prestigious Nobel Prize is awarded, and pronouncements by economists are reported in the media daily. A 2015 journal article argued that "the superiority of economists" gives them considerable influence over economic policy.[8] And *The Economist,* a widely respected news weekly from London, has argued that economic ideas have influenced policy "to a degree that would make other social scientists drool."[9]

The economics profession thrives because its models usually do a better job of making economic sense out of a confusing world than do alternative approaches. But not all economists are wealthy, nor is personal wealth the goal of the discipline. In a similar vein, not all doctors are healthy (some even smoke), not all carpenters live in perfectly built homes, not all marriage counselors are happily married, and not all child psychologists have well-adjusted children. Still, those who study economics do reap financial rewards, as discussed in this closing case study, which looks at the link between a college major and annual earnings.

7. As reported by George Anders, "An Economist's Courtroom Bonanza," *Wall Street Journal*, 19 March 2007.
8. Marion Fourcade, Etienne Ollion, and Yann Algan, "The Superiority of Economists," *Journal of Economic Perspectives*, 29 (Winter 2015): 89–114.
9. "The Puzzling Failure of Economics," *The Economist,* 23 August 1997, p. 11.

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CASE STUDY

THE INFORMATION ECONOMY

COLLEGE MAJOR AND ANNUAL EARNINGS

Earlier in the chapter, you learned that economic choice involves comparing the expected marginal benefit and the expected marginal cost. Surveys show that students go to college because they believe a college diploma is the ticket to better jobs and higher pay. Put another way, for nearly two-thirds of U.S. high school graduates, the expected marginal benefit of college apparently exceeds the expected marginal cost. The cost of college will be discussed in the next chapter; the focus here is on the benefits of college, particularly expected earnings.

Among college graduates, all kinds of factors affect earnings, such as general ability, effort, occupation, college attended, college major, highest degree earned, appearance, and, yes, luck. PayScale.com collects real-time information on annual pay from its 10 million users. To isolate the effects of a college major on earnings, only workers with a bachelor's as their highest degree are included in the results. Exhibit 4 shows the median earnings in 2015 by major for two groups of college graduates: (1) those with 0 to 5 years of job experience and (2) those with 10 to 20 years of job experience. Majors are listed from the top down by the median annual pay of those with between 0 and 5 years of experience, identified by the light green bars. The top pay of $67,300 per year went to those who had majored in computer engineering; indeed, the top four slots went to engineering and computer majors. Nursing ranked fifth and economics ranked sixth out of the twenty majors listed. Economics had a median pay of $51,400, or 24 percent below the top pay. Elementary education majors held the bottom spot of $33,600, which was only half the top pay.

The dark green bars show the median pay by major for those with 10 to 20 years of job experience. Again, those who had majored in computer engineering led the field with $108,600, an increase of 61 percent over the pay of newer graduates with that degree. Economics majors with 10 to 20 years of job experience saw a 90 percent increase to $97,700. While economics majors with 0 to 5 years experience were paid 24 percent less than the top paying major, among those with at least a decade of job experience, the median pay for economics majors moved up to within 10 percent of the top pay. In fact, economics majors saw their median pay grow more in dollar terms and in percentage terms than did any other major listed. This suggests that those who study economics acquire skills that appreciate with experience. The bump in median pay based on experience for the 19 other majors averaged 67 percent. Elementary education remained the lowest paying major among those with 10 to 20 years of experience. Note that the majors ranked toward the top of the list tend to be more quantitative and analytical. The selection of a relatively more challenging major such as engineering or economics may send a favorable signal to future employers. Nursing majors ranked high right out of school, thanks to strong demand for health care. But nurses with 10 to 20 years of experience earned only 29 percent more than those with only 0 to 5 years of experience. This was the slowest growth rate among the 20 majors.

Incidentally, Exhibit 4 ranks only 20 majors, but Payscale.com ranks 207 majors in all. Median pay for economics majors ranked them in the top 10 percent of that larger group of majors.

Remember, the survey was limited to those whose highest degree was the baccalaureate, so it excluded the many economics majors who went on to pursue graduate studies in law, business administration, economics, public administration, journalism, and other fields (a different study found that lawyers with undergraduate degrees

Bloomberg/Getty Images

continued

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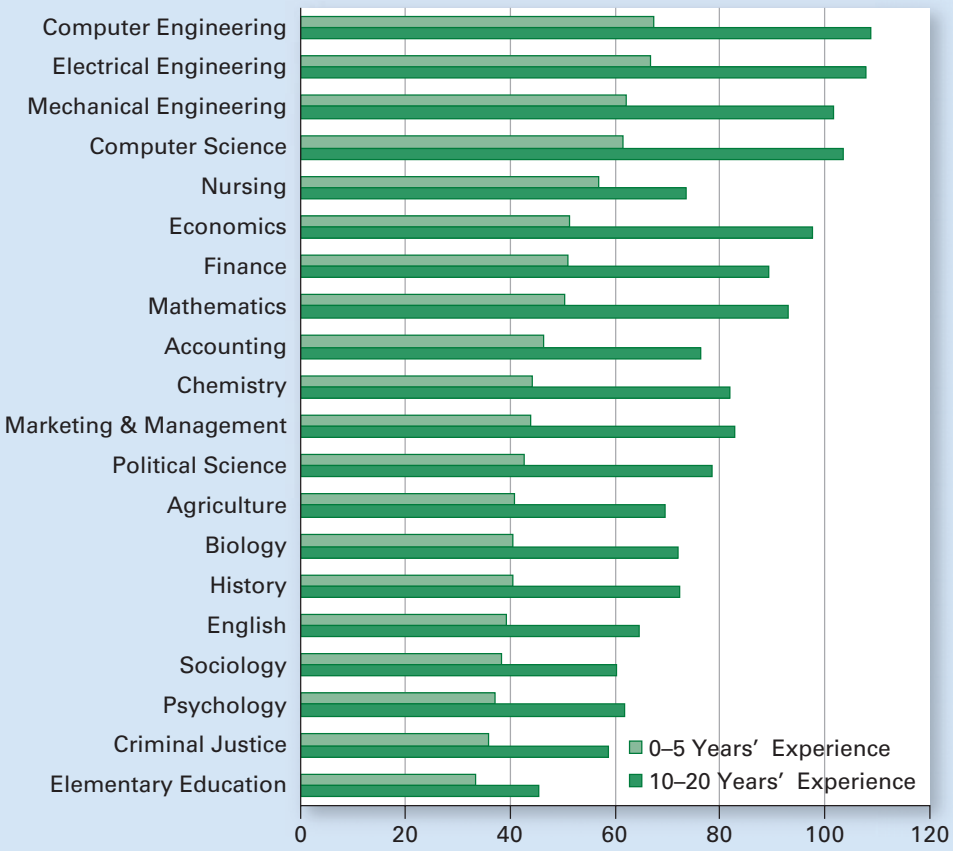
EXHIBIT 4 **Median Annual Pay by College Major**



in economics earned more on average than lawyers with other majors).

A number of world leaders majored in economics, including three of the last seven U.S. presidents; Prime Minister Stephen Harper of Canada; billionaire and former president of Chile, Sebastian Pinera (who earned a Ph.D. in economics from Harvard); Turkey's first female prime minister, Tansu Ciller (who earned a Ph.D. in economics from the University of Connecticut); Italy's former prime minister, Mario Monti (who earned a Ph.D. in economics from Yale); Greece's former prime minister, Lucas Papademos (who earned a Ph.D. in economics from MIT); U.S. Supreme Court justices Stephen Breyer and Anthony Kennedy; and former justice Sandra Day O'Connor. Other notable economics majors include billionaire Donald Trump, Hewlett-Packard president (and billionaire) Meg Whitman, former head of Microsoft (and billionaire) Steve Ballmer, CNN founder (and billionaire) Ted Turner, financial guru (and billionaire) Warren Buffett, Walmart founder (and billionaire) Sam Walton, and Scott Adams, creator of *Dilbert*, the mouthless wonder.

Sources: Median pay data for 2015 were found at http://www.payscale.com/best-colleges/degrees.asp; "The World's Billionaires," *Forbes*, 23 March 2015; and R. Kim Craft and Joe Baker, "Do Economists Make Better Lawyers?" *Journal of Economic Education*, 34 (Summer 2003): 263–281. For a survey of employment opportunities, go to the U.S. Labor Department's Occupational Outlook Handbook at http://www.bls.gov/oco/.

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CHECKPOINT

What are the steps of the scientific method?

1-4 Conclusion

This textbook describes how economic factors affect individual choices and how all these choices come together to shape the economic system. Economics is not the whole story, and economic factors are not always the most important. But economic considerations have important and predictable effects on individual choices, and these choices affect the way we live.

Sure, economics is a challenging discipline, but it is also an exciting and rewarding one. The good news is that you already know a lot about economics. To use this knowledge, however, you must cultivate the art and science of economic analysis. You must be able to simplify the world to formulate questions, isolate the relevant variables, and then tell a persuasive story about how these variables relate.

An economic relation can be expressed in words, represented as a table of quantities, described by a mathematical equation, or illustrated as a graph. The appendix to this chapter introduces graphs. You may find a detailed reading of this unnecessary. If you are already familiar with relations among variables, slopes, tangents, and the like, you can probably just browse. But if you have little recent experience with graphs, you might benefit from a more careful reading with pencil and paper in hand.

The next chapter introduces key tools of economic analysis. Subsequent chapters use these tools to explore economic problems and to explain economic behavior that may otherwise seem puzzling. You must walk before you can run, however, and in the next chapter, you will take your first wobbly steps.

Summary

1. Economics is the study of how people choose to use their scarce resources to produce, exchange, and consume goods and services in an attempt to satisfy unlimited wants. The economic problem arises from the conflict between scarce resources and unlimited wants. If wants were limited or if resources were not scarce, there would be no need to study economics.
2. Economic resources are combined in a variety of ways to produce goods and services. Major categories of resources include labor, capital, natural resources, and entrepreneurial ability. Because economic resources are scarce, only a limited number of goods and services can be produced with them. Therefore, goods and services are also scarce so choices must be made.
3. Microeconomics focuses on choices made in households, firms, and governments and how these choices affect particular markets, such as the market for used cars. Choice is guided by rational self-interest. Choice typically requires time and information, both of which are scarce and valuable.
4. Whereas microeconomics examines the individual pieces of the puzzle, macroeconomics steps back to consider the big picture—the performance of the economy as a whole as reflected by such measures as total production, employment, the price level, and economic growth.
5. Economists use theories, or models, to help understand the effects of an economic change, such as a change in price or income, on individual choices and how these choices affect particular markets and the economy as a whole. Economists employ the scientific method to study an economic problem by (a) formulating the question and identifying relevant variables, (b) specifying the assumptions under which the theory operates, (c) developing a theory, or hypothesis, about how the variables relate, and (d) testing that theory by comparing its predictions with the evidence. A theory might not work perfectly, but it is useful as long as it predicts better than competing theories do.
6. Positive economics aims to discover how the economy works. Normative economics is concerned more with how, in someone's opinion, the economy should work. Those who are not careful can fall victim to the fallacy that association is causation, to the fallacy of composition, and to the mistake of ignoring secondary effects.

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Key Concepts

Economics 2
Resources 3
Labor 3
Capital 3
Natural resources 3
Entrepreneurial ability 3
Entrepreneur 3
Wages 3
Interest 3
Rent 3
Profit 3
Good 4
Service 4
Scarcity 4
Market 5
Product market 5
Resource market 5
Circular-flow model 5
Rational self-interest 7
Marginal 9
Microeconomics 9
Macroeconomics 9
Economic fluctuations 9
Economic theory, or economic model 10
Variable 11
Other-things-constant assumption 11
Behavioral assumption 12
Hypothesis 12
Positive economic statement 12
Normative economic statement 12
Association-is-causation fallacy 14
Fallacy of composition 14
Secondary effects 14

Questions for Review

1. **Definition of Economics** What determines whether or not a resource is scarce? Why is the concept of scarcity important to the definition of economics?
2. **Resources** To which category of resources does each of the following belong?
   a. A taxi
   b. Computer software
   c. One hour of legal counsel
   d. A parking lot
   e. A forest
   f. The Mississippi River
   g. An individual introducing a new way to market products on the Internet
3. **Goods and Services** Explain why each of the following would *not* be considered "free" for the economy as a whole:
   a. Food vouchers
   b. U.S. aid to developing countries
   c. Corporate charitable contributions
   d. Noncable television programs
   e. Public high school education
4. **Economic Decision Makers** Which group of economic decision makers plays the leading role in the economic system? Which groups play supporting roles? In what sense are they supporting actors?
5. **Micro Versus Macro** Determine whether each of the following is primarily a microeconomic or a macroeconomic issue:
   a. What price to charge for an automobile
   b. Measuring the impact of tax policies on consumer spending in the economy
   c. Your family's decisions about what to buy
   d. A worker deciding how much to work each week
   e. Designing a government policy to increase total employment
6. **Micro Versus Macro** Some economists believe that to understand macroeconomics, you must first understand microeconomics. How does microeconomics relate to macroeconomics?
7. **Normative Versus Positive Analysis** Determine whether each of the following statements is normative or positive:
   a. The U.S. unemployment rate was 6.2 percent in 2014.
   b. The inflation rate in the United States is too high.
   c. The U.S. government should increase the minimum wage.
   d. U.S. trade restrictions cost consumers $100 billion annually.
8. **Role of Theory** What good is economic theory if it can't predict the behavior of a specific individual?

Problems and Exercises

9. **Rational Self-Interest** Discuss the impact of rational self-interest on each of the following decisions:
   a. Whether to attend college full time or enter the workforce full time
   b. Whether to buy a new textbook or a used one
   c. Whether to attend a local college or an out-of-town college
10. **Rational Self-Interest** If behavior is governed by rational self-interest, why do people make charitable contributions of time and money?
11. **Marginal Analysis** The owner of a small pizzeria is deciding whether to increase the radius of delivery area by one mile. What considerations must be taken into account if such a decision is to increase profitability?

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12. **Time and Information** It is often costly to obtain the information necessary to make good decisions. Yet your own interests can be best served by rationally weighing all options available to you. This requires informed decision making. Does this mean that making uninformed decisions is irrational? How do you determine how much information is the right amount?

13. **Pitfalls of Economic Analysis** Review the discussion of pitfalls in economic thinking in this chapter. Then identify the fallacy, or mistake in thinking, in each of the following statements:

    a. Raising taxes always increases government revenues.
    b. Whenever there is a recession, imports decrease. Therefore, to stop a recession, we should increase imports.
    c. Raising the tariff on imported steel helps the U.S. steel industry. Therefore, the entire economy is helped.
    d. Gold sells for about $1,200 per ounce. Therefore, the U.S. government could sell all the gold in Fort Knox at $1,200 per ounce to reduce the national debt.

14. **Association Versus Causation** Suppose I observe that communities with lots of doctors tend to have relatively high rates of illness. I conclude that doctors cause illness. What's wrong with this reasoning?

15. **Case Study: College Major and Annual Earnings** Because some college majors pay nearly twice as much as others, why would students pursuing their rational self-interest choose a lower paying major?

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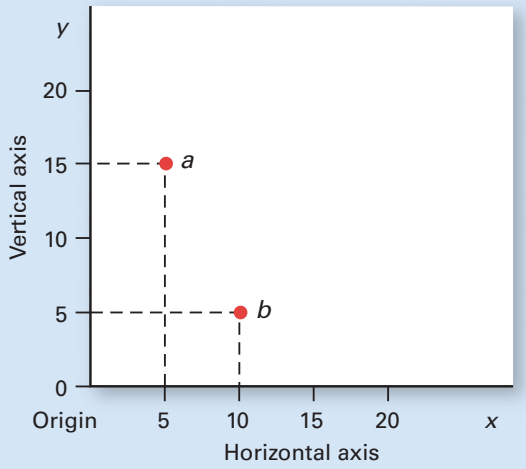
Understanding Graphs

Take out a pencil and a blank piece of paper. Go ahead. Put a point in the middle of the paper. This is your point of departure, called the **origin**. With your pencil at the origin, draw a straight line off to the right. This line is called the **horizontal axis**. The value of the variable *x* measured along the horizontal axis increases as you move to the right of the origin. Now mark off this line from 0 to 20, in increments of 5 units each. Returning to the origin, draw another line, this one straight north. This line is called the **vertical axis**. The value of the variable *y* measured along the vertical axis increases as you move north of the origin. Mark off this line from 0 to 20, in increments of 5 units each.

Within the space framed by the two axes, you can plot possible combinations of the variables measured along each axis. Each point identifies a value measured along the horizontal, or *x*, axis *and* a value measured along the vertical, or *y*, axis. For example, place point *a* in your graph to reflect the combination where *x* equals 5 units and *y* equals 15 units. Likewise, place point *b* in your graph to reflect 10 units of *x* and 5 units of *y*. Now compare your results with points shown in Exhibit 5.

EXHIBIT 5 Basics of a Graph



Any point on a graph represents a combination of values of two variables. Here point *a* represents the combination of 5 units of variable *x* (measured on the horizontal axis) and 15 units of variable *y* (measured on the vertical axis). Point *b* represents 10 units of *x* and 5 units of *y*.

A **graph** is a picture showing how variables relate, and a picture can be worth a thousand words. Take a look at Exhibit 6, which shows the U.S. annual unemployment rate since 1900. The year is measured along the horizontal axis and the unemployment rate is measured as a percentage along the vertical axis. Exhibit 6 is a *time-series graph,* which shows the value of a variable, in this case the percent of the labor force unemployed, over time. If you had to describe the information presented in Exhibit 6, the explanation could take many words. The picture shows not only how one year compares to the next but also how one decade compares to another and how the unemployment rate trends over time. The sharply higher unemployment rate during the Great Depression of the 1930s is unmistakable. *Graphs convey information in a compact and efficient way.*

This appendix shows how graphs express a variety of possible relations among variables. Most graphs of interest in this book reflect the relationship between two economic variables, such as the unemployment rate and the year, the price of a product and the quantity demanded, or the price of production and the quantity supplied. Because we focus on just two variables at a time, we usually assume that other relevant variables remain constant.

One variable often depends on another. The time it takes you to drive home depends on your average speed. Your weight depends on how much you eat. The amount of Pepsi you buy depends on the price. A *functional relation* exists between two variables when the value of one variable *depends* on the value of another variable. The value of the **dependent variable** depends on the value of the **independent variable**. The task of the economist is to isolate economic relations and determine the direction of causality, if any. Recall that one of the pitfalls of economic thinking is the erroneous belief that association is causation. We cannot conclude that, simply because two events relate in time, one causes the other. There may be no relation between the two events.

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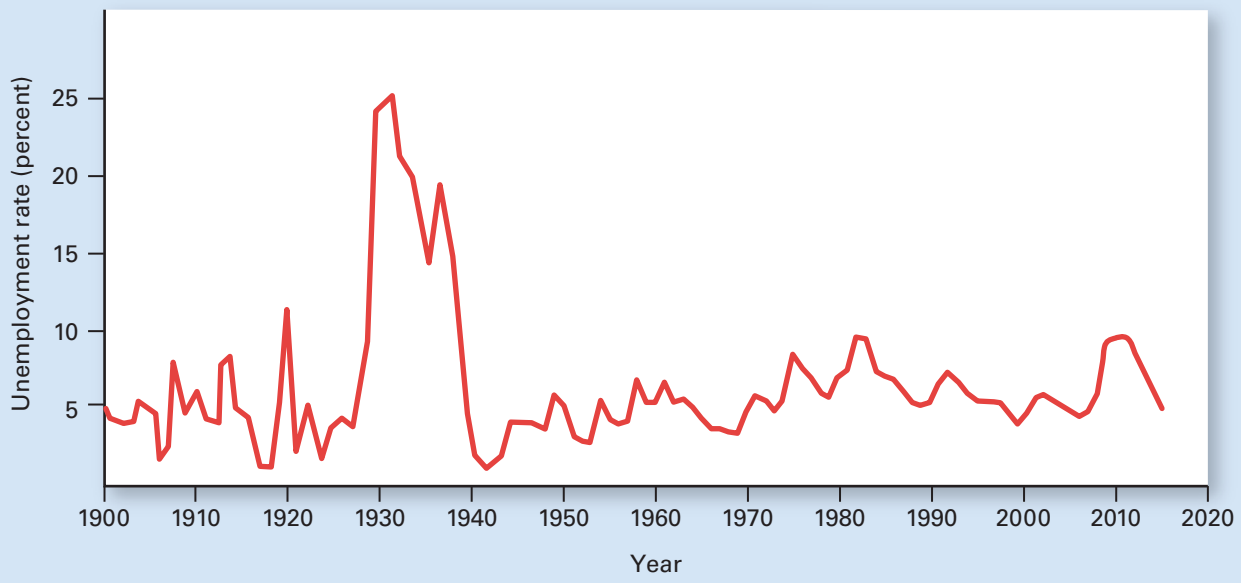
EXHIBIT 6 U.S. Unemployment Rate Since 1900



A time-series graph depicts the behavior of some economic variable over time. Shown here are U.S. unemployment rates since 1900.

Source: *Historical Statistics of the United States*, 1970; and *Economic Report of the President*, February 2015.

Drawing Graphs

Let's begin with a simple relation. Suppose you are planning to drive across the country and want to figure out how far you will travel each day. You plan to average 50 miles per hour. Possible combinations of driving time and distance traveled per day appear in Exhibit 7. One column lists the hours driven per day, and the next column lists the number of miles traveled per day, assuming an average speed of 50 miles per hour. The distance traveled, the *dependent* variable, depends on the number of hours driven, the *independent* variable. Combinations of hours driven and distance traveled are shown as *a*, *b*, *c*, *d*, and *e*. Each combination is represented by a point in Exhibit 8. For example, point *a* shows that if you drive for 1 hour, you travel 50 miles. Point *b* indicates that if you drive for 2 hours, you travel 100 miles. By connecting the points, or possible combinations, we create a line running upward and to the right. This makes sense because, the longer you drive, the farther you travel. Assumed constant along this line is your average speed of 50 miles per hour.

EXHIBIT 7 Schedule Relating Distance Traveled to Hours Driven

	Hours Driven per Day	Distance Traveled per Day (miles)
a	1	50
b	2	100
c	3	150
d	4	200
e	5	250

The distance traveled per day depends on the hours driven per day, assuming an average speed of 50 miles per hour. This table shows combinations of hours driven and distance traveled. These combinations are shown as points in Exhibit 8.

Types of relations between variables include the following:

1. As one variable increases, the other increases—as in Exhibit 8; this is called a **positive, or direct, relation** between the variables.
2. As one variable increases, the other decreases; this is called a **negative, or inverse, relation.**
3. As one variable increases, the other remains unchanged; the two variables are said to be *independent,* or *unrelated.*

One of the advantages of graphs is that they easily convey the relation between variables. We do not need to examine the particular combinations of numbers; we need only focus on the shape of the curve.

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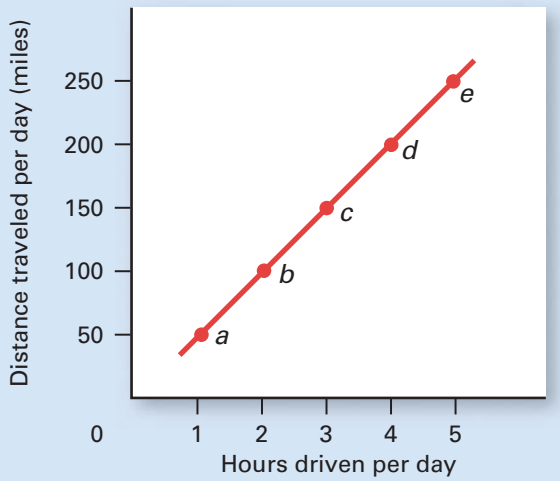
EXHIBIT 8 Graph Relating Distance Traveled to Hours Driven



Points *a* through *e* depict different combinations of hours driven per day and the corresponding distances traveled. Connecting these points creates a graph.

The Slope of a Straight Line

A more precise way to describe the shape of a curve is to measure its slope. The **slope of a line** indicates how much the vertical variable changes for a given increase in the horizontal variable. Specifically, the slope between any two points along any straight line is the vertical change between these two points divided by the horizontal increase, or

$$\text{Slope} = \frac{\text{Change in the vertical distance}}{\text{Increase in the horizontal distance}}$$

Each of the four panels in Exhibit 9 indicates a vertical change, given a 10-unit increase in the horizontal variable. In panel (a), the vertical distance increases by 5 units when the horizontal distance increases by 10 units. The slope of the line is therefore 5/10, or 0.5. Notice that the slope in this case is a positive number because the relation between the two variables is positive, or direct. This slope indicates that for every 1-unit increase in the horizontal variable, the vertical variable increases by 0.5 units. The slope, incidentally, does not imply causality; the increase in the horizontal variable does not necessarily *cause* the increase in the vertical variable. The slope simply measures the relation between an increase in the horizontal variable and the associated change in the vertical variable.

In panel (b) of Exhibit 9, the vertical distance declines by 7 units when the horizontal distance increases by 10 units, so the slope equals 27/10, or 20.7. The slope in this case is a negative number because the two variables have a negative, or inverse, relation. In panel (c), the vertical variable remains unchanged as the horizontal variable increases by 10, so the slope equals 0/10, or 0. These two variables are not related. Finally, in panel (d), the vertical variable can take on any value, although the horizontal variable remains unchanged. Again, the two variables are not related. In this case, any change in the vertical measure, for example a 10-unit change, is divided by 0, because the horizontal value does not change. Any change divided by 0 is mathematically undefined, but as the line tilts toward vertical, its slope gets incredibly large. For practical purposes, we will assume that the slope of this line is not undefined but infinitely large.

The Slope, Units of Measurement, and Marginal Analysis

The mathematical value of the slope depends on the units measured on the graph. For example, suppose copper tubing costs $1 a foot. Graphs depicting the relation between total cost and quantity purchased are shown in Exhibit 10. In panel (a), the total cost increases by $1 for each 1-foot increase in the amount of tubing purchased. Thus, the slope equals 1/1, or 1. If the cost per foot remains the same but units are measured not in *feet* but in *yards,* the relation between total cost and quantity purchased is as depicted in panel (b). Now total cost increases by $3 for each 1-*yard* increase in output, so the slope equals 3/1, or 3. Because different units are used to measure the copper tubing, the two panels reflect different slopes, even though the cost is $1 per foot in each panel. Keep in mind that *the slope depends in part on the units of measurement.*

Economic analysis usually involves *marginal analysis,* such as the marginal cost of one more unit of output. The slope is a convenient device for measuring marginal effects because it reflects the change in total cost, measured along the vertical axis, for each 1-unit change in output, measured along the horizontal axis. For example, in panel (a) of Exhibit 10, the marginal cost of another *foot* of copper tubing is $1, which also equals the slope of the line. In panel (b), the marginal cost of another *yard* of tubing is $3, which again is the slope of that line. Because of its applicability to marginal analysis, the slope has special relevance in economics.

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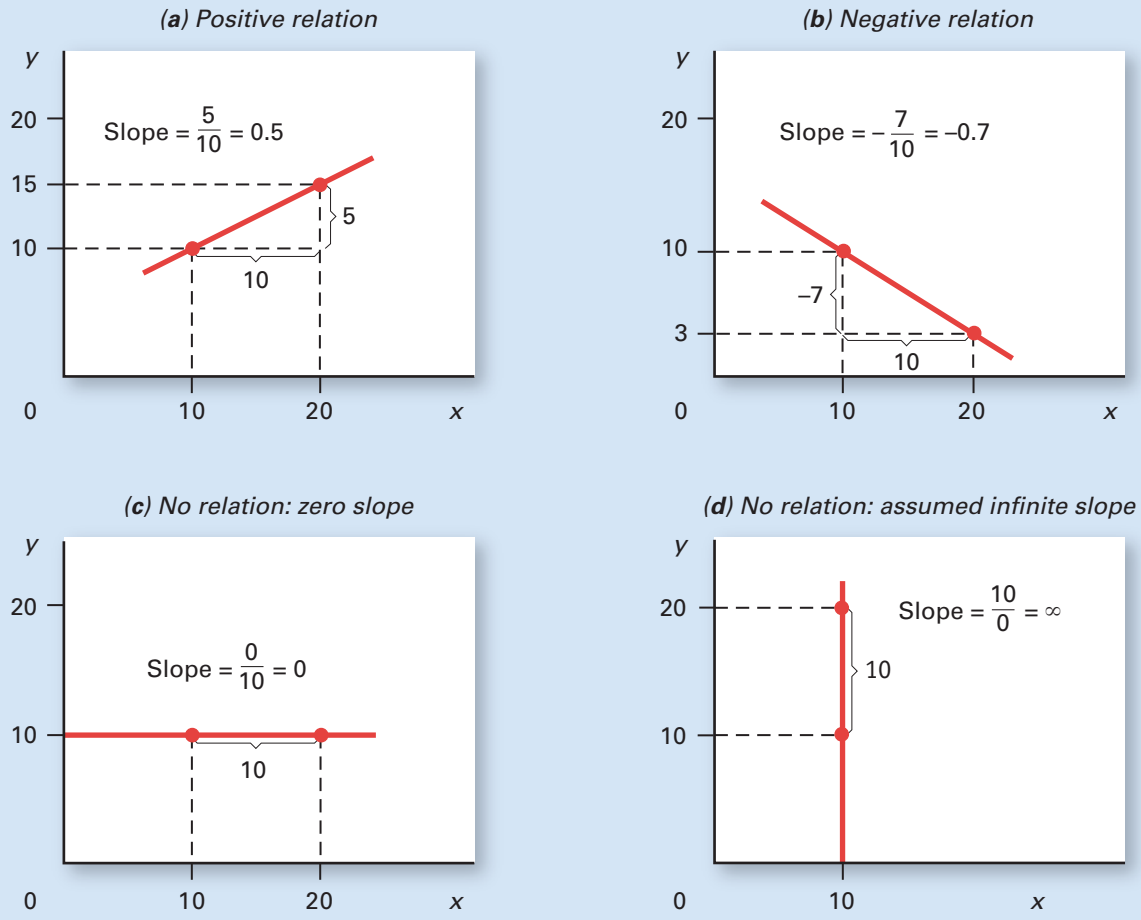
EXHIBIT 9 **Alternative Slopes for Straight Lines**



The slope of a line indicates how much the vertically measured variable changes for a given increase in the variable measured along the horizontal axis. Panel (a) shows a positive relation between two variables; the slope is 0.5, a positive number. Panel (b) depicts a negative, or inverse, relation. When the *x* variable increases, the *y* variable decreases; the slope is 20.7, a negative number. Panels (c) and (d) represent situations in which two variables are unrelated. In panel (c), the *y* variable always takes on the same value; the slope is 0. In panel (d), the *x* variable always takes on the same value; the slope is mathematically undefined but we simplify by assuming the slope is infinite.

The Slopes of Curved Lines

The slope of a straight line is the same everywhere along the line, but the slope of a curved line differs along the curve, as shown in Exhibit 11. To find the slope of a curved line at a particular point, draw a straight line that just touches the curve at that point but does not cut or cross the curve. Such a line is called a tangent to the curve at that point. The slope of the **tangent** gives the slope of the curve at that point. Look at line *A*, which is tangent to the curve at point *a*. As the horizontal value increases from 0 to 10, the vertical value drops along *A* from 40 to 0. Thus, the vertical change divided by the horizontal change equals 240/10, or 24, which is the slope of the curve at point *a*. This slope is negative because the vertical value decreases as the horizontal value increases. Line *B*, a line tangent to the curve at point *b*, has the slope 210/30, or 20.33. As you can see, the curve depicted in Exhibit 11 gets flatter as the horizontal variable increases, so the value of its slope approaches zero.

Other curves, of course, will reflect different slopes as well as different changes in the slope along the curve.

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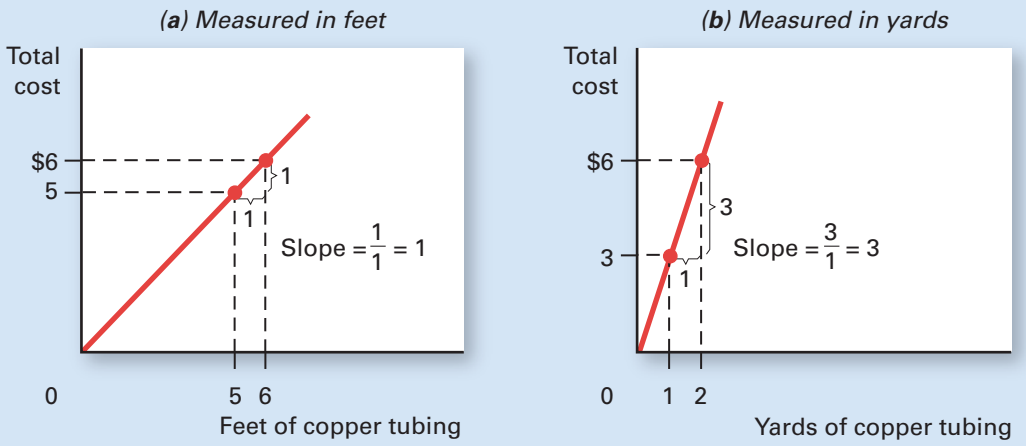
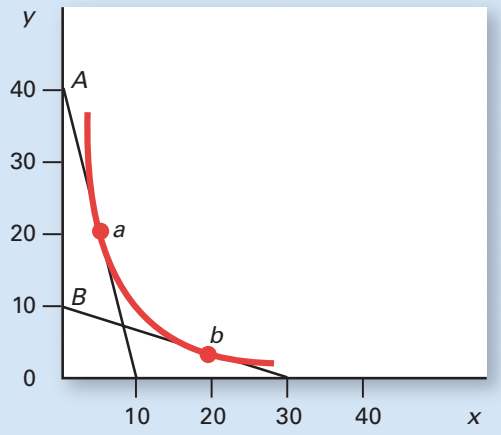
EXHIBIT 10 Slope Depends on the Unit of Measure



The value of the slope depends on the units of measure. In panel (a), output is measured in feet of copper tubing; in panel (b), output is measured in yards.

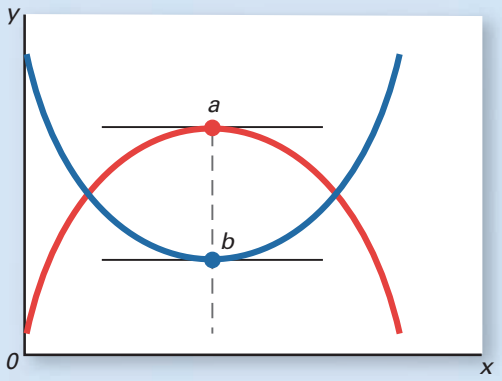
Although the cost is $1 per foot in each panel, the slope is different in the two panels because copper tubing is measured using different units.

EXHIBIT 11 Slopes at Different Points on a Curved Line



The slope of a curved line varies from point to point. At a given point, such as *a* or *b*, the slope of the curve is equal to the slope of the straight line that is tangent to the curve at the point.

EXHIBIT 12 Curves with Both Positive and Negative Slopes



Some curves have both positive and negative slopes. The hill-shaped curve (in red) has a positive slope to the left of point *a*, a slope of 0 at point *a*, and a negative slope to the right of that point. The U-shaped curve (in blue) starts off with a negative slope, has a slope of 0 at point *b*, and has a positive slope to the right of that point.

Downward-sloping curves have negative slopes, and upward-sloping curves, positive slopes. Sometimes curves, such as those in Exhibit 12, are more complex, having both positive and negative ranges, depending on the horizontal value. In the hill-shaped curve, for small values of x, there is a positive relation between x and y, so the slope is positive. As the value of x increases, however, the slope declines and eventually becomes negative. We can divide the curve into two segments: (1) the segment between the origin and point a, where the slope is positive; and (2) the segment of the curve to the right of point a, where the slope is negative. The slope of the curve at point a is 0. The U-shaped curve in Exhibit 12 represents the opposite relation: x and y are negatively related until point b is reached; thereafter, they are positively related. The slope equals 0 at point b.

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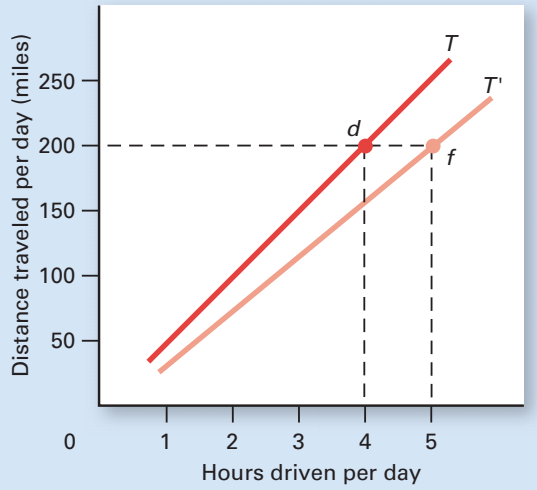
Line Shifts

Let's go back to the example of your cross-country trip, where we were trying to determine how many miles you would travel per day. Recall that we measured hours driven per day on the horizontal axis and miles traveled per day on the vertical axis, assuming an average speed of 50 miles per hour. That same relation is shown as line *T* in Exhibit 13. What happens if the average speed is 40 miles per hour? The entire relation between hours driven and distance traveled would change, as shown by the shift to the right of line *T* to *T′*. With a slower average speed, any distance traveled per day now requires more driving time. For example, 200 miles traveled requires 4 hours of driving when the average speed is 50 miles per hour (as shown by point *d* on curve *T*), but 200 miles takes 5 hours when your speed averages 40 miles per hour (as shown by point *f* on curve *T′*). Thus, *a change in the assumption about average speed changes the relationship between the two variables observed*. This changed relationship is expressed by a shift of the line that shows how the two variables relate.

That ends our once-over of graphs. Return to this appendix when you need a review.

EXHIBIT 13 Shift of Line Relating Distance Traveled to Hours Driven



Line *T* appeared originally in Exhibit 8 to show the relation between hours driven and distance traveled per day, assuming an average speed of 50 miles per hour. If the speed averages only 40 miles per hour, the entire relation shifts to the right to *T′*, indicating that any given distance traveled requires more driving time. For example, 200 miles traveled takes 4 hours at 50 miles per hour but 5 hours at 40 miles per hour. This figure shows how a change in assumptions, in this case, the average speed, can shift the entire relationship between two variables.

Appendix Questions

1. **Understanding Graphs** Look at Exhibit 6 and answer the following questions:
   a. In what year (approximately) was the unemployment rate the highest? In what year was it the lowest?
   b. In what decade, on average, was the unemployment rate highest? In what decade was it lowest?
   c. Between 1950 and 1980, did the unemployment rate generally increase, decrease, or remain about the same?
2. **Drawing Graphs** Sketch a graph to illustrate your idea of each of the following relationships. Be sure to label each axis appropriately. For each relationship, explain under what circumstances, if any, the curve could shift:
   a. The relationship between a person's age and height
   b. Average monthly temperature in your hometown over the course of a year
   c. A person's income and the number of hamburgers consumed per month
   d. The amount of fertilizer added to an acre and the amount of corn grown on that land in one growing season
   e. An automobile's horsepower and its gasoline mileage (in miles per gallon)
3. **Slope** Suppose you are given the following data on wage rates and number of hours worked:

Point	Hourly Wage	Hours Worked per Week
a	$0	0
b	5	0
c	10	30
d	15	35
e	20	45
f	25	50

   a. Construct and label a set of axes and plot these six points. Label each point *a*, *b*, *c*, and so on. Which variable do you think should be measured on the vertical axis, and which variable should be measured on the horizontal axis?
   b. Connect the points. Describe the resulting curve. Does it make sense to you?
   c. Compute the slope of the curve between points *a* and *b*. Between points *b* and *c*. Between points *c* and *d*. Between points *d* and *e*. Between points *e* and *f*. What happens to the slope as you move from point *a* to point *f*?

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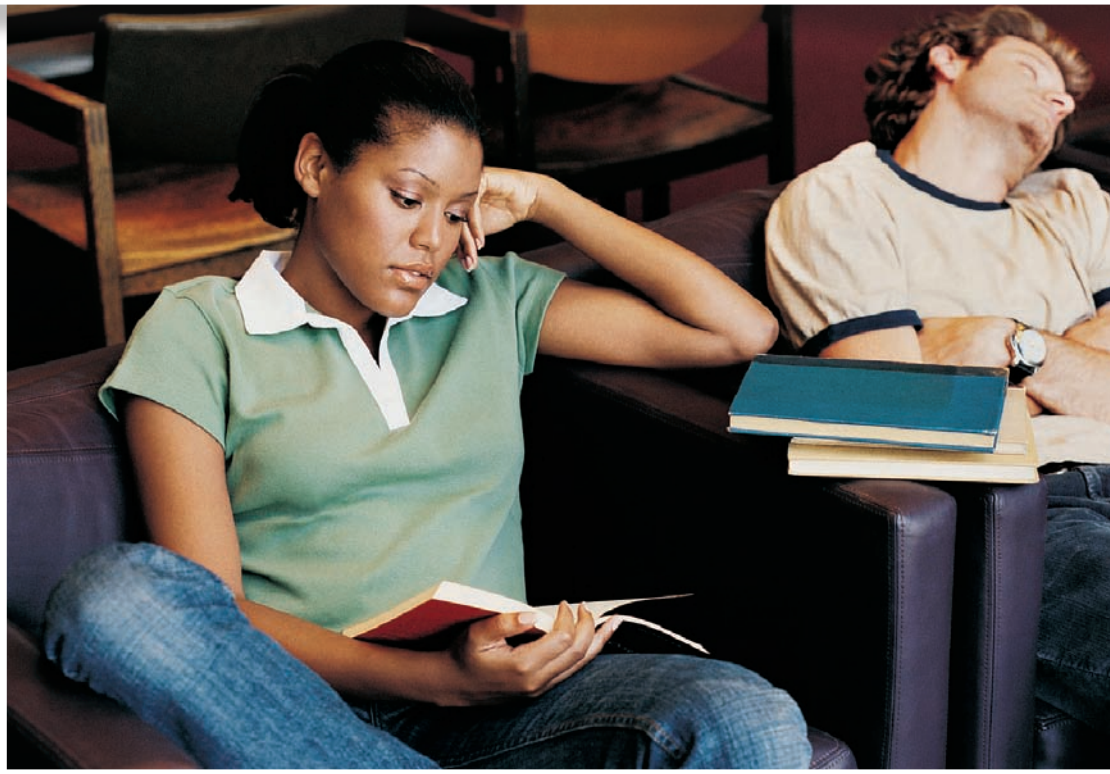
2 Economic Tools and Economic Systems



Digital Vision/Jupiter Images

- *Why are you reading this book right now rather than doing something else?*
- *What is college costing you?*
- *Why will you eventually major in one subject rather than continue to take courses in various subjects?*
- *Why is fast food so fast?*
- *Why is there no point crying over spilled milk?*
- *Why does common ownership often lead to common neglect?*

These and other questions are addressed in this chapter, which introduces some tools of economic analysis—some tools of the trade.

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Chapter 1 introduced the idea that scarcity forces us to make choices, but the chapter said little about how to make economic choices. This chapter develops a framework for evaluating economic alternatives. First, we consider the cost involved in selecting one alternative over others. Next, we develop tools to explore the choices available to individuals and to the economy as a whole. Finally, we examine the questions that different economies must answer—questions about what goods and services to produce, how to produce them, and for whom to produce them.

Topics discussed in this chapter include:

- Opportunity cost
- Comparative advantage
- Specialization
- Division of labor
- Production possibilities frontier
- Economic systems
- Three economic questions
- Capitalism, command systems, and in between

2-1 Choice and Opportunity Cost

Think about a choice you just made: the decision to begin reading this chapter right now rather than use your time to study for another course, play sports, watch TV, play video games, go online, get some sleep, hang with friends, or do something else. Suppose it's late and your best alternative to reading right now is getting some sleep. The cost of reading is passing up the opportunity of sleep. Because of scarcity, whenever you make a choice, you must pass up another opportunity; you must incur an *opportunity cost*.

2-1a Opportunity Cost

What do we mean when we talk about the cost of something? Isn't it what we must give up—must forgo—to get that thing? The **opportunity cost** of the chosen item or activity is *the value of the best alternative that is forgone*. You can think of opportunity cost as the *opportunity lost*. Sometimes opportunity cost can be measured in terms of money, although, as we shall see, money is usually only part of opportunity cost.

opportunity cost
The value of the best alternative forgone when an item or activity is chosen

How many times have you heard people say they did something because they "had nothing better to do"? They actually mean they had nothing else going on. Yet, according to the idea of opportunity cost, people *always* do what they do because they have nothing better to do. The choice selected seems, at the time, preferable to any other possible alternative. You are reading this chapter right now because you have nothing better to do. In fact, you are attending college for the same reason: College appears more attractive than your best alternative, as discussed in the following case study.

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