William J. Baumol
Alan S. Blinder

ECONOMICS

PRINCIPLES and POLICY

Thirteenth Edition

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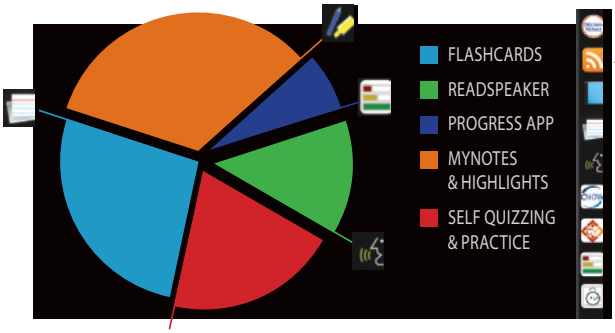

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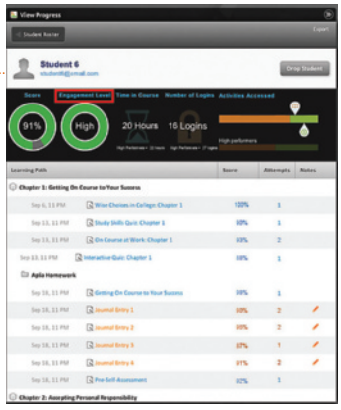

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ECONOMICS

PRINCIPLES and POLICY

Thirteenth Edition

William J. Baumol

New York University and Princeton University

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Princeton University

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To our wonderful wives, Hilda Baumol and Madeline Blinder.

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PREFACE

It can be argued that, from the point of view of the general welfare, there are two topics of primary importance in economics. One is the analysis of recessions and depressions, with the unemployment and general impoverishment they bring. The second is economic growth and rising productivity, which, in the long run, is the way to reduce poverty in our country and throughout the world.

In earlier editions of this book, before the problems stemming from the recent, terrible worldwide economic crisis claimed the spotlight, the new materials that we added focused more on the growth issue. We discussed, for example, the microeconomic roles of innovation and entrepreneurship, offering far more material on these issues than any other textbook in the field.

Then, for two editions, the biggest changes came in the macroeconomic portions of the book, especially the parts relevant to understanding the financial crisis and the Great Recession of 2007–2009. Those changes remain in this thirteenth edition—including the abandonment, almost unique among principles books, of pretending that there is only one interest rate ("the interest rate"). Instead, we explain and discuss the implications of having many different interest rates, based on differential risk.

The biggest innovation in this thirteenth edition is a brand new chapter (Chapter 21) that appraises the strengths and weaknesses of America's economy in relation to those of other nations—both now and in the future. As is common when things go wrong, there have been many claims in recent years that America is slipping or has lost its way. Chapter 21 attempts to separate truth from fiction in that regard, focusing on what the facts and the relevant economic theory can tell us.

As usual, this revision includes literally hundreds of small changes to improve clarity of exposition and especially to update the text material—both for relevant advances in economics and for recent events, particularly the aftermath of the Great Recession—which continues to play out day by day. In the microeconomic sections of the book, we have added ample new material in response to requests by survey respondents. For example, we have updated our coverage of the new health-care reform in Chapter 15.

NOTE TO THE STUDENT

May we offer a suggestion for success in your economics course? Unlike some of the other subjects you may be studying, economics is cumulative: Each week's lesson builds on what you have learned prior to that. You will save yourself a lot of frustration—and a lot of work—by keeping up on a week-to-week basis.

To assist you in doing so, we provide a chapter summary, a list of important terms and concepts, a selection of questions to help you review the contents of each chapter, as well as the answers to odd-numbered Test Yourself questions. Making use of these learning aids will help you to master the material in your economics course. For additional assistance, we have prepared student supplements to help in the reinforcement of the concepts in this book and provide opportunities for practice and feedback.

The following list indicates the ancillary materials and learning tools that have been designed specifically to be helpful to you. If you believe any of these resources could benefit you in your course of study, you may want to discuss them with your instructor. Further information on these resources is available at www.cengagebrain.com.

To access additional course materials and companion resources, please visit www.cengagebrain.com. At the CengageBrain.com home page, search for the ISBN of your title (from the back cover of your book) using the search box at the top of the page. This will take you to the product page where free companion resources can be found.

We hope our book is helpful to you in your study of economics and welcome your comments or suggestions for improving student experience with economics. Please write to us in care of Baumol and Blinder, Editor for Economics, Cengage Learning, 5191 Natorp Boulevard, Mason, Ohio, 45040, or through the book's website at www.cengagebrain.com.

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Aplia saves instructors valuable time they would otherwise spend on routine grading while giving students an easy way to stay on top of coursework with regularly scheduled assignments. Currently, Aplia supports college-level courses and has been used by more than 1,000,000 students at over 1,300 institutions. Aplia's economics students use interactive chapter assignments, tutorials, news analyses, and experiments to make economics relevant and engaging. Math and graphing tutorials help students overcome deficiencies in these crucial areas. Economics articles from top news sources challenge students to connect current events to course concepts.

End of Chapter and traditional homework problem sets allow students to work through the economic concepts they have learned in each chapter. Students can choose to "Grade It Now" on a homework problem and will receive instant feedback whether an answer is correct or incorrect. Students can then choose to complete another problem to test themselves on the same concept with randomization. Aplia End of Chapter will also be mobile enabled.

IN GRATITUDE

Finally, we are pleased to acknowledge our mounting indebtedness to the many people who have generously helped us in our efforts through the history of this book. We often have needed assistance in dealing with some of the many subjects that an introductory textbook must cover. Our friends and colleagues Dean Alderucci, *New York University*; Rebecca Blank, *University of Michigan*; Gregory Chow, *Princeton University*; Avinash Dixit, *Princeton University*; Susan Feiner, *University of Southern Maine*; Claudia Goldin, *Harvard University*; Ronald Grieson, *University of California, Santa Cruz*; Daniel Hamermesh, *University of Texas*; Yuzo Honda, *Osaka University*; Peter Kenen, *Princeton University*; Melvin Krauss, *Stanford University*; Herbert Levine, *University of Pennsylvania*; Burton Malkiel, *Princeton University*; Edwin Mills, *Northwestern University*; Janusz Ordover, *New York*

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Obviously, the book you hold in your hands was not produced by us alone. In revising the thirteenth edition, a special role was played by Baumol's in-office editor, Anne Noyes Saini, who skillfully edited, researched, and refreshed data and information throughout the book. It is probably true that Baumol could not have done it without her.

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And, finally, we must acknowledge—with joy—our continuing debt to our wives, Hilda Baumol and Madeline Blinder. They have now suffered through 13 editions and the inescapable neglect and distraction the preparation of each new edition imposes. Their tolerance and understanding have been no minor contribution to the project.

William J. Baumol
Alan S. Blinder

About the Authors

William J. Baumol

William J. Baumol was born in New York City and received his BSS at the College of the City of New York and his Ph.D. at the University of London.

He is the Harold Price Professor of Entrepreneurship Emeritus at New York University, where he taught a course in introductory microeconomics, and the Joseph Douglas Green, 1895, Professor of Economics Emeritus and Senior Economist at Princeton University. He has been a frequent consultant to the management of major firms in a wide variety of industries in the United States and other countries as well as to a number of governmental agencies. In several fields, including the telecommunications and electric utility industries, current regulatory policy is influenced by his explicit recommendations. Among his many contributions to economics are research on the theory of the firm, the contestability of markets, the economics of the arts and other services—the "cost disease of the services" is often referred to as "Baumol's disease"—and economic growth, entrepreneurship, and innovation. In addition to economics, he taught a course in wood sculpture at Princeton for about 20 years and is an accomplished painter (you may view some of his paintings at http://pages.stern.nyu.edu/~wbaumol).

Professor Baumol has been president of the American Economic Association and three other professional societies. He is an elected member of the National Academy of Sciences, created by the U.S. Congress, and of the American Philosophical Society, founded by Benjamin Franklin. He is also on the board of trustees of the National Council on Economic Education and is the recipient of 11 honorary degrees.

Baumol is the author of hundreds of journal and newspaper articles and more than 45 books, including *Global Trade and Conflicting National Interests* (2000); *The Free-Market Innovation Machine* (2002); *Good Capitalism, Bad Capitalism* (2007); *The Microtheory of Innovative Entrepreneurship* (2010); and *The Cost Disease* (2012). His writings have been translated into more than a dozen languages.

Alan S. Blinder

Alan S. Blinder was born in New York City and attended Princeton University, where one of his teachers was William Baumol. After earning a master's degree at the London School of Economics and a Ph.D. at MIT, Blinder returned to Princeton, where he has taught since 1971, including teaching introductory macroeconomics since 1977. He is currently the Gordon S. Rentschler Memorial Professor of Economics and Public Affairs.

In January 1993, Blinder went to Washington as part of President Bill Clinton's first Council of Economic Advisers. Then, from June 1994 through January 1996, he served as vice chairman of the Federal Reserve Board. He thus played some role in formulating both fiscal and monetary policies, two topics discussed extensively in this book. He has also advised several presidential campaigns and numerous politicians.

Blinder has consulted for a number of the world's largest financial institutions, testified dozens of times before congressional committees, and been involved in several entrepreneurial start-ups. For many years, he has written newspaper and magazine articles on economic policy, including regular columns for the *Boston Globe*, *BusinessWeek*, and *The New York Times*. Currently, he has a regular monthly column in *The Wall Street Journal*. Blinder also appears frequently on PBS, CNBC, Bloomberg TV, Fox Business, and elsewhere. His recent book on the financial crisis (*After the Music Stopped*, Penguin, 2013) garnered many accolades and was a *New York Times* best-seller.

Blinder has served as president of the Eastern Economic Association and vice president of the American Economic Association, which elected him a Distinguished Fellow in 2011. He has won numerous awards, including the Council for Economic Education's Visionary Award. He is a member of the American Philosophical Society, the American Academy of Arts and Sciences, the American Academy of Political and Social Science, and the Council on Foreign Relations.

Blinder and his wife have two grown sons, two grandsons, and live in Princeton, where he doesn't play tennis as often as he should.

Part 1

Getting Acquainted with Economics

Welcome to economics! Some of your fellow students may have warned you that "econ is boring." Don't believe them—or at least, don't believe them too much. It is true that studying economics is hardly pure fun. But a first course in economics can be an eye-opening experience. There is a vast and important world out there—the economic world—and this book is designed to help you understand it.

Have you ever wondered whether jobs will be plentiful or scarce when you graduate, or why a college education becomes more and more expensive? Should the government be suspicious of big firms? Why can't pollution be eliminated? How did the U.S. economy manage to grow so rapidly in the 1990s while Japan's economy stagnated? If any of these questions have piqued your curiosity, read on. You may find economics is more interesting than you had thought!

It is only in later chapters that we will begin to give you the tools you need to begin carrying out your own economic analyses. However, the four chapters of Part 1 listed next will introduce you to both the subject matter of economics and some of the methods that economists use to study their subject.

CHAPTERS

WHAT IS ECONOMICS?

Why does public discussion of economic policy so often show the abysmal ignorance of the participants? Why do I so often want to cry at what public figures, the press, and television commentators say about economic affairs?

ROBERT M. SOLOW, WINNER OF THE 1987 NOBEL PRIZE IN ECONOMICS

Economics is a broad-ranging discipline, both in the questions it asks and the methods it uses to seek answers. Many of the world's most pressing problems are economic in nature. The first part of this chapter is intended to give you some idea of the sorts of issues that economic analysis helps to clarify and the kinds of solutions that economic principles suggest. The second part briefly introduces the tools that economists use—tools you are likely to find useful in your career, personal life, and role as an informed citizen, long after this course is over.

CONTENTS

1-1 IDEAS FOR BEYOND THE FINAL EXAM

Elephants may never forget, but people do. We realize that most students inevitably forget much of what they learn in a course—perhaps with a sense of relief—soon after the final exam. Nevertheless, we hope that you will remember some of the most significant economic ideas and, even more important, the ways of thinking about economic issues that will help you evaluate the economic issues that arise in our economy.

To help you identify some of the most crucial concepts, we have selected 10 from the many in this book. Some offer key insights into the workings of the economy, and several bear on important policy issues that appear in newspapers; others point out common misunderstandings that occur among even the most thoughtful lay observers. Most of them indicate that it takes more than just good common sense to analyze economic issues effectively. As the opening quote of this chapter suggests, many learned judges, politicians, and university administrators who failed to understand basic economic principles could have made wiser decisions.

Try this one on for size. Imagine you own a widget manufacturing company that rents a warehouse. Your landlord raises your rent by $10,000 per year. Should you raise the price of your widgets to try to recoup some of your higher costs or should you do the opposite—lower your price to try to sell more and spread the so-called overhead costs over more products? In fact, as we shall see in Chapter 8, both answers are probably wrong!


Ideas for Beyond the Final Exam

Each of the 10 "Ideas for Beyond the Final Exam," many of which are counterintuitive, will be sketched briefly here. More important, each will be discussed in depth when it occurs in the course of the book, where it will be called to your attention by a special icon in the margin. Don't expect to master these ideas fully now, but do notice how some of the ideas arise again and again as we deal with different topics. By the end of the course, you will have a better grasp of when common sense works and when it fails, and you will be able to recognize common fallacies that are all too often offered by public figures, the press, and television commentators.

1-1a Idea 1: How Much Does It Really Cost?

Because no one has infinite riches, people are constantly forced to make choices. If you purchase a new computer, you may have to give up that trip you had planned. If a business decides to retool its factories, it may have to postpone its plans for new executive offices. If a government expands its defense program, it may be forced to reduce its outlays on school buildings.

Economists say that the true costs of such decisions are not the number of dollars spent on the computer, the new equipment, or the military, but rather *the value of what must be given up in order to acquire the item*—the vacation trip, the new executive offices, and the new schools. These are called **opportunity costs** because they represent the opportunities the individual, firm, or government must forgo to make the desired expenditure. Economists maintain that rational decision making must be based on opportunity costs, not just dollar costs (see Chapters 3, 8, 14, and 15).

The **opportunity cost** of a decision is the value of the next best alternative that must be given up because of that decision (e.g., working instead of going to school).

The cost of a college education provides a vivid example. How much do you think it *costs* to go to college? Most people are likely to answer by adding together their expenditures on tuition, room and board, books, and the like, and then deducting any scholarship funds they may receive. Suppose that amount comes to $15,000.

Economists keep score differently. They first want to know how much you would be earning if you were not attending college. Suppose that salary is $20,000 per year. This may seem irrelevant, but because you *give up* these earnings by attending college, they must be added to your tuition bill. You have that much less income because of your education. On the other side of the ledger, economists would not count *all* of the university's bill for room and board as part of the costs of your education. They would want to know how much *more* it costs you to live at school rather than at home. Economists would count only these *extra* costs as an educational expense because you would have incurred these costs whether or not you attend college. On balance, college is probably costing you much more than you think. And, as we will see later, taking opportunity cost into account in any personal planning will help you to make more rational decisions.

1-1b Idea 2: Attempts to Repeal the Laws of Supply and Demand—The Market Strikes Back

When a commodity is in short supply, its price naturally tends to rise. Sometimes disgruntled consumers badger politicians into "solving" this problem by making the high prices illegal—by imposing a ceiling on the price. Similarly, when supplies are plentiful—say, when fine weather produces extraordinarily abundant crops—prices tend to fall. Falling prices naturally dismay producers, who often succeed in getting legislators to impose price floors.

Such attempts to repeal the laws of supply and demand usually backfire and sometimes produce results virtually the opposite of those intended. Where rent controls are adopted to protect tenants, housing grows scarce because the law makes it unprofitable to build and maintain apartments. When price floors are placed under agricultural products, surpluses pile up because people buy less.

As we will see in Chapter 4 and elsewhere in this book, such consequences of interference with the price mechanism are not accidental. They follow inevitably from the way in which free markets work.

1-1c Idea 3: The Surprising Principle of Comparative Advantage

China today produces many products that Americans buy in huge quantities, including toys, textiles, and electronic equipment. American manufacturers often complain about Chinese competition and demand protection from the flood of imports that, in their view, threatens American standards of living. Is this view justified?

Economists think that it is often false. They maintain that both sides normally gain from international trade. But what if the Chinese were able to produce *everything* more cheaply than we can? Wouldn't Americans be thrown out of work and our nation be impoverished?

A remarkable result, called the law of *comparative advantage,* shows that, even in this extreme case, the two nations could still benefit by trading and that each could gain as a result! We will explain this principle first in Chapter 3 and then more fully in Chapter 35. For now, a simple parable will make the reason clear.

Suppose Sally grows up on a farm and is a whiz at plowing, but she is also a successful country singer who earns $4,000 per performance. Should Sally turn down singing engagements to leave time to work in the fields? Of course not. Instead, she should hire Alfie, a much less efficient farmer, to do the plowing for her. Sally may be better at plowing, but she earns so much more by singing that it makes sense for her to specialize in that and leave the farming to Alfie. Although Alfie is a less skilled farmer than Sally, he is an even worse singer.

So Alfie earns his living in the job at which he at least has a *comparative* advantage (his farming is not as inferior as his singing), and both Alfie and Sally gain. The same is true of two countries. Even if one of them is more efficient at everything, both countries can gain by producing the things they do best *comparatively*.

1-1d Idea 4: Trade Is a Win–Win Situation

One of the most fundamental ideas of economics is that both parties must expect to gain something in a voluntary exchange. Otherwise, why would they both agree to trade? This principle seems self-evident, yet it is amazing how often it is ignored in practice.

For example, it was widely believed for centuries that in international trade one country's gain from an exchange must be the other country's loss (Chapter 35). Analogously, some people feel instinctively that if Ms. A profits handsomely from a deal with Mr. B, then Mr. B must have been exploited. Laws sometimes prohibit mutually beneficial exchanges between buyers and sellers—as when a loan transaction is banned because the interest rate is "too high" (Chapter 18), or when a willing worker is condemned to remain unemployed because the wage she is offered is "too low" (Chapter 19), or when the resale of tickets to sporting events ("ticket scalping") is outlawed even though the buyer is happy to get the ticket that he could not obtain at a lower price (Chapter 4).

In every one of these cases, well-intentioned but misguided reasoning blocks the possible mutual gains that arise from voluntary exchange and thereby interferes with one of the most basic functions of an economic system (see Chapter 3).

1-1e Idea 5: The Importance of Thinking at the Margin

We will devote much of this book to explaining and extolling a type of decision-making process called *marginal analysis* (see especially Chapters 5, 7, 8, and 14), which we can best illustrate through an example.

Suppose an airline is told by its accountants that the full average cost of transporting one passenger from Los Angeles to New York is $300. Can the airline profit by offering a reduced fare of $200 to students who fly on a standby basis? The surprising answer is probably yes. The reason is that most of the costs of the flight must be paid whether the plane carries 20 passengers or 120 passengers.

Costs such as maintenance, landing rights, and ground crews are irrelevant to the decision of whether to carry *additional* standby passengers at reduced rates. The only costs that are relevant are the extra costs of writing and processing additional tickets, the food and beverages consumed by these passengers, the additional fuel required, and so on. These so-called *marginal costs* are probably quite small in this example. A passenger who pays the airline any amount more than it costs the airline to give her a seat that would otherwise be unused (its marginal cost of flying her) adds something to the company's profit. So it probably is more profitable to let students ride at low fares than to leave the seats empty.

In many real cases, a failure to understand marginal analysis leads decision makers to reject advantageous possibilities, like the reduced fare in our example. These people are misled by using *average* rather than *marginal* cost figures in their calculations—an error that can be very costly.

1-1f Idea 6: Externalities—A Shortcoming of the Market Cured by Market Methods

Markets are adept at producing the goods that consumers want and in just the quantities they desire. They do so by rewarding those who respond to what consumers want and who produce these commodities economically. This all works out well as long as each exchange involves only the buyer and the seller—and no one else. However, some transactions affect third parties who were not involved in the decision. Examples abound: Electric utilities that generate power for midwestern states also produce pollution that kills freshwater fish in upstate New York. A farmer sprays crops with toxic pesticides, but the poison seeps into the groundwater and affects the health of neighboring communities.

Such social costs are called *externalities* because they affect parties *external* to the economic transactions that cause them. Externalities escape the control of the market mechanism because no financial incentive motivates polluters to minimize the damage they do—as we will learn in Chapters 15 and 16. So business firms make their products as cheaply as possible, disregarding any environmental harm they may cause.

Yet Chapters 15 and 16 will point out a way for the government to use the market mechanism to control undesirable externalities. If the electric utility and the farmer are charged for the clean air and water they use, just as they are charged for any coal and fertilizer they consume, then they will have a financial incentive to reduce the amount of pollution they generate. Thus, in this case, economists believe that market methods are often the best way to cure one of the market's most important shortcomings.

1-1g Idea 7: The Trade-Off between Efficiency and Equality

Wages and income have grown more unequal in the United States since the late 1970s. Highly skilled workers have pulled away from low-skilled workers. The rich have grown richer while the poor have become (relatively) poorer, yet U.S. unemployment has been much lower than that in Europe for many years. In many European countries, inequality has not grown more extreme.

Many economists see these phenomena as two sides of the same coin. Europe and the United States have made different choices regarding how best to balance the conflicting claims of greater economic efficiency (more output and jobs) versus greater equality.

Roughly speaking, the American solution is to let markets work to promote efficiency—something they are very good at doing—with only minimal government interferences to reduce economic inequalities. (Some of these interferences are studied in Chapter 20.) However, much of continental Europe takes a different view. They find it scandalous that many Americans work for less than $7.50 per hour, with virtually no fringe benefits and no job security. European laws mandate not only relatively high minimum wages but also substantial fringe benefits and employment protections; of course, European taxes must be much higher to pay for these programs.

As economists see it, each system's virtue is also its vice. There is an agonizing *trade-off* between the *size* of a nation's output and the degree of *equality* with which that output is distributed. European-style policies designed to divide the proverbial economic pie more equally inadvertently can cause the size of the pie to shrink. American-style arrangements that promote maximal efficiency and output may permit or even breed huge inequalities and poverty. Which system is better? There is no clear answer, but we will examine the issue in detail in Chapter 20.

1-1h Idea 8: Government Policies Can Limit Economic Fluctuations—But Don't Always Succeed

One of the most persistent and troubling problems of market economies has been their tendency to go through cycles of boom and bust. The booms, as we shall see, often bring inflation, and the busts always raise unemployment. Years ago, economists, businesspeople, and politicians viewed these fluctuations as inevitable: There was nothing the government could or should do about them.

That view is now considered obsolete. As we will learn in Part 7, and especially Part 8, modern governments have an arsenal of weapons that they can and do deploy to try to mitigate fluctuations in their national economies—to limit both inflation and unemployment. Some of these weapons constitute what is called *fiscal policy*: control over taxes and government spending. Others come from *monetary policy*: control over money and interest rates. Both were used on a grand scale to fight the Great Recession of 2007–2009.

But *trying* to tame the business cycle is not the same as *succeeding*. Economic fluctuations remain with us, and one reason is that the government's fiscal and monetary policies sometimes fail—for both political and economic reasons. As we will see in Part 8, policy makers do not always make the right decisions. And even when they do, the economy does not always react as policymakers hope. Furthermore, for reasons we will explain later, the "right" decision is not always clear. To this day, many of the fiscal and monetary policies of 2008 and 2009 remain highly controversial.

1-1i Idea 9: The Short-Run Trade-Off between Inflation and Unemployment

The U.S. economy was lucky in the second half of the 1990s. A set of fortuitous events—falling energy prices, tumbling computer prices, a rising dollar, and so on—pushed inflation down even as unemployment fell to its lowest level in almost 30 years. During the 1970s and early 1980s, the United States was not so fortunate. Skyrocketing prices for food and energy sent both inflation and unemployment up to extraordinary heights. In both episodes, then, inflation and unemployment moved in the same direction.

But economists maintain that neither of these two episodes was "normal." When we are experiencing neither unusually good luck (as in the 1990s) nor exceptionally bad luck (as in the 1970s), there is a *trade-off between inflation and unemployment*—meaning that low

unemployment normally makes inflation rise and high unemployment normally makes inflation fall. For example, the high unemployment of 2008–2010 pushed the inflation rate down so low that people began worrying about *negative* inflation rates, or *de*flation. We will study the mechanisms underlying this trade-off in Parts 7 and 8, especially in Chapter 34. It poses one of the fundamental dilemmas of national economic policy.

1-1j Idea 10: Productivity Growth Is (Almost) Everything in the Long Run

Today in Geneva, Switzerland, workers in a watch factory turn out more than 100 times as many mechanical watches per year as their ancestors did three centuries earlier. The productivity of labor (output per hour of work) in cotton production has probably gone up more than 1,000-fold in 200 years. It is estimated that rising labor productivity has increased the standard of living of a typical American worker approximately sevenfold in the past century (see Chapter 24).

Other economic issues such as unemployment, monopoly, and inequality are important to us all and receive much attention in economics. But in the long run, nothing has as great an effect on our material well-being and the amounts society can afford to spend on hospitals, schools, and social amenities as the rate of growth of productivity—the amount that an average worker can produce in an hour. Chapter 24 points out that what appears to be a small increase in productivity growth can have a huge effect on a country's standard of living over a long period of time because productivity compounds like the interest on savings in a bank. Similarly, a slowdown in productivity growth that persists for a substantial number of years can have a devastating effect on living standards.

1-1k Epilogue

These ideas are some of the more fundamental concepts you will find in this book—ideas that we hope you will retain beyond the final exam. There is no need to master them right now, for you will hear much more about each as you progress through the book. By the end of the course, you may be amazed to see how natural, or even obvious, they will seem.

1-2 INSIDE THE ECONOMIST'S TOOL KIT

We turn now from the kinds of issues economists deal with to some of the tools they use to grapple with them.

1-2a Economics as a Discipline

Although economics is clearly the most rigorous of the social sciences, it nevertheless looks decidedly more "social" than "scientific" when compared with, say, physics. An economist must be a jack of several trades, borrowing modes of analysis from numerous fields. Mathematical reasoning is often used in economics, but so is historical study. And neither looks quite the same as when practiced by a mathematician or a historian. Statistics play a major role in modern economic inquiry, although economists had to modify standard statistical procedures to fit their kinds of data.

1-2b The Need for Abstraction

Some students find economics unduly abstract and "unrealistic." The stylized world envisioned by economic theory seems only a distant cousin to the world they know. There is an old joke about three people—a chemist, a physicist, and an economist—stranded on a desert island with an ample supply of canned food but no tools to open the cans. The chemist thinks that lighting a fire under the cans would burst the cans. The physicist advocates building a catapult with which to smash the cans against some boulders. The economist's suggestion? "Let's assume we have a can opener."

Economic theory *does* make some unrealistic assumptions—you will encounter some of them in this book—but some abstraction from reality is necessary because of the incredible complexity of the economic world, not because economists like to sound absurd.

Compare the chemist's simple task of explaining the interactions of compounds in a chemical reaction with the economist's complex task of explaining the interactions of people in an economy. Are molecules motivated by greed or altruism, by envy or ambition? Do they ever imitate other molecules? Do forecasts about them influence their behavior? People, of course, do all these things and many, many more. It is therefore vastly more difficult to predict human behavior than to predict chemical reactions. If economists tried to keep track of every feature of human behavior, they would never get anywhere. Thus:

Abstraction from unimportant details is necessary to understand the functioning of anything as complex as the economy.

From *The Wall Street Journal*—Permission, Cartoon Features Syndicate.

"Yes, John, we'd all like to make economics less dismal . . ."

NOTE: The nineteenth-century British writer Thomas Carlyle described economics as the "dismal science," a label that stuck.

An analogy will make it clear why economists **abstract** from details. Suppose you have just arrived for the first time in Los Angeles. You are now at the Los Angeles Civic Center—the point marked *A* in Maps 1 and 2, which are alternative maps of part of Los Angeles. You want to drive to the Los Angeles County Museum of Art, point *B* on each map. Which map would be more useful?

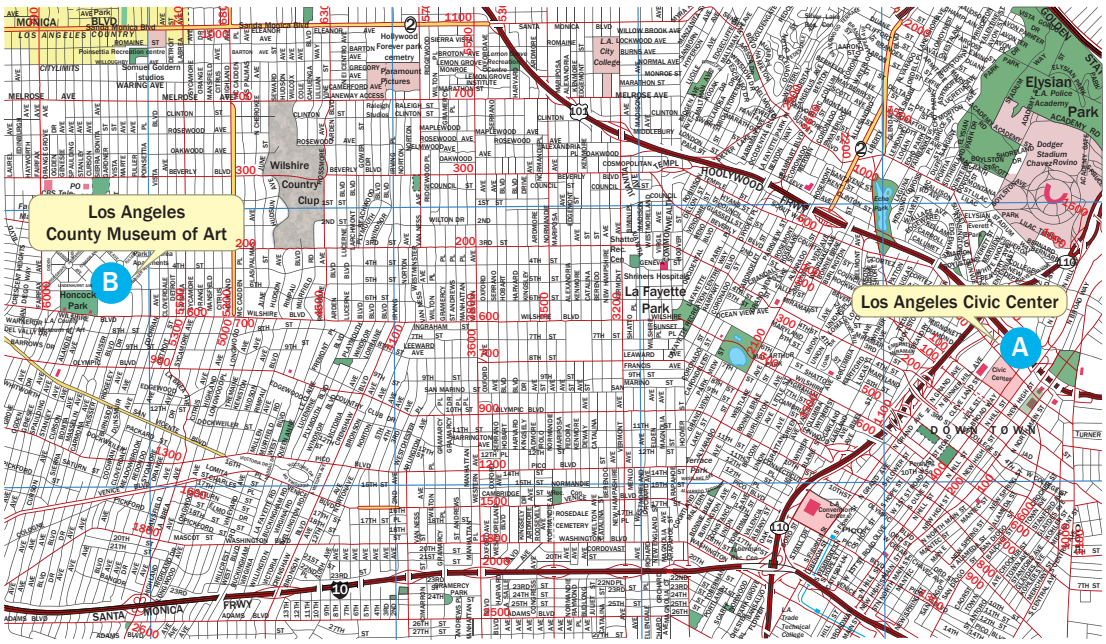
Abstraction means ignoring many details so as to focus on the most important elements of a problem.

Map 1 has complete details of the Los Angeles road system, but this makes it hard to read and hard to use as a way to find the art museum. For this purpose, Map 1 is far too detailed, although for other purposes (e.g., locating a small street in Hollywood) it may be far better than Map 2.

In contrast, Map 2 omits many minor roads—you might say they are *assumed away*—so that the freeways and major arteries stand out more clearly. As a result of this simplification, several routes from the Civic Center to the Los Angeles County Museum of Art

Map 1

Detailed Road Map of Los Angeles



NOTE: Point *A* marks the Los Angeles Civic Center, and point *B* marks the Los Angeles County Museum of Art.