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Robert S. Pindyck • Daniel L. Rubinfeld

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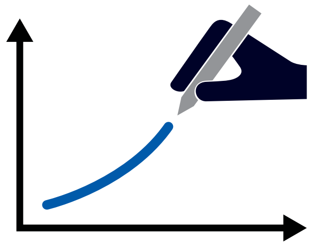

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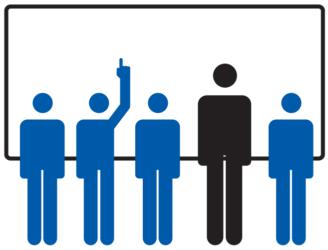

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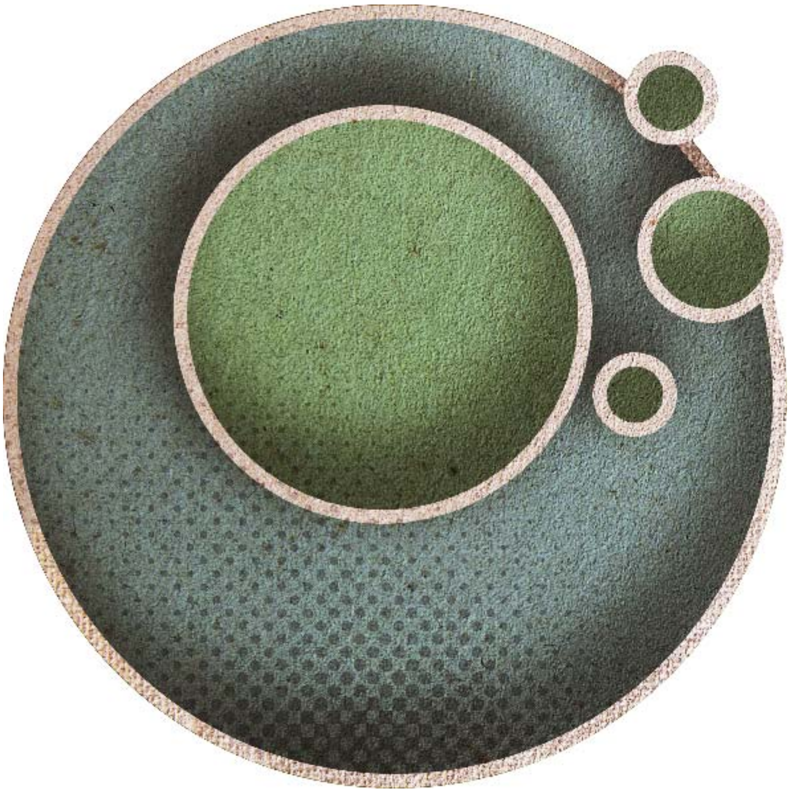

ROBERT S. PINDYCK
Massachusetts Institute of Technology

DANIEL L. RUBINFELD
University of California, Berkeley

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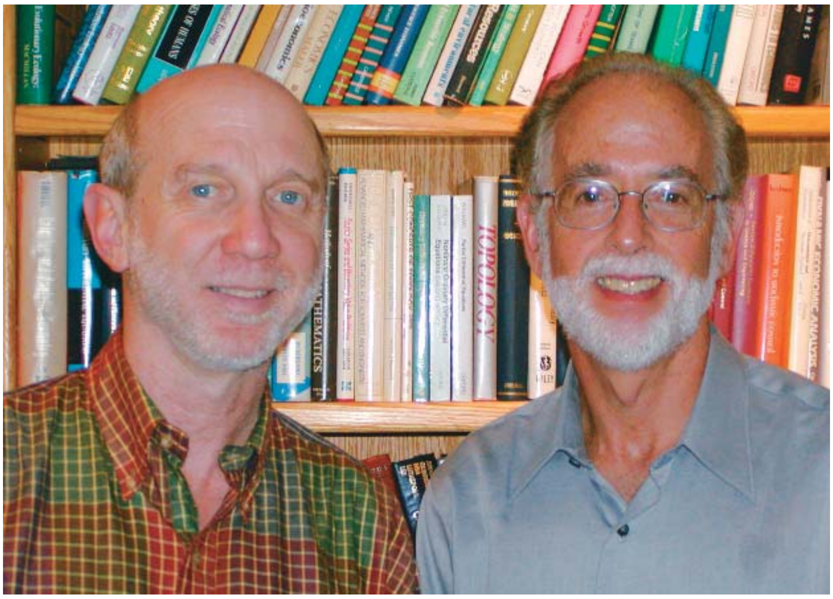
To our daughters,

Maya, Talia, and Shira
Sarah and Rachel

ABOUT THE AUTHORS



The authors, back again for a new edition, reflect on their years of successful textbook collaboration. Pindyck is on the right and Rubinfeld on the left.

Revising a textbook every three or four years is hard work, and the last edition was well-liked by students. "So why is our publisher pushing for a new edition?" the authors wondered. "Were some of the examples becoming stale? Or might it have something to do with the used book market?" Could be both. In any case, here they are again, with a new edition that has substantial improvements and lots of new examples.

Robert S. Pindyck is the Bank of Tokyo-Mitsubishi Ltd. Professor of Economics and Finance in the Sloan School of Management at M.I.T. Daniel L. Rubinfeld is the Robert L. Bridges Professor of Law and Professor of Economics Emeritus at the University of California, Berkeley, and Professor of Law at NYU. Both received their Ph.D.s from M.I.T., Pindyck in 1971 and Rubinfeld in 1972. Professor Pindyck's research and writing have covered a variety of topics in microeconomics, including the effects of uncertainty on firm behavior and market structure; the behavior of natural resource, commodity, and financial markets; environmental economics; and criteria for investment decisions. Professor Rubinfeld, who served as chief economist at the Department of Justice in 1997 and 1998, is the author of a variety of articles relating to antitrust, competition policy, law and economics, law and statistics, and public economics.

Pindyck and Rubinfeld are also co-authors of *Econometric Models and Economic Forecasts*, another best-selling textbook that makes a perfect gift (birthdays, weddings, bar mitzvahs, you name it) for the man or woman who has everything. (Buy several—bulk pricing is available.) These two authors are always looking for ways to earn some extra spending money, so they enrolled as human subjects in a double-blind test of a new hair restoration medication. Rubinfeld strongly suspects that he is being given the placebo.

This is probably more than you want to know about these authors, but for further information, see their Web sites: **http://web.mit.edu/rpindyck/www/** and **https://www.law.berkeley.edu/our-faculty/faculty-profiles/daniel-rubinfeld/**

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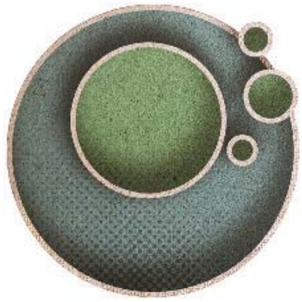

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PREFACE

For students who care about how the world works, microeconomics is probably the most relevant, interesting, and important subject they can study. (Macroeconomics is the second-most important subject.) A good grasp of microeconomics is vital for managerial decision making, for designing and understanding public policy, and, more generally, for appreciating how a modern economy functions. In fact, even understanding the news each day often requires knowledge of microeconomics.

We wrote this book, *Microeconomics*, because we believe that students need to be exposed to the new topics that have come to play a central role in microeconomics over the years—topics such as game theory and competitive strategy, the roles of uncertainty and information, and the analysis of pricing by firms with market power. We also felt that students need to be shown how microeconomics can help us to understand what goes on in the world and how it can be used as a practical tool for decision making. Microeconomics is an exciting and dynamic subject, but students need to be given an appreciation of its relevance and usefulness. They want and need a good understanding of how microeconomics can actually be used outside the classroom.

To respond to these needs, the ninth edition of *Microeconomics* provides a treatment of microeconomic theory that stresses its relevance and application to both managerial and public policy decision making. This applied emphasis is accomplished by including examples that cover such topics as the analysis of demand, cost, and market efficiency; the design of pricing strategies; investment and production decisions; and public policy analysis. Because of the importance that we attach to these examples, they are included in the flow of the text. (A complete list is included on the endpapers inside the front cover.)

The coverage in this edition of *Microeconomics* incorporates the dramatic changes that have occurred in the field in recent years. There has been growing interest in game theory and the strategic interactions of firms (Chapters 12 and 13), in the role and implications of uncertainty and asymmetric information (Chapters 5 and 17), in the pricing strategies of firms with market power (Chapters 10 and 11), in the design of policies to deal efficiently with externalities such as environmental pollution (Chapter 18), and in behavioral economics (Chapter 19).

That the coverage in *Microeconomics* is comprehensive and up to date does not mean that it is "advanced" or difficult. We have worked hard to make the exposition clear and accessible as well as lively and engaging. We believe that the study of microeconomics should be enjoyable and stimulating. We hope that our book reflects this belief. Except for appendices and footnotes, *Microeconomics* uses no calculus. As a result, it should be suitable for students with a broad range of backgrounds. (Those sections that are more demanding are marked with an asterisk and can be easily omitted.)

Changes in the Ninth Edition

Each new edition of this book is built on the success of prior editions by adding some new topics, by adding and updating examples, and by improving the exposition of existing materials. We continue that tradition in this ninth edition. We have made a number of changes throughout the book, but the most important are the following:

- We added a new chapter (Chapter 19) on behavioral economics. Behavioral economics goes beyond the simple paradigm of maximizing something (e.g., utility, output, profit) subject to a constraint (e.g., income, cost, demand and cost). While this paradigm has been extremely powerful in helping us understand how markets work, it does not accurately describe how real-world consumers and firms behave. The new and flourishing field of behavioral economics incorporates findings from psychology into our descriptions of how consumers and firms make decisions. Although the previous edition of this book had a section on behavioral economics (that appeared in Chapter 5), we decided that this topic was sufficiently important to deserve a chapter of its own.

We have updated many of the examples (as we do in every new edition), but we also added several new ones.

- We now have several examples of taxicab markets that include the entry of "ride-share" services like Uber and Lyft (Chapters 9 and 13).
- We added an example about Tesla's new battery factory (its "Gigafactory") and how scale economies will reduce the cost of batteries for electric cars (Chapter 7).
- We added an example on merger policy (Chapter 10) and one on the Auto Parts Cartel (Chapter 12).
- We even have two examples (in Chapters 1 and 12) that deal with the pricing of this textbook.
- As part of the new Chapter 19, we added several examples that are "behavioral" in nature, including consumers' use of credit card debt (and apparent willingness to pay extremely high interest rates) and decisions to join and use health clubs.
- With the exception of the new Chapter 19, the layout of this edition is similar to that of the prior edition. This has allowed us to continue to define key terms in the margins (as well as in the Glossary at the end of the book) and to use the margins to include Concept Links that relate newly developed ideas to concepts introduced previously in the text.

Alternative Course Designs

This new edition of *Microeconomics* offers instructors considerable flexibility in course design. For a one-quarter or one-semester course stressing the basic core material, we would suggest using the following chapters and sections of chapters: 1 through 6, 7.1–7.4, 8 through 10, 11.1–11.3, 12, 14, 15.1–15.4, 18.1–18.2, and 18.5. A somewhat more ambitious course might also include parts of Chapters 5, 16, and 19 and additional sections in Chapters 7 and 9.

To emphasize uncertainty and market failure, an instructor should also include substantial parts of Chapters 5 and 17.

Depending on one's interests and the goals of the course, other sections could be added or used to replace the materials listed above. A course emphasizing modern pricing theory and business strategy would include all of Chapters 11, 12, and 13 and the remaining sections of Chapter 15. A course in managerial economics might also include the appendices to Chapters 4, 7, and 11, as well as the appendix on regression analysis at the end of the book. A course stressing welfare economics and public policy should include Chapter 16 and additional sections of Chapters 18 and 19.

Finally, we want to stress that those sections or subsections that are more demanding and/or peripheral to the core material have been marked with an asterisk. These sections can easily be omitted without detracting from the flow of the book.

Supplementary Materials

Ancillaries of an exceptionally high quality are available to instructors and students using this book. The *Instructor's Manual*, prepared by Duncan M. Holthausen of North Carolina State University, provides detailed solutions to all end-of-chapter Questions for Review and Exercises. The ninth edition contains many entirely new review questions and exercises, and a number of exercises have been revised and updated. The new instructor's manual has been revised accordingly. Each chapter also contains Teaching Tips to summarize key points.

The *Test Item File* contains approximately 2,000 multiple-choice and short-answer questions with solutions. All of this material has been thoroughly reviewed, accuracy checked, and revised for this edition. TestGen is a computerized test generation program, available exclusively from Pearson, that allows instructors to easily create and administer tests on paper, electronically, or online. Instructors can select test items from the publisher-supplied test bank, which is organized by chapter and based on the associated textbook material, or create their own questions from scratch. With both quick and simple test creation and flexible and robust editing tools, TestGen is a complete test generator system for today's educators.

The *PowerPoint Presentation* has been revised for this edition by Fernando Quijano. Instructors can edit the detailed outlines to create their own full-color, professional-looking presentations and customized handouts for students. The PowerPoint Presentation also contains lecture notes and a complete set of animated textbook figures.

For your convenience, all instructor resources are available online via our centralized supplements Web site, the Instructor Resource Center (www.pearsonglobaleditions.com/Pindyck). For access or more information, contact your local Pearson representative or request access online at the Instructor Resource Center.

Pearson MyLab Economics

Pearson MyLab Economics is a content-rich Web site with homework, quiz, test, and tutorial options related to the ninth edition of *Microeconomics*. Pearson MyLab Economics offers students an opportunity to sharpen their problem-solving skills and to assess their understanding of text material in one program. Similarly, instructors can manage all assessment needs in one program. Pearson MyLab Economics contains:

- End-of-chapter exercises available for practice or auto-graded assignment. These exercises include algorithmic, numerical, and draw-graph exercises.
- Additional exercises for assignment that draws upon material in the text.
- Instant tutorial feedback on a student's problem and graphing responses.
- Interactive Learning Aids including *Help Me Solve This* step-by-step tutorials and graph animations.
- Auto Graded Problems and Graphs for all assignments.
- Digital Interactives are engaging assessment activities that promote critical thinking and application of key economic principles.
- Test Item File questions for homework assignment.
- A Custom Exercise Builder that allows instructors to create their own problems.
- A Gradebook that records student performance and generates reports by student or chapter.
- Experiments in two versions, *Single Player* (for easy, asynchronous, interactive homework assignments) and *Multiplayer* (for a fast paced, instructor-led, synchronous, interactive experience).
- The Pearson eText gives students access to their textbook anytime, anywhere. Students actively read, with access to note-taking, highlighting, and bookmarking. Instructors can share comments or highlights, and students can add their own, for a tight community of learners in any class.
- Communication tools that enable students and instructors to communicate through email, discussion board, chat, and ClassLive.
- Customization options that provide additional ways to share documents and add content.
- Prebuilt courses offer a turn-key way for instructors to create a course that includes pre-built assignments distributed by chapter.
- A fourteen-day grace period that offers students temporary access as they wait for financial aid.

The Pearson MyLab Economics exercises for *Microeconomics* were created by Duncan M. Holthausen at North Carolina State University. For additional information and a demonstration, visit **www.myeconlab.com**.

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As the saying goes, it takes a village to revise a textbook. Because the ninth edition of *Microeconomics* has been the outgrowth of years of experience in the classroom, we owe a debt of gratitude to our students and to the colleagues with whom we often discuss microeconomics and its presentation.

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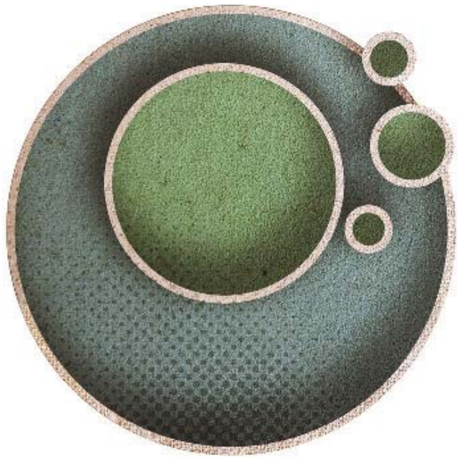
R.S.P.
D.L.R.

PART ONE

Introduction: Markets and Prices



Part 1 surveys the scope of microeconomics and introduces some basic concepts and tools.

Chapter 1 discusses the range of problems that microeconomics addresses, and the kinds of answers it can provide. It also explains what a market is, how we determine the boundaries of a market, and how we measure market price.

Chapter 2 covers one of the most important tools of microeconomics: supply-demand analysis. We explain how a competitive market works and how supply and demand determine the prices and quantities of goods and services. We also show how supply-demand analysis can be used to determine the effects of changing market conditions, including government intervention.

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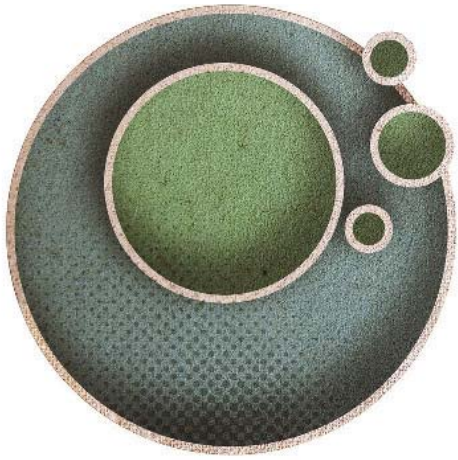

CHAPTER 1

Preliminaries

Economics is divided into two main branches: microeconomics and macroeconomics. **Microeconomics** deals with the behavior of individual economic units. These units include consumers, workers, investors, owners of land, business firms—in fact, any individual or entity that plays a role in the functioning of our economy.[1] Microeconomics explains how and why these units make economic decisions. For example, it explains how consumers make purchasing decisions and how their choices are affected by changing prices and incomes. It also explains how firms decide how many workers to hire and how workers decide where to work and how much work to do.

Another important concern of microeconomics is how economic units interact to form larger units—markets and industries. Microeconomics helps us to understand, for example, why the American automobile industry developed the way it did and how producers and consumers interact in the market for automobiles. It explains how automobile prices are determined, how much automobile companies invest in new factories, and how many cars are produced each year. By studying the behavior and interaction of individual firms and consumers, microeconomics reveals how industries and markets operate and evolve, why they differ from one another, and how they are affected by government policies and global economic conditions.

By contrast, **macroeconomics** deals with aggregate economic quantities, such as the level and growth rate of national output, interest rates, unemployment, and inflation. But the boundary between macroeconomics and microeconomics has become less and less distinct in recent years. The reason is that macroeconomics also involves the analysis of markets—for example, the aggregate markets for goods and services, labor, and corporate bonds. To understand how these aggregate markets operate, we must first understand the behavior of the firms, consumers, workers, and investors who constitute them. Thus macroeconomists have become increasingly concerned with the microeconomic foundations of aggregate economic phenomena, and much of macroeconomics is actually an extension of microeconomic analysis.

[1]The prefix *micro-* is derived from the Greek word meaning "small." However, many of the individual economic units that we will study are small only in relation to the U.S. economy as a whole. For example, the annual sales of General Motors, IBM, or Microsoft are larger than the gross national products of many countries.

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microeconomics Branch of economics that deals with the behavior of individual economic units—consumers, firms, workers, and investors—as well as the markets that these units comprise.

macroeconomics Branch of economics that deals with aggregate economic variables, such as the level and growth rate of national output, interest rates, unemployment, and inflation.

1.1 The Themes of Microeconomics

The Rolling Stones once said: "You can't always get what you want." This is true. For most people (even Mick Jagger), that there are limits to what you can have or do is a simple fact of life learned in early childhood. For economists, however, it can be an obsession.

Much of microeconomics is about *limits*—the limited incomes that consumers can spend on goods and services, the limited budgets and technical know-how that firms can use to produce things, and the limited number of hours in a week that workers can allocate to labor or leisure. But microeconomics is also about *ways to make the most of these limits.* More precisely, it is about *the allocation of scarce resources.* For example, microeconomics explains how consumers can best allocate their limited incomes to the various goods and services available for purchase. It explains how workers can best allocate their time to labor instead of leisure, or to one job instead of another. And it explains how firms can best allocate limited financial resources to hiring additional workers versus buying new machinery, and to producing one set of products versus another.

In a planned economy such as that of Cuba, North Korea, or the former Soviet Union, these allocation decisions are made mostly by the government. Firms are told what and how much to produce, and how to produce it; workers have little flexibility in choice of jobs, hours worked, or even where they live; and consumers typically have a very limited set of goods to choose from. As a result, many of the tools and concepts of microeconomics are of limited relevance in those countries.

Trade-Offs

In modern market economies, consumers, workers, and firms have much more flexibility and choice when it comes to allocating scarce resources. Microeconomics describes the *trade-offs* that consumers, workers, and firms face, and *shows how these trade-offs are best made.*

The idea of making optimal trade-offs is an important theme in microeconomics—one that you will encounter throughout this book. Let's look at it in more detail.

CONSUMERS Consumers have limited incomes, which can be spent on a wide variety of goods and services, or saved for the future. *Consumer theory*, the subject matter of Chapters 3, 4, and 5 of this book, describes how consumers, based on their preferences, maximize their well-being by trading off the purchase of more of some goods for the purchase of less of others. We will also see how consumers decide how much of their incomes to save, thereby trading off current consumption for future consumption.

WORKERS Workers also face constraints and make trade-offs. First, people must decide whether and when to enter the workforce. Because the kinds of jobs—and corresponding pay scales—available to a worker depend in part on educational attainment and accumulated skills, one must trade off working now (and earning an immediate income) for continued education (and the hope of earning a higher future income). Second, workers face trade-offs in their choice of employment. For example, while some people choose to work for large corporations that offer job security but limited potential for advancement, others prefer to work for small companies where there is more opportunity for advancement but less security. Finally, workers must sometimes decide how many hours per week they wish to work, thereby trading off labor for leisure.

FIRMS Firms also face limits in terms of the kinds of products that they can produce, and the resources available to produce them. General Motors, for example, is very good at producing cars and trucks, but it does not have the ability to produce airplanes, computers, or pharmaceuticals. It is also constrained in terms of financial resources and the current production capacity of its factories. Given these constraints, GM must decide how many of each type of vehicle to produce. If it wants to produce a larger total number of cars and trucks next year or the year after, it must decide whether to hire more workers, build new factories, or do both. The *theory of the firm*, the subject matter of Chapters 6 and 7, describes how these trade-offs can best be made.

Prices and Markets

A second important theme of microeconomics is the role of *prices.* All of the trade-offs described above are based on the prices faced by consumers, workers, or firms. For example, a consumer trades off beef for chicken based partly on his or her preferences for each one, but also on their prices. Likewise, workers trade off labor for leisure based in part on the "price" that they can get for their labor—i.e., the *wage.* And firms decide whether to hire more workers or purchase more machines based in part on wage rates and machine prices.

Microeconomics also describes how prices are determined. In a centrally planned economy, prices are set by the government. In a market economy, prices are determined by the interactions of consumers, workers, and firms. These interactions occur in *markets*—collections of buyers and sellers that together determine the price of a good. In the automobile market, for example, car prices are affected by competition among Ford, General Motors, Toyota, and other manufacturers, and also by the demands of consumers. The central role of markets is the third important theme of microeconomics. We will say more about the nature and operation of markets shortly.

Theories and Models

Like any science, economics is concerned with the *explanations* of observed phenomena. Why, for example, do firms tend to hire or lay off workers when the prices of their raw materials change? How many workers are likely to be hired or laid off by a firm or an industry if the price of raw materials increases by, say, 10 percent?

In economics, as in other sciences, explanation and prediction are based on *theories.* Theories are developed to explain observed phenomena in terms of a set of basic rules and assumptions. The *theory of the firm*, for example, begins with a simple assumption—firms try to maximize their profits. The theory uses this assumption to explain how firms choose the amounts of labor, capital, and raw materials that they use for production and the amount of output they produce. It also explains how these choices depend on the *prices* of inputs, such as labor, capital, and raw materials, and the prices that firms can receive for their outputs.

Economic theories are also the basis for making predictions. Thus the theory of the firm tells us whether a firm's output level will increase or decrease in response to an increase in wage rates or a decrease in the price of raw materials. With the application of statistical and econometric techniques, theories can be used to construct models from which quantitative predictions can be made. A *model* is a mathematical representation, based on economic theory, of a firm, a market, or some other entity. For example, we might develop a model of a particular firm and use it to predict *by how much* the firm's output level will change as a result of, say, a 10-percent drop in the price of raw materials.

Statistics and econometrics also let us measure the *accuracy* of our predictions. For example, suppose we predict that a 10-percent drop in the price of raw materials will lead to a 5-percent increase in output. Are we sure that the increase in output will be exactly 5 percent, or might it be somewhere between 3 and 7 percent? Quantifying the accuracy of a prediction can be as important as the prediction itself.

No theory, whether in economics, physics, or any other science, is perfectly correct. The usefulness and validity of a theory depend on whether it succeeds in explaining and predicting the set of phenomena that it is intended to explain and predict. Theories, therefore, are continually tested against observation. As a result of this testing, they are often modified or refined and occasionally even discarded. The process of testing and refining theories is central to the development of economics as a science.

When evaluating a theory, it is important to keep in mind that it is invariably imperfect. This is the case in every branch of science. In physics, for example, Boyle's law relates the volume, temperature, and pressure of a gas.[2] The law is based on the assumption that individual molecules of a gas behave as though they were tiny, elastic billiard balls. Physicists today know that gas molecules do not, in fact, always behave like billiard balls, which is why Boyle's law breaks down under extremes of pressure and temperature. Under most conditions, however, it does an excellent job of predicting how the temperature of a gas will change when the pressure and volume change, and it is therefore an essential tool for engineers and scientists.

The situation is much the same in economics. For example, because firms do not maximize their profits all the time, the theory of the firm has had only limited success in explaining certain aspects of firms' behavior, such as the timing of capital investment decisions. Nonetheless, the theory does explain a broad range of phenomena regarding the behavior, growth, and evolution of firms and industries, and has thus become an important tool for managers and policymakers.

Positive versus Normative Analysis

Microeconomics is concerned with both *positive* and *normative* questions. Positive questions deal with explanation and prediction, normative questions with what *ought* to be. Suppose the U.S. government imposes a quota on the import of foreign cars. What will happen to the price, production, and sales of cars? What impact will this policy change have on American consumers? On workers in the automobile industry? These questions belong to the realm of **positive analysis**: statements that describe relationships of cause and effect.

positive analysis Analysis describing relationships of cause and effect.

Positive analysis is central to microeconomics. As we explained above, theories are developed to explain phenomena, tested against observations, and used to construct models from which predictions are made. The use of economic theory for prediction is important both for the managers of firms and for public policy. Suppose the federal government is considering raising the tax on gasoline. The change would affect the price of gasoline, consumers' purchasing choices for small or large cars, the amount of driving that people do, and so on.

[2]Robert Boyle (1627–1691) was a British chemist and physicist who discovered experimentally that pressure (P), volume (V), and temperature (T) were related in the following way: $PV = RT$, where R is a constant. Later, physicists derived this relationship as a consequence of the kinetic theory of gases, which describes the movement of gas molecules in statistical terms.

To plan sensibly, oil companies, automobile companies, producers of automobile parts, and firms in the tourist industry would all need to estimate the impact of the change. Government policymakers would also need quantitative estimates of the effects. They would want to determine the costs imposed on consumers (perhaps broken down by income categories); the effects on profits and employment in the oil, automobile, and tourist industries; and the amount of tax revenue likely to be collected each year.

Sometimes we want to go beyond explanation and prediction to ask such questions as "What is best?" This involves **normative analysis**, which is also important for both managers of firms and those making public policy. Again, consider a new tax on gasoline. Automobile companies would want to determine the best (profit-maximizing) mix of large and small cars to produce once the tax is in place. Specifically, how much money should be invested to make cars more fuel-efficient? For policymakers, the primary issue is likely to be whether the tax is in the public interest. The same policy objectives (say, an increase in tax revenues and a decrease in dependence on imported oil) might be met more cheaply with a different kind of tax, such as a tariff on imported oil.

normative analysis Analysis examining questions of what ought to be.

Normative analysis is not only concerned with alternative policy options; it also involves the design of particular policy choices. For example, suppose it has been decided that a gasoline tax is desirable. Balancing costs and benefits, we then ask what is the optimal size of the tax.

Normative analysis is often supplemented by value judgments. For example, a comparison between a gasoline tax and an oil import tariff might conclude that the gasoline tax will be easier to administer but will have a greater impact on lower-income consumers. At that point, society must make a value judgment, weighing equity against economic efficiency. When value judgments are involved, microeconomics cannot tell us what the best policy is. However, it can clarify the trade-offs and thereby help to illuminate the issues and sharpen the debate.

1.2 What Is a Market?

Business people, journalists, politicians, and ordinary consumers talk about markets all the time—for example, oil markets, housing markets, bond markets, labor markets, and markets for all kinds of goods and services. But often what they mean by the word "market" is vague or misleading. In economics, markets are a central focus of analysis, so economists try to be as clear as possible about what they mean when they refer to a market.

It is easiest to understand what a market is and how it works by dividing individual economic units into two broad groups according to function—*buyers* and *sellers.* Buyers include consumers, who purchase goods and services, and firms, which buy labor, capital, and raw materials that they use to produce goods and services. Sellers include firms, which sell their goods and services; workers, who sell their labor services; and resource owners, who rent land or sell mineral resources to firms. Clearly, most people and most firms act as both buyers and sellers, but we will find it helpful to think of them as simply buyers when they are buying something and sellers when they are selling something.

Together, buyers and sellers interact to form *markets.* A **market** is *the collection of buyers and sellers that, through their actual or potential interactions, determine the price of a product or set of products.* In the market for personal computers, for example, the buyers are business firms, households, and students; the sellers are

market Collection of buyers and sellers that, through their actual or potential interactions, determine the price of a product or set of products.

Hewlett-Packard, Lenovo, Dell, Apple, and a number of other firms. Note that a market includes more than an *industry. An industry is a collection of firms that sell the same or closely related products.* In effect, an industry is the supply side of the market.

market definition Determination of the buyers, sellers, and range of products that should be included in a particular market.

Economists are often concerned with **market definition**—with determining which buyers and sellers should be included in a particular market. When defining a market, *potential* interactions of buyers and sellers can be just as important as *actual* ones. An example of this is the market for gold. A New Yorker who wants to buy gold is unlikely to travel to Zurich to do so. Most buyers of gold in New York will interact only with sellers in New York. But because the cost of transporting gold is small relative to its value, buyers of gold in New York *could* purchase their gold in Zurich if the prices there were significantly lower.

arbitrage Practice of buying at a low price at one location and selling at a higher price in another.

Significant differences in the price of a commodity create a potential for **arbitrage**: buying at a low price in one location and selling at a higher price somewhere else. The possibility of arbitrage prevents the prices of gold in New York and Zurich from differing significantly and creates a world market for gold.

Markets are at the center of economic activity, and many of the most interesting issues in economics concern the functioning of markets. For example, why do only a few firms compete with one another in some markets, while in others a great many firms compete? Are consumers necessarily better off if there are many firms? If so, should the government intervene in markets with only a few firms? Why have prices in some markets risen or fallen rapidly, while in other markets prices have hardly changed at all? And which markets offer the best opportunities for an entrepreneur thinking of going into business?

Competitive versus Noncompetitive Markets

perfectly competitive market Market with many buyers and sellers, so that no single buyer or seller has a significant impact on price.

In this book, we study the behavior of both competitive and noncompetitive markets. A **perfectly competitive market** has many buyers and sellers, so that no single buyer or seller has any impact on price. Most agricultural markets are close to being perfectly competitive. For example, thousands of farmers produce wheat, which thousands of buyers purchase to produce flour and other products. As a result, no single farmer and no single buyer can significantly affect the price of wheat.

Many other markets are competitive enough to be treated as if they were perfectly competitive. The world market for copper, for example, contains a few dozen major producers. That number is enough for the impact on price to be small if any one producer goes out of business. The same is true for many other natural resource markets, such as those for coal, iron, tin, or lumber.

Other markets containing a small number of producers may still be treated as competitive for purposes of analysis. For example, the U.S. airline industry contains several dozen firms, but most routes are served by only a few firms. Nonetheless, because competition among those firms is often fierce, for some purposes airline markets can be treated as competitive. Finally, some markets contain many producers but are *noncompetitive*; that is, individual firms can jointly affect the price. The world oil market is one example. Since the early 1970s, that market has been dominated by the OPEC cartel. (A *cartel* is a group of producers that acts collectively.)

Market Price

market price Price prevailing in a competitive market.

Markets make possible transactions between buyers and sellers. Quantities of a good are sold at specific prices. In a perfectly competitive market, a single price—the **market price**—will usually prevail. The price of wheat in Kansas