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Microeconomics
and Behavior

Robert H. Frank





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MICROECONOMICS AND BEHAVIOR

Ninth Edition

ROBERT H. FRANK

Cornell University

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MICROECONOMICS & BEHAVIOR, NINTH EDITION

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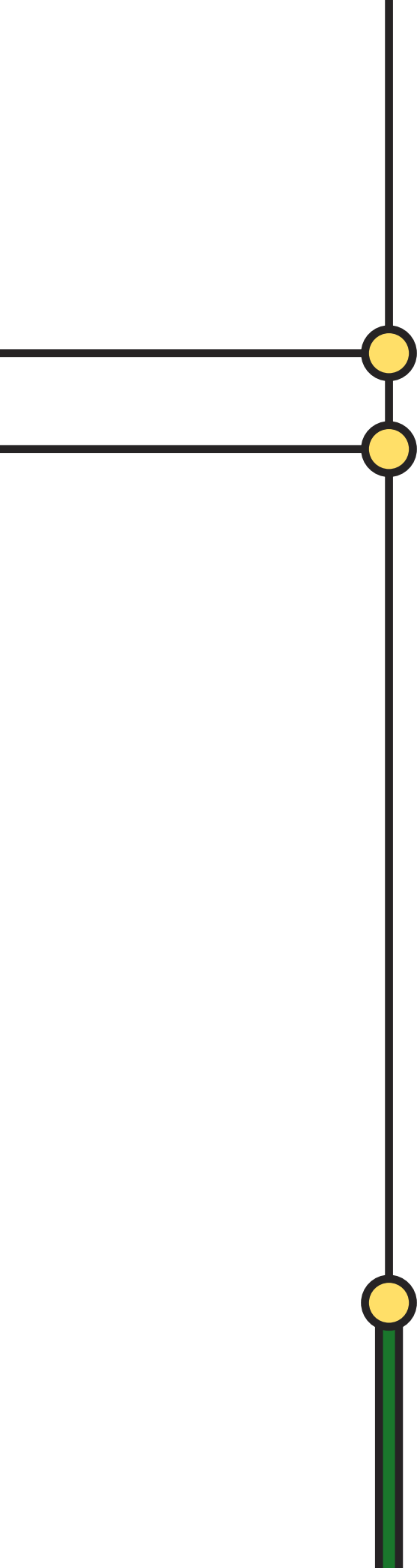
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For David, Jason, Chris, and Hayden

ABOUT THE AUTHOR



Robert H. Frank is the Henrietta Johnson Louis Professor of Management and Professor of Economics at the Johnson Graduate School of Management at Cornell University. His “Economic View” column appears monthly in *The New York Times*. After receiving his B. S. from Georgia Tech, he taught math and science for two years as a Peace Corps volunteer in rural Nepal. After receiving his M. A. in statistics and his Ph.D. in economics from the University of California at Berkeley, he began his teaching career at Cornell. During leaves of absence from the university, he served as chief economist for the Civil Aeronautics Board, a Fellow at the Center for Advanced Study in the Behavioral Sciences, Professor of American Civilization at l’École des Hautes Études en Sciences Sociales in Paris, and the Peter and Charlotte Schoenfeld Visiting Scholar at the NYU Stern School of Business. His research has focused on rivalry and cooperation in economic and social behavior. His books on these themes, which include *Choosing the Right Pond*, *What Price the Moral High Ground?*, *Passions Within Reason*, *The Economic Naturalist*, *Falling Behind*, and *The Darwin Economy*, have been translated into 22 languages. Other books include *The Economic Naturalist’s Field Guide* and *Principles of Economics*, co-authored with Ben Bernanke. *The Winner-Take-All Society*, co-authored with Philip Cook, received a Critic’s Choice Award, was named a Notable Book of the Year by *The New York Times*, and was included on *BusinessWeek*’s list of the 10 best books 1995. His *Luxury Fever* was named to the Knight-Ridder Best Books list for 1999. He is past president of the Eastern Economic Association, a co-recipient of the 2004 Leontief Prize for Advancing the Frontiers of Economic Thought, and a recipient of the Merrill Scholars Program Outstanding Educators Citation. At the Johnson School, he was awarded the Russell Distinguished Teaching Award in 2004, 2010, and 2012, and the Apple Distinguished Teaching Award in 2005.



My goal in writing *Microeconomics and Behavior* was to produce an intellectually challenging text that would also be accessible and engaging to students. The more common approach in this market has been to emphasize one of these dimensions or the other. For example, some texts have done well by sacrificing rigor in the name of user-friendliness. But although such books sometimes keep students happy, they often fail to prepare them for upper-division courses in the major. Others texts have succeeded by sacrificing accessibility in the name of rigor, where rigor all too often means little more than mathematical density. These courses overwhelm many undergraduates, and even those few who become adept at solving well-posed mathematical optimization problems are often baffled by questions drawn from everyday contexts. I have always believed that a text could at once be rigorous *and* user-friendly. And to judge by the breadth of *Microeconomics and Behavior's* adoption list, many of you apparently agree.

I wrote this book in the conviction that the teaching of intuition and the teaching of technical tools are complements, not substitutes. Students who learn only technical tools rarely seem to develop any real affection for our discipline; and even more rarely do they acquire that distinctive mindset we call “thinking like an economist.” By contrast, students who develop economic intuition are stimulated to think more deeply about the technical tools they learn, and to find more interesting ways to apply them. Most important, they usually end up *liking* economics.

Microeconomics and Behavior develops the core analytical tools with patience and attention to detail. At the same time, it embeds these tools in a uniquely diverse collection of examples and applications to illuminate the power and versatility of the economic way of thinking.

ECONOMIC NATURALISM

In more than forty years of teaching, I have found no more effective device for developing intuition than to train students to become “Economic Naturalists.” Studying biology enables people to observe and marvel at many details of life that would otherwise have escaped notice. In much the same way, studying microeconomics can enable students to see the mundane details of ordinary existence in a sharp new light. Throughout the text, I try to develop intuition by

means of examples and applications drawn from everyday experience. *Microeconomics and Behavior* teaches students to see each feature of the manmade landscape as the reflection of an implicit or explicit cost-benefit calculation.

To illustrate, an Economic Naturalist is someone who wonders why the business manager of the economics department was delighted when I began putting the lecture notes for my course on the university’s intranet server, whereas the very same move troubled the associate dean in the management school, where I also teach. About a week into the term, I got an urgent letter from this dean telling me that henceforth I should make hardcopies of my lecture notes for distribution to students free of charge. No similar instruction came from the business manager of the economics department. When I asked for clarification, the management school’s dean told me that students had been downloading my notes and printing them in the school’s computer labs at a cost of 5 cents a page, which was far more than the 1.25 cents the school’s copy center was charging at the time. Fair enough. But then why was the economics department’s administrator not worried about the same problem? (When I asked whether he wanted me to distribute hardcopies of my notes, he replied “Don’t you dare!”)

Their different viewpoints, I soon discovered, had nothing to do with the very different cultures of the two units. Instead, they stemmed from a small but important difference in economic incentives: In the management school, the same administrator pays for printing in both the computer labs and the copy center. The economics department administrator, however, pays only for printing on the department copier. When economics students print my lecture notes off the Web in the various campus computer laboratories in the Arts College, the bills go directly to the College. From the economics department’s point of view, these copies were free.

Year in and year out, the most valuable assignments in my course are the two brief papers in which I ask students to report on their efforts to become economic naturalists. Their specific charge is to use microeconomic principles to answer a question prompted by a personal observation. In recent terms, students have grappled with questions like these: Why do the keypads of drive-up ATM machines have Braille dots? Why do top female models earn more than top male models? Why do brides spend so much money on wedding dresses, while grooms

often rent cheap tuxedos (even though grooms could potentially wear their tuxedos on many other occasions and brides will never wear their dresses again)? Why are child safety seats required in cars but not for air travel? Why do airlines charge their highest prices to passengers who buy at the last minute, while the practice is exactly the reverse for Broadway theaters?

The beauty of this assignment is not only that most students enjoy writing these papers, but also that few manage to complete them without becoming life-long economic naturalists. For those who would like to learn more about the assignment, my lecture on it is posted in the Authors@google series here: www.youtube.com/watch?v=QalNVxeIKKE.

FOCUS ON PROBLEM SOLVING —

Most economists agree that a critical step in learning price theory is to solve problems. More than any other text currently available in the marketplace, *Microeconomics and Behavior* prepares students for its end-of-chapter problems by taking them through a sequence of carefully crafted examples and concept checks within each chapter. Because most of these examples and concept checks are drawn from familiar contexts, and because students engage more readily with the concrete than with the abstract, this approach has proven effectiveness. In the absence of such groundwork, many students would reach the end-of-chapter problems with little or no idea how to proceed.

OPTIMAL TOPIC COVERAGE —

A guiding principle in the evolution of *Microeconomics and Behavior* has been that topics should be emphasized in proportion both to their importance and to the difficulty that students have in mastering them. Because the basic rational choice model is the building block for much of what comes later in the course, I have devoted considerably more attention to its development than competing texts do. I have also allocated extra space for elasticity and its applications in demand theory, and for the average-marginal distinction in production theory.

As an additional means for discovering which topics are most difficult to master, I have used research in behavioral economics that identifies systematic departures from the prescriptions of the rational choice model. For example, whereas the model says that rational persons will ignore sunk costs, many people are in fact strongly influenced by them. (Someone who receives an expensive, but painfully tight, pair of shoes as a gift is much less

likely to wear them than is someone who spent \$400 out of his own pocket for those same shoes.) Especially in the chapters on consumer behavior, I call students' attention to situations in which they themselves are likely to make irrational choices. Because student resources are limited, it makes sense to focus on precisely those issues for which knowing price theory is most likely to be helpful.

It may seem natural to wonder whether discussing examples of irrational choices might confuse students who are struggling to master the details of the rational choice model. It's a reasonable question, but my experience has been exactly to the contrary. Such examples actually underscore the normative message of the traditional theory. Students who are exposed to them invariably gain a deeper understanding of the basic theoretical principles at issue. Indeed, they often seem to take an almost conspiratorial pride in being able to see through the errors of judgment that many consumers make. For instructors who want to pursue how cognitive limitations affect consumer behavior in greater detail, there is an entire chapter devoted to this topic. When the first edition of *Microeconomics and Behavior* appeared in 1990, many in the economics profession were skeptical about the emerging field of behavioral economics. But as evidenced by U.C. Berkeley economist Matthew Rabin's receipt of the John Bates Clark Award in 2000 (the honor bestowed every two years by the American Economics Association on the most outstanding American economist under the age of 40) and by Daniel Kahneman's receipt of the Nobel Prize in Economics in 2002, the behavioral approach is now part of the microeconomics mainstream.

A BROADER CONCEPTION OF SELF-INTEREST —

Another of my goals has been to incorporate a broader conception of preferences into models of individual choice. Most texts mention at the outset that the rational choice model takes people's tastes as given. They may be altruists, sadists, or masochists; or they may be concerned solely with advancing their narrow material interests. But having said that, most texts then proceed to ignore all motives other than narrow self-interest. It is easy to see why, because economic research has scored its most impressive gains on the strength of this portrayal of human motivation. It tells us, for example, why Ford discontinued production of its 7,500-pound Excursion SUV in the wake of gasoline price increases; and why thermostats are generally set lower in apartments that have separately metered utilities.

And yet, as students are keenly aware, our *Homo economicus* caricature is patently at odds with much of what we know about human behavior. People vote in presidential elections. They give anonymously to public television stations and private charities. They donate bone marrow to strangers with leukemia. They endure great trouble and expense to see justice done, even when it will not undo the original injury. At great risk to themselves, they pull people from burning buildings, and jump into icy rivers to rescue people who are about to drown. Soldiers throw their bodies atop live grenades to save their comrades. Seen through the lens of the self-interest theory emphasized in most textbooks, such behavior is the human equivalent of planets traveling in square orbits. Indeed, many students are strongly alienated by our self-interest model, which they perceive as narrow and mean-spirited.

Microeconomics and Behavior freely concedes the importance of the self-interest motive in many contexts. But it also highlights the role of unselfish motives in social and economic transactions. Employing elementary game theory, Chapter 12 identifies circumstances in which people who hold such motives have a competitive advantage over pure opportunists. It shows, for example, that people known to have cooperative predispositions can often solve prisoner's dilemmas and other commitment problems in ways that purely self-interested persons cannot.

Our theoretical models of human nature are important, not least because they mold our expectations about how others will behave. Economics is the social science most closely identified with the self-interest model of human behavior. Does this model color our expectations of others, and perhaps even our own behavior? When Cornell psychologists Tom Gilovich, Dennis Regan, and I investigated this question, we found numerous indications that economists are much more likely than others to behave opportunistically in social dilemmas.¹ For example, academic economists were more than twice as likely as the members of any other discipline we surveyed to report that they give no money at all to any private charity. In an experiment, we also found that economics majors were more than twice as likely as nonmajors to defect when playing one-shot prisoner's dilemmas with strangers.

This difference was not merely a reflection of the fact that people who chose to major in economics were more opportunistic to begin with. We found, for example, that the difference in defection rates grew larger

the longer a student had studied economics. Questionnaire responses also indicated that freshmen in their first microeconomics course were more likely at the end of the term to expect opportunistic behavior from others than they were at the beginning.

There are thus at least some grounds for concern that, by stressing only the narrow self-interest motive, economists may have undermined our students' propensities for cooperative behavior. The irony is that the internal logic of the economic model never predicted such narrowly self-interested behavior in the first place.

ADDITIONAL PEDAGOGICAL FEATURES

Unlike most intermediate texts, *Microeconomics and Behavior* contains no boxed applications, which tend to distract students from the thread of argument being developed. Instead, applications and examples are integrated fully into the text. Many of these have the added advantage of being drawn from experiences to which students can personally relate.

The chapter introductions and summaries are another innovative feature of *Microeconomics and Behavior*. Most chapters begin with an anecdote that poses a problem or question that the material developed in the chapter will enable the student to answer. These introductions have proved especially helpful for the many students who find that getting started is often the hardest step. The chapter summaries in most current texts consist of brief annotated lists of the topics covered. The chapter summaries in *Microeconomics and Behavior*, by contrast, are written in a narrative form that carefully synthesizes the material covered in the chapters.

Each chapter concludes with a selection of problems that range in difficulty from routine to highly challenging. These problems have all been class-tested to assure their accuracy and effectiveness in helping students master the most important concepts in the chapters.

Answers to all in-text concept checks appear at the end of the chapter in which they occur. Variations and extensions of these concept checks are echoed in the end-of-chapter problems, which enables students to approach these problem sets with greater confidence. Detailed answers to all end-of-chapter problems are included in the instructor's manual.

Evidence suggests that introductory economics courses leave little measurable trace on the students who take them. Six months after having taken them, for example, students score no better on tests that probe their knowledge of basic economic principles

¹See R. H. Frank, T. D. Gilovich, and D. T. Regan, "Does Studying Economics Inhibit Cooperation?" *Journal of Economic Perspectives*, Spring 1993.

than others who never took the course at all. In my 2007 book *The Economic Naturalist*, I argue that this dismal performance owes largely to the fact that the typical introductory course tries to expose students to far too many ideas and concepts, so that, by semester's end, everything seems to have gone by in a blur. These courses would be much more effective, I believe, if they focused instead on repeated applications of the short list of basic principles that do most of the heavy lifting in economics.

We lack the necessary studies to assess definitively whether intermediate economics courses are ineffective in similar ways. But when teaching microeconomics to first-year Ph.D. students in economics in the 1980s, I noticed that a remarkably high proportion of them seemed to have developed little economic intuition from their exposure to economics courses as undergraduates. One of my reasons for writing the first edition of this book in 1991 was my conviction that we need to focus more intensively on repeated application of core ideas in the intermediate course. In keeping with that approach in the ninth edition, I have tried in each chapter to extract a small number of central insights for succinct summary in the margins.

CHANGES IN THE NINTH EDITION

Each chapter now begins with a list of the main ideas students can expect to master as they work through the chapter. In the end-of-chapter materials, points of correspondence are flagged between these individual learning objectives and specific points covered in the chapter summary, review questions, problems, and answers to concept checks.

Beyond the usual updating of time-sensitive numerical examples, I have also tried to achieve a simpler and more unified design look throughout the text. The Examples and Exercises (now named Concept Checks) from the previous edition have been redesigned to provide more clarity and ease of use. Data has been updated accordingly throughout.

Material from chapters 7 and 8 in earlier editions is combined in this edition to form chapter 7, "Departures from Traditional Rational Choice Models (with and without regret)." This chapter's aim is to call students' attention to two important strands in the burgeoning behavioral economics literature, each of which considers predictions of traditional rational choice models that often fail to hold. The first focuses

on examples in which predictions fail because people appear to be pursuing motives other than those traditionally assumed, the second on cases in which systematic cognitive errors lead people to choose irrationally.

Another substantial change in the ninth edition is expanded coverage of game theory and models of imperfect competition. In earlier editions, these subjects were treated in a single chapter (chapter 12). Chapter 12 is now confined to game theory and includes material on evolutionary game theory formally treated in chapter 7. Models of oligopoly and monopolistic competition are now treated separately in Chapter 13.

A final significant change in the ninth edition is the reintroduction of a separate chapter on general equilibrium theory.

SUPPLEMENTS FOR THE INSTRUCTOR

The following ancillaries are available for quick download and convenient access via the book's website at www.mhhe.com/frank9e and are password protected for security.

The supplements package, which has been revised and improved, now consists of the following materials:

Instructor's Manual: Each chapter contains a Chapter Summary, a Chapter Outline, Teaching Suggestions, a list of Stumbling Blocks for Students, Answers to Text Questions for Review, Problems, and Study Guide Homework Assignments.

Test Bank: The comprehensive selection of book-specific items available in the Test Bank includes multiple choice and essay questions that test students' knowledge of key terms and concepts.

PowerPoints: The PowerPoints contain a detailed, chapter-by-chapter review of the important concepts and figures presented in the textbook. You can print, or rearrange the slides to fit the needs of your course.

SUPPLEMENTS FOR THE STUDENT

Online Learning Center (www.mhhe.com/frank9e): For students there are such useful features as the PowerPoints, practice quizzes, and Study Guide as described below.

Study Guide: For each chapter, the Study Guide provides the following sections: Boiling Down (the chapter), Chapter Outline, Important Terms, A Case to Consider, Multiple-Choice Questions, Problems, and Homework Assignments. This invaluable study tool has been revised by Professor Halteman.

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I want to convey my sincere thanks and admiration to my editors at McGraw-Hill for their continued willingness to take steps that run counter to market trends. The biggest gambles, of course, were those taken by Scott Stratford, my editor for the first edition. (I hope he is pleased that subsequent developments in the economics profession appear to have ratified the wisdom of those early decisions.) Scott's successors, Douglas Reiner, Michele Janicek, and Christina Kouvelis, have worked attentively on this project. I am extremely grateful for their enthusiastic support.

I also want to thank the many reviewers who have been involved in the project, both in this edition and in earlier ones. Their insights and critiques have led to improvements too numerous to list. I hope they are as happy as I am with their influence on the final product.

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As usual, I welcome further comments and suggestions.

Robert H. Frank



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INTRODUCTION

In these first two chapters we review material from the introductory microeconomics course. Chapter 1 applies the principles of cost-benefit analysis to a variety of choices familiar from experience. Its goal is to give you an intuitive feel for what it means to “think like an economist.”

Chapter 2 develops basic supply and demand analysis, our analytical tool for explaining the prices and quantities of goods traded in markets. We will see that although unregulated markets may not always yield outcomes we like, they often produce the best results attainable under the circumstances. By contrast, governmental efforts to help the poor by regulating prices and quantities often produce undesired side effects. We will see that a better way to assist the poor is with programs that increase their incomes.

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Thinking Like an Economist

Much of microeconomics entails the study of how people choose under conditions of scarcity. Many people react to this description by saying that the subject is of little real relevance in developed countries, where material scarcity is largely a thing of the past.

This reaction, however, takes too narrow a view of the Greek shipping magnate scarcity, for there are *always* important resources in short supply. At his death, Aristotle Onassis was worth several billion dollars. He had more money than he could possibly spend and used it for such things as finely crafted whale ivory footrests for the barstools on his yacht. And yet he confronted the problem of scarcity much more than most of us will ever have to. Onassis was the victim of *myasthenia gravis*, a debilitating and progressive neurological disease. For him, the scarcity that mattered was not money but time, energy, and the physical skill needed to carry out ordinary activities.

Time is a scarce resource for everyone, not just the terminally ill. In deciding which movies to see, for example, it is time, not the price of admission, that constrains most of us. With only a few free nights available each month, seeing one movie means not being able to see another, or not being able to have dinner with friends.

Time and money are not the only important scarce resources. Consider the economic choice you confront when a friend invites you to a buffet brunch. You must decide how to fill your plate. Even if you are not rich, money would be no object, since you can eat as much as you want for free. Nor is time an obstacle, since you have all afternoon and would enjoy spending it in the company of your friend. The important scarce resource here is the capacity of your stomach. A smorgasbord of your favorite foods lies before you, and you must decide which to eat and in what quantities. Eating another waffle necessarily means having less room for more scrambled eggs. The fact that no money changes hands here does not make your choice any less an economic one.

Every choice involves important elements of scarcity. Sometimes the most relevant scarcity will involve money, but not always. Coping with scarcity is the essence of the human condition. Indeed, were it not for the problem of scarcity, life would be stripped of much of its intensity. For someone with an infinite lifetime and limitless material resources, hardly a single decision would ever matter. If you made a bad decision today, you could always start with a clean slate tomorrow.

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- LO1 Explain and apply the cost-benefit principle.
- LO2 Explain the uses and limitations of economic models.
- LO3 Describe the four common decision pitfalls.
- LO4 Translate quantitative information about costs and benefits into graphical form.
- LO5 Describe Adam Smith's invisible hand theory.
- LO6 Give several clear examples of how basic economic principles can be used to explain patterns of behavior observed in everyday life.
- LO7 Explain the difference between positive and normative theories.
- LO8 Explain the difference between microeconomics and macroeconomics.



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"Oh, it's great here, all right, but I sort of feel uncomfortable in a place with no budget at all."

In this chapter we examine some basic principles of microeconomic theory and see how an economist might apply them to a wide variety of choices involving scarcity. Later chapters more formally develop the theory. For now, our only goal is to get an intuitive feel for that distinctive mindset known as "thinking like an economist." And the best way to do that is to work through a series of problems familiar from actual experience.

THE COST-BENEFIT APPROACH TO DECISIONS

If the benefit of an activity exceeds its cost, do it.

Many of the choices economists study can be posed as the following question:

Should I do activity x ?

For the choice confronting a moviegoer, "... do activity x ?" might be, for example, "... see *Casablanca* tonight?" For the person attending the buffet brunch, it might be "... eat another waffle?" Economists answer such questions by comparing the costs and benefits of doing the activity in question. The decision rule we use is disarmingly simple. If $C(x)$ denotes the costs of doing x and $B(x)$ denotes the benefits, it is:

If $B(x) > C(x)$, do x ; otherwise don't.

To apply this rule, we must define and measure costs and benefits. Monetary values are a useful common denominator for this purpose, even when the activity has nothing directly to do with money. We define $B(x)$ as the maximum dollar amount you would be willing to pay to do x . Often $B(x)$ will be a hypothetical magnitude, the amount you would be willing to pay if you had to, even though no money will change hands. $C(x)$, in turn, is the value of all the resources you must give up in order to do x . Here too $C(x)$ need not involve an explicit transfer of money.

For most decisions, at least some of the benefits or costs will not be readily available in monetary terms. To see how we proceed in such cases, consider the following simple decision.

Comparing Costs and Benefits

EXAMPLE 1.1

Should I turn down my stereo?

You have settled into a comfortable chair and are listening to your stereo when you realize that the next two tracks on the disc are ones you dislike. If you had a programmable player, you would have programmed it not to play them. But you don't, and so you must decide whether to get up and turn the music down or stay put and wait it out.

The benefit of turning it down is not having the songs you don't like blare away at you. The cost, in turn, is the inconvenience of getting out of your chair. If you are extremely comfortable and the music is only mildly annoying, you will probably stay put. But if you haven't been settled for long or if the music is really bothersome, you are more likely to get up.

Even for simple decisions like this one, it is possible to translate the relevant costs and benefits into a monetary framework. Consider first the cost of getting out of your chair. If someone offered you 1 cent to get up out of a comfortable chair and there were no reason other than the penny to do it, would you take the offer? Most people would not. But if someone offered you \$1000, you would be on your feet in an instant. Somewhere between 1 cent and \$1000 lies your **reservation price**, the minimum amount it would take to get you out of the chair.

To see where the threshold lies, imagine a mental auction with yourself in which you keep boosting the offer by small increments from 1 cent until you reach the point at which it is barely worthwhile to get up. Where this point occurs will obviously depend on circumstance. If you are rich, it will tend to be higher than if you are poor, because a given amount of money will seem less important; if you feel energetic, it will be lower than if you feel tired; and so on. For the sake of discussion, suppose your reservation price for getting out of the chair turns out to be \$1. You can conduct a similar mental auction to determine the maximum sum you would be willing to pay someone to turn the music down. This reservation price measures the benefits of turning the music down; let's suppose it turns out to be 75 cents.

In terms of our formal decision rule, we then have $x = \text{"turn my stereo down,"}$ with $B(x) = \$0.75 < C(x) = \1 , which means that you should remain in your chair. Listening to the next two songs will be unpleasant, but less so than getting up

reservation price of activity x the price at which a person would be indifferent between doing x and not doing x .



"Blown-Away Man," image by Steve Steigman.

Is it worth the trouble to turn down your stereo?

would be. A reversal of these cost and benefit figures would imply a decision to get up and turn the music down. If $B(x)$ and $C(x)$ happened to be equal, you would be indifferent between the two alternatives.

THE ROLE OF ECONOMIC THEORY

The idea that anyone might actually calculate the costs and benefits of turning down a stereo may sound absurd. Economists have been criticized for making unrealistic assumptions about how people behave, and outsiders are quick to wonder what purpose is served by the image of a person trying to decide how much he would pay to avoid getting up from his chair.

There are two responses to this criticism. The first is that economists don't assume that people make such calculations explicitly. Rather, many economists argue, we can make useful predictions by assuming people act *as if* they made such calculations. This view was forcefully expressed by Nobel laureate Milton Friedman, who illustrated his point by looking at the techniques expert pool players use.¹ He argued that the shots they choose, and the specific ways they attempt to make them, can be predicted extremely well by assuming that players take careful account of all the relevant laws of Newtonian physics. Of course, few expert pool players have had formal training in physics, and hardly any can recite such laws as “the angle of incidence equals the angle of reflection.” Nor are they likely to know the definitions of “elastic collisions” and “angular momentum.” Even so, Friedman argued, they would never have become expert players in the first place *unless* they played as dictated by the laws of physics. Our theory of pool player behavior assumes, unrealistically, that players know the laws of physics. Friedman urged us to judge this theory not by how accurate its central assumption is but by how well it predicts behavior. And on this score, it performs very well indeed.

People don't always behave as predicted by economic models, but the models provide useful insights about how to achieve important goals.



Professional pool champion Corey Deuel may not know all the formal laws of Newtonian physics, but the quality of his play suggests that he has a deep understanding of them.

Like pool players, we must also develop skills for coping with our environments. Many economists, Friedman among them, believe that useful insights into our behavior can be gained by assuming that we act as if governed by the rules of rational decision making. By trial and error we eventually absorb these rules, just as pool players absorb the laws of physics.

A second response to the charge that economists make unrealistic assumptions is to concede that behavior does often differ from the predictions of economic models. Thus, as economist Richard Thaler puts it, we often behave more like novice than expert pool players—ignoring bank shots and having no idea about putting the proper spin on the cue ball to position it for the next shot. Considerable evidence supports this second view.

But even where economic models fail on descriptive grounds, they often provide useful guidance for decisions. That is, even if they don't always predict how we *do* behave, they may often give useful insights into how to achieve our

¹Milton Friedman, “The Methodology of Positive Economics,” *Essays in Positive Economics*, Chicago: University of Chicago Press, 1953.

goals more efficiently. If novice pool players have not yet internalized the relevant physical laws, they may nonetheless consult those laws for guidance about how to improve. Economic models often play an analogous role with respect to ordinary consumer and business decisions. Indeed, this role alone provides a compelling reason for learning economics.

COMMON PITFALLS IN DECISION MAKING

Some economists are embarrassed if an outsider points out that much of what they do boils down to an application of the principle that we should perform an action if and only if its benefits exceed its costs. That just doesn't sound like enough to keep a person with a PhD busy all day! There is more to it, however, than meets the eye. People who study economics quickly discover that measuring costs and benefits is as much an art as a science. Some costs seem almost deliberately hidden from view. Others may seem relevant but, on a closer look, turn out not to be.

Economics teaches us how to identify the costs and benefits that really matter. An important goal of this book is to teach you to become a better decision maker. A good starting point is to examine some common pitfalls in decision making. The relevant economic principles are simple and commonsensical, but many people ignore them.

PITFALL I. IGNORING IMPLICIT COSTS

One pitfall is to overlook costs that are not explicit. If doing activity x means not being able to do activity y , then the value to you of doing y (had you done it) is an **opportunity cost** of doing x . Many people make bad decisions because they tend to ignore the value of such forgone opportunities. This insight suggests that it will almost always be instructive to translate questions such as "Should I do x ?" into ones such as "Should I do x or y ?" In the latter question, y is simply the most highly valued alternative to doing x . Example 1.2 helps drive this important point home.

opportunity cost of activity
the value of all that must be sacrificed to do the activity.

Implicit Cost

EXAMPLE 1.2

Should I go skiing today or work as a research assistant?

There is a ski area near your campus. From experience you know that a day on the slopes is worth \$60 to you. The charge for the day is \$40 (which includes bus fare, lift ticket, and equipment). However, this is not the only cost of going skiing. You must also take into account the value of the most attractive alternative you will forgo by heading for the slopes. Suppose the best alternative is your new job as a professor's research assistant. The job pays \$45 per day, and you like it just well enough to be willing to do it for free. The question you face is, "Should I go skiing or work as a research assistant?"

Here the cost of skiing is not just the explicit cost of the ski package (\$40) but also the opportunity cost of the lost earnings (\$45). The total costs are therefore \$85, which exceeds the benefits of \$60. Since $C(x) > B(x)$, you should stay on campus and work for your professor. Someone who ignored the opportunity cost of the forgone earnings would decide incorrectly to go skiing.

The fact that you liked the research job just well enough to have been willing to do it for free is another way of saying there were no psychic costs associated with doing it. This is important because it means that by not doing the job you would not have been escaping something unpleasant. Of course, not all jobs fall into this category. Suppose instead that your job is to scrape plates in the dining hall for the same pay, \$45/day, and that the job is so unpleasant that you would be unwilling to do it for less than \$30/day. Assuming your manager at the dining hall permits you to take a day off whenever you want, let's now reconsider your decision about whether to go skiing.

EXAMPLE 1.3

Costs and Benefits Are Reciprocal

Should I go skiing today or scrape plates?

There are two equivalent ways of looking at this decision. One is to say that one benefit of going skiing is not having to scrape plates. Since you would never be willing to scrape plates for less than \$30/day, avoiding that task is worth that amount to you. Going skiing thus carries the indirect benefit of not scraping plates. When we add that indirect benefit to the \$60 direct benefit of the skiing, we get $B(x) = \$90$. In this view of the problem, $C(x)$ is the same as before, namely, the \$40 ski charge plus the \$45 opportunity cost of the lost earnings, or \$85. So now $B(x) > C(x)$, which means you should go skiing.

Alternatively, we could have viewed the unpleasantness of the plate-scraping job as an offset against its salary. By this approach, we would subtract \$30/day from your \$45/day earnings and say that the opportunity cost of not working is only \$15/day. Then $C(x) = \$40 + \$15 = \$55 < B(x) = \60 , and again the conclusion is that you should go skiing.

It makes no difference in which of these two ways you handle the valuation of the unpleasantness of scraping plates. It is critically important, however, that you do it either one way or the other. Don't count it twice!

As Example 1.3 makes clear, costs and benefits are reciprocal. Not incurring a cost is the same as getting a benefit. By the same token, not getting a benefit is the same as incurring a cost.

Obvious as this sounds, it is often overlooked. A case in point was a foreign graduate student who got his degree some years ago and was about to return to his home country. The trade regulations of his nation permitted people returning from abroad to bring back a new automobile without having to pay the normal 50 percent tariff. The student's father-in-law asked him to bring him back a new \$20,000 Chevrolet and sent him a check for exactly that amount. This put the student in a quandary. He had been planning to bring back a Chevrolet and sell it in his home country. Because, as noted, new cars normally face a 50 percent import tax, such a car would sell at a dealership there for \$30,000. The student estimated that he could easily sell it privately for \$28,000, which would net him an \$8000 gain. Thus the opportunity cost of giving the car to his father-in-law for \$20,000 was going to be \$8000! Not getting this big benefit was a big cost. In the end, it was one the student elected to bear because he valued keeping peace in the family even more. As the cost-benefit principle makes clear, the best decision is not always the one that leaves you with the most money in your pocket.

Opportunity Cost

EXAMPLE 1.4

Should I work first or go to college first?

College costs are not limited to tuition, fees, housing, food, books, supplies, and the like. They also include the opportunity cost of earnings forgone while studying. Earnings increase with experience. Thus the more experience you have, the more you must forgo to attend college. This opportunity cost is therefore lowest when you are right out of high school.

On the benefit side, one big gain of a college education is sharply higher earnings. The sooner you graduate, the longer you will reap this benefit. Another benefit is the pleasantness of going to college as opposed to working. In general, the kinds of jobs people hold tend to be less unpleasant (or more pleasant) the more education they have. By going to college right away, you thus avoid having to work at the least pleasant jobs. For most people, then, it makes sense to go to college first and work afterward. Certainly it makes more sense to attend college at age 20 than at age 50.

A common exception involves people who are too immature right out of high school to reap the benefits of college work, who often do better by working a year or two before college.



Why do most students start college right after finishing high school?

Example 1.4 is a perfect illustration of Friedman's argument about how to evaluate a theory. High school seniors don't decide when to attend college on the basis of sophisticated calculations involving opportunity costs. On the contrary, most start right out of high school simply because that is what most of their peers do. It is the thing to do.

But this begs the question of how it got to *be* the thing to do. Customs do not originate out of thin air. A host of different societies have had centuries to experiment with this decision. If there were a significantly better way of arranging the learning and working periods of life, some society should have long since discovered it. Our current custom has survived because it is efficient. People may not make explicit calculations about the opportunity cost of forgone earnings, but they often behave *as if* they do.²

As simple as the opportunity cost concept is, it is one of the most important in microeconomics. The art in applying the concept correctly lies in being able to recognize the most valuable alternative that is sacrificed by the pursuit of a given activity.

PITFALL 2. FAILING TO IGNORE SUNK COSTS

An opportunity cost may not seem to be a relevant cost when in reality it is. On the other hand, sometimes an expenditure may seem relevant when in reality it is not. Such is often the case with *sunk costs*, costs that are beyond recovery at the moment a decision is made. Unlike opportunity costs, these costs *should be* ignored. Not ignoring them is a second pitfall in decision making. The principle of ignoring sunk costs emerges clearly in the following example.

²This does not mean that all customs necessarily promote efficiency. For example, circumstances may have changed in such a way that a custom that promoted efficiency in the past no longer does so. In time, such a custom might change. Yet many habits and customs, once firmly entrenched, are very slow to change.