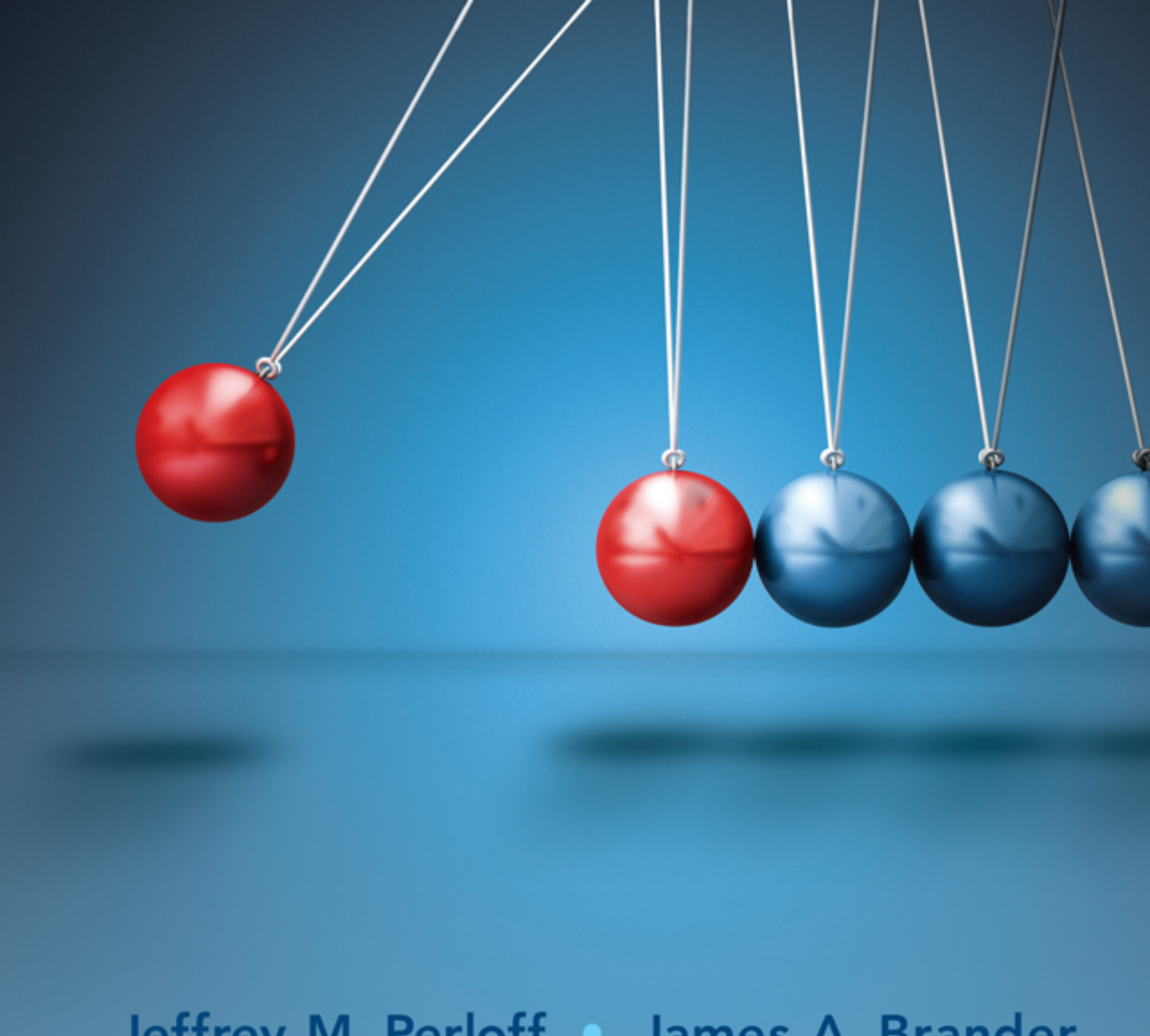

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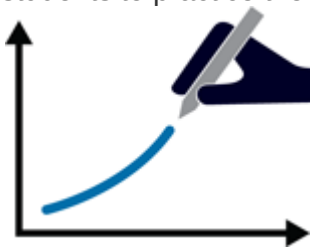

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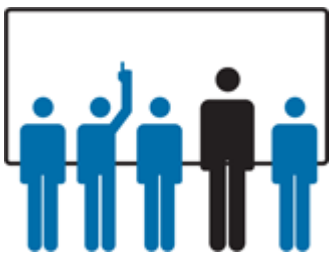

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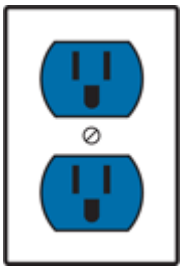

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Preface

Successful managers make extensive use of economic tools when making important decisions. They use these tools to produce at minimum cost, to choose a price or an output level to maximize profit, and for many other managerial decisions including:

- How much to advertise.
- What strategies to use to compete with rival firms.
- Whether to sell several goods in a bundle for a single price.
- Whether to offer buy-one-get-one-free deals.
- How to design compensation contracts to provide appropriate incentives for employees.
- How to structure an international supply chain to take advantage of cross-country differences in production costs.

We show how to apply economic theory using actual business examples and real data. Our experience teaching managerial economics at the Wharton School (University of Pennsylvania) and the Sauder School of Business (University of British Columbia) as well as teaching a wide variety of students at the Massachusetts Institute of Technology; Queen's University; and the University of California, Berkeley, has convinced us that students prefer our emphasis on real-world issues and examples from actual markets.

What's New in the Second Edition

We have substantially revised the second edition based in large part on the very helpful suggestions of instructors and students who used the first edition. We have updated and revised every chapter. The vast majority of the Mini-Cases (brief applications of the theory) are updated or new. Each chapter opener now lists learning objectives, and **Chapters 2–17** contain new end-of-chapter questions.

New Themes

This edition contains new material on two themes that have become increasingly important in business schools and corporate boardrooms: *corporate social responsibility* (CSR) and *innovation*. A new section on CSR in **Chapter 7** discusses the tradeoff that managers face between promoting social objectives and maximizing short-run profit, but also describes how some *strategic*CSR activities increase long-run profits. **Chapter 16** examines the possible role of environmental CSR as a response to environmental externalities.
This edition increases our coverage of innovation. The section "Innovation" in **Chapter 5** contains an expanded treatment of *process innovation* and *organizational innovation*. The section "Cost and Innovation Strategies" in **Chapter 13** examines the role of innovation in dynamic games between rival firms. Many of our Mini-Cases and other examples focus on the knowledge-based economy, in which innovation plays a crucial role. Such examples include genetically modified foods, the use of robots, the efforts of drug companies to maximize the profits earned from drug development, and the Internet.

Other New Content

We have revised and updated the text throughout the book. For example, the international coffee market is now the main example in the supply and demand analysis in **Chapter 2**. **Chapter3** illustrates econometric forecasting using Nike's revenue and features the Excel Regression tool. **Chapter 7** defines and discusses opportunistic behavior in a section on "Transaction Costs and Opportunistic Behavior." **Chapter 11** simplifies the treatment of the Cournot model in the main text by moving the algebraic analysis of the *n*-firm case with general linear demand to an appendix. **Chapter 12** adds a discussion of double auctions. A new appendix to **Chapter 13** covers the Stackelberg model with general linear demand. **Chapter 17** uses newly estimated supply and demand curves to analyze the effect of trade policy in the oil market.
Most importantly, because instructors and students enjoyed the cartoons in the first edition, we have increased the number in this edition to 21. In addition to providing entertainment, these cartoons convey important economic points in a memorable way.

Managerial Problems, Mini-Cases, and Managerial Implications

In the second edition, we have 103 Managerial Problems and Mini-Cases. Of these, 80% are new or updated. The one-third that are new address important current topics including "Capping Oil and Gas Bankruptcies," "Entry and Exit of Solar Power Firms," "Chinese State-Owned Enterprises," and "Mobile Phone Number Portability." Of the 36 Managerial Implications (statements of economic principles that managers can use to make key managerial decisions), 4 are new and 12 are updated.

End-of-Chapter Questions

This edition has 593 end-of-chapter questions, of which 88 are new. We have increased the integration between Mini-Cases and end-of-chapter questions: Half of the Mini-Cases have corresponding end-of-chapter questions.

Spreadsheet Exercises

Many instructors and students appreciated the first edition's spreadsheet exercises (designed by Satyajit Ghosh) and asked for more. This edition has 50% more: three exercises at the end of each chapter (apart from **Chapter 1**) instead of two.

MyEconLab ***Videos***

The second edition provides enhanced integration with MyEconLab (**http://www.myeconlab.com**), a powerful online learning support system. Probably the most striking innovation in this edition is the addition of a set of MyEconLab Videos that illustrate key points in the

text. An icon shows which figures, tables, sections, and Excel applications have MyEconLab Videos by Tony Lima, a skilled and experienced professor. For 48 of the book's figures, he slowly builds each figure and explains the economics behind each step. Six of his MyEconLab Videos cover normal-form games. One MyEconLab Video addresses correlation and diversification, while two MyEconLab Videos tackle moral hazard. Two other MyEconLab Videos show students how to use Excel to run regressions.

Experiments

The textbook now advises students about the availability of single-player experiments in MyEconLab. A student plays against virtual players to see how competitive markets work, how price controls and taxes affect markets, how markets respond to informational problems, and why public goods are underprovided.

Main Innovations

This book differs from other managerial economics texts in three main ways.

- It places greater emphasis than other texts on modern theories that are increasingly useful to managers in areas such as agency and contract theory, behavioral economics, game theory, and pricing.
- It makes more extensive use of real-world business examples to illustrate how to use economic theory in making business decisions.
- It employs a *problem-based* approach to demonstrate how to apply economic theory to specific business decisions.

Modern Theories for Business Decisions

This book covers all the standard economic theory, of course. However, what sets it apart is its emphasis on modern theories that are particularly useful for managers.

Agency and Contract Theory

How can a manager induce employees to work hard rather than shirk? How can the owner of a firm make sure a manager, as the owner's *agent*, acts in the owner's best interests rather than in the manager's own interests? How can a manager avoid being exploited by experts and other people with superior information? We use modern contract theory to show how to write contracts to avoid or minimize such problems.

Behavioral Economics.

Should a manager allow workers to opt in or opt out of a retirement system? How can the manager of a motion picture firm take -advantage of movie reviews? We address questions such as these using behavioral economics—one of the hottest new areas of economic theory—which uses psychological principles to explain why people deviate from rational behavior. These theories areparticularly -relevant for managers, but managerial economics textbooks have largely ignored them.

Game Theory.

Should the manager of a radio station schedule commercial breaks at the same time as rival firms do? What strategy should a manager use when bidding in an auction for raw materials? Under what circumstances should a manager act to prevent entry by a rival? This book goes well beyond other managerial economics texts by making significant use of game theory to examine such topics as oligopoly quantity and price setting, entry and exit decisions, entry deterrence, and innovation. Game theory provides a way of thinking about business strategies and choosing strategies that maximize profits. Unlike most microeconomics and managerial economics books, our applications of game theory are devoted almost exclusively to actual business problems.

Pricing.

How often should a manager put products on sale? Should a manager charge low prices to build a network of users for a product? When should a manager use pricing tools such as volume discounts, off-season discounts, rebates, and package deals? When should a manager charge various customers different prices? This book provides more analysis of these important real-world pricing tools than other managerial economics textbooks.

Real-World Business Examples

We demonstrate that economics is practical and useful to managers by examining real markets and actual business decisions. We do so in two ways. In our presentation of the basic theory, we use real-world data and examples. Second, we examine many real-world problems in our various features.

To illustrate important economic concepts, we use graphs and calculations based on actual markets and real data. Students learn the basic model of supply and demand using estimated supply and demand curves for coffee, and they practice estimating demand curves using real data from sources such as from the Portland Fish Exchange. They study how imported oil limits pricing by U.S. oil producers using real estimated supply and demand curves, derive cost curves from Japanese beer manufacturers using actual estimated production functions, and analyze oligopoly strategies using estimated demand curves and cost and profit data from the real-world rivalries between United Airlines and American Airlines and between Coke and Pepsi.

Problem-Based Learning

Managers have to solve business problems daily. We use a problem-solving approach to demonstrate how economic theory can help managers make good decisions. In each chapter, we solve problems using a step-by-step approach to model good problem-solving techniques. At the end of each chapter, we have an extensive set of questions. Some of these require the student to solve problems similar to those solved in the chapter, while others ask the student to use the tools of the chapter to answer questions about Mini-Cases and

Managerial Implications within the chapter or new real-world problems. We also provide exercises asking students to use spreadsheets to apply the theory they have learned to real-world problems.

Features

This book has more features dedicated to showing students how to apply theory to real-world problems than do rival texts.

Managerial Implications.

The *Managerial Implications* feature provides bottom-line statements of economic principles that managers can use to make key managerial decisions. For example, we describe how managers can assess whether they are maximizing profit. We also show how they can structure discounts to maximize profits, promote customer loyalty, design auctions, prevent gray markets, and use important insights from game theory to make good managerial decisions.

Mini-Cases.

Eighty-seven *Mini-Cases* apply economic theory to interesting and important managerial problems. For example, Mini-Cases demonstrate how price increases on iTunes affect music downloads using actual data, how to estimate Crocs' production function for shoes using real-world data, why top-end designers limit the number of designer bags customers can buy, how "poison pills" at Yahoo! harmed shareholders, how Pfizer used limit pricing to slow the entry of rivals, why advertisers pay so much for Super Bowl commercials, and how managers of auto manufacturing firms react to tariffs and other regulations.

Q&As.

After the introductory chapter, each chapter provides three to five *Q&A*s (Questions & Answers). Each Q&A poses a qualitative or quantitative problem and then uses a step-by-step approach to solve the problem. The 55 Q&As focus on important managerial issues such as how a cost-minimizing firm would adjust to changing factor prices, how a manager prices bundles of goods to maximize profits, how to determine Intel's and AMD's profit-maximizing quantities and prices using their estimated demand curves and marginal costs, and how to allocate production across plants internationally.

Managerial Problems and Managerial Solutions.

After the introductory chapter, each chapter starts with a *Managerial Problem* that motivates the chapter by posing real-world managerial questions. At the end of each chapter, we answer this question in the *Managerial Solution* using the economic principles discussed in that chapter. Thus, each Managerial Problem–Managerial Solution pair combines the essence of a Mini-Case and a Q&A.

End-of-Chapter Questions.

Starting with **Chapter 2**, each chapter ends with an extensive set of questions, including many real-world problems. Each Q&A has at least one associated end-of-chapter question that references that Q&A and allows the student to answer a similar problem. In addition, many of the end-of-chapter questions relate to Mini-Cases. The answers to selected end-of-chapter problems appear at the end of the book, and answers to all of the problems are available online in MyEconLab.

Spreadsheet Exercises.

In addition to the verbal, graphical, and mathematical exercises, each chapter has three end-of-chapter *spreadsheet exercises*. These exercises demonstrate how managers can use a spreadsheet to apply the economic methods described in the chapter. They address important managerial issues such as choosing the profit-maximizing level of advertising or designing compensation contracts to motivate employees. MyEconLab provides answers for all of the book's spreadsheet exercises, as well as additional spreadsheet exercises.

Using Calculus.

Using Calculus sections show how to analyze theory with calculus, reinforcing the graphical, verbal, and algebraic treatment of theory. In contrast, most other books relegate calculus to appendices, mix calculus in with other material where it cannot easily be skipped, or avoid calculus entirely. Because of this structure, both courses that use calculus and those that do not can use this book effectively. Some clearly indicated end-of-chapter questions use calculus.

Alternative Organizations

Because instructors differ in the order in which they cover material and in the range of topics they choose to teach, this text allows for flexibility. The most common approach to teaching managerial economics is to follow the sequence of the chapters in order. However, many variations are possible. For example, some instructors choose to address empirical methods (**Chapter 3**) first.
Instructors may skip consumer theory (**Chapter 4**) without causing problems in later chapters. Or, they may cover consumer theory after the chapters on production and cost (**Chapters 5 and6**).
Chapter 7, "Firm Organization and Market Structure," provides an overview of the key issues that are discussed in later chapters, such as types of firms, profit maximization and its alternatives, conflicts between managers and owners (and other "agency" issues), and the structure of markets. We think that presenting this material early in the course is ideal, but an instructor can cover all of this material except for the section on profit maximization later.
An instructor may teach pricing with market power (**Chapter 10**) at any point after discussing monopoly (**Chapter 9**). Because game theory is introduced in two chapters (**Chapters 12 and13**), instructors can conveniently choose how much game theory to present. Although **Chapter 11** on oligopoly and monopolistic competition precedes the game theory chapters, a course could cover the game theory chapters first.

A common variant is to present **Chapter 14** on uncertainty earlier in the course. A course could present asymmetric information (**Chapter 15**) at any point after **Chapter 7** (if it is covered) and the uncertainty chapter. Thus, a course could cover both the uncertainty and information chapters early.
Chapter 16 on government and business discusses market failures, government regulation, externalities, public goods, and intellectual property. A course could cover this material earlier. For example, the regulation and intellectual property material could follow monopoly. The externality and public good treatment could be presented at any point after **Chapter 8** on competitive firms and markets. The final chapter, Global Business (**Chapter 17**), is valuable in a course that stresses international issues. An instructor could cover this chapter at any point after the competition and monopoly chapters.

MyEconLab

MyEconLab is a powerful assessment and tutorial system that works hand-in-hand with *Managerial Economics*. It includes comprehensive homework, quiz, test, and tutorial options, allowing students to test their knowledge and instructors to manage all assessment needs in one program. Students and instructors can register, create, and access all of their MyLab courses, regardless of discipline, from one convenient online location: **http://www.pearsonmylab.com**.
Key innovations in the MyEconLab course for *Managerial Economics*, second edition, include the following resources for students and instructors:

- **Pearson eText.** The Pearson eText gives students access to their textbook anytime, anywhere. In addition to notetaking, highlighting, and bookmarking, the Pearson eText offers interactive and sharing features. Students actively read and learn through embedded and auto-graded practice, real-time data-graphs, animations, author videos, and more. Instructors can share comments or highlights, and students can add their own, for a tight community of learners in any class.
- **MyEconLab Videos.** Key figures and concepts from the textbook are presented in step-by-step animations with audio explanations of the action. These new videos are embedded in the eText and are accessible through MyEconLab.
- **MyEconLab Q&As.** Key Q&A features from the textbook are available in MyEconLab. Many students have difficulty applying economics concepts to solving problems. The goal of this digital resource is to help students overcome this hurdle by giving them a model of how to solve an economic problem by breaking it down step by step. In this text, the Q&A features are presented as solved problems. Each Q&A in the printed text has a similar companion problem online so students can practice their problem-solving skills. These interactive tutorials help students apply basic problem-solving skills to homework, quizzes, and exams. The goal is for students to build skills they can use to analyze real-world economic issues they hear and read about in the news. Each Q&A in MyEconLab and the eText also includes at least one additional graded practice exercise for students.
- **MyEconLab Spreadsheet Exercises.** MyEconLab provides Excel spreadsheets that students can work with and worked-out answers for end-of-chapter spreadsheet exercises.
- **NEW: Math Review Exercises in MyEconLab.** MyEconLab now offers a rich array of assignable and auto-graded exercises covering fundamental math concepts geared for managerial economics students. Aimed at increasing student confidence and success, the new math skills review Chapter R is accessible from the assignment manager and contains over 150 graphing, algebra, and calculus exercises for homework, quiz, and test use.
- **Practice.** Algorithmically generated homework and study plan exercises with instant feedback ensure varied and productive practice that helps students improve their understanding and prepare for quizzes and tests. Exercises that require drawing figures encourage students to practice the language of economics.
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- **Current News Exercises.** These exercises provide a turnkey approach to assign gradable news-based exercises in MyEconLab. Every week, Pearson scours the news, finds a current article appropriate for a managerial economics course, creates an exercise based on this news article, and then automatically adds it to MyEconLab.
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For more information, visit **http://www.myeconlab.com**.

Supplements

This book has a full range of supplementary materials that support teaching and learning.

- The *Online Instructor's Manual* by Matt Roelofs of Western Washington University contains many useful and creative teaching ideas. It offers additional discussion questions, and provides solutions for all the end-of-chapter questions in the text.
- The *Online Test Bank* by Todd Fitch of the University of California, Berkeley, features problems of varying levels of complexity, suitable for homework assignments and exams. Many of these multiple-choice questions draw on current events.

- The *Computerized Test Bank* reproduces the Test Bank material in the TestGen software, which is available for both Windows and Macintosh. With TestGen, instructors can easily edit existing questions, add questions, generate tests, and print the tests in a variety of formats.
- The *Online PowerPoint Presentation* by Nelson Altamirano of National University contains text figures and tables, as well as lecture notes. These slides allow instructors to walk through examples from the text during in-class presentations.

These teaching resources are available online for download at the Instructor Resource Center, **http://www.pearsonhighered.com/perloff/**, and on the catalog page for *Managerial Economics*.

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J. M. P.

J. A. B.

1 Introduction

An Economist's Theory of Reincarnation: *If you're good, you come back on a higher level. Cats come back as dogs, dogs come back as horses, and people—if they've been very good like George Washington—come back as money.*

If all the food, clothing, entertainment, and other goods and services we wanted were freely available, no one would study economics, and we would not need managers. However, most of the good things in life are scarce. We cannot have everything we want. Consumers cannot consume everything but must make choices about what to purchase. Similarly, managers of firms cannot produce everything and must make careful choices about what to produce, how much to produce, and how to produce it. Studying such choices is the main subject matter of economics. **Economics** is the study of decision making in the presence of scarcity.[1]

[1] Many dictionaries define economics as the study of the production, distribution, and consumption of goods and services. However, professional economists think of economics as applying more broadly, including any decisions made subject to scarcity.

Managerial economics is the application of economic analysis to managerial decision making. It focuses on how managers make economic decisions by allocating the scarce resources at their disposal. To make good decisions, a manager must understand the behavior of other decision makers, such as consumers, workers, other managers, and governments. In this book, we examine decision making by such participants in the economy, and we show how managers can use this understanding to be successful.

Main Topics

In this chapter, we examine two main topics

1. **Managerial Decision Making:** Economic analysis helps managers develop strategies to achieve a firm's objective—such as maximizing profit—in the presence of scarcity.
2. **Economic Models:** Managers use models based on economic theories to help make predictions about consumer and firm behavior, and as an aid to managerial decision making.

1.1 Managerial Decision Making

A firm's managers allocate the limited resources available to them to achieve the firm's objectives. The objectives vary for different managers within a firm. A production manager's objective is normally to achieve a production target at the lowest possible cost. A marketing manager must allocate an advertising budget to promote the product most effectively. Human resource managers design compensation systems to encourage employees to work hard. The firm's top manager must coordinate and direct all these activities.

Each of these tasks is constrained by resource scarcity. At any moment in time, a production manager has to use the existing factory and a marketing manager has a limited marketing budget. Such resource limitations can change over time but managers always face constraints.

Profit

The main objective of most private sector firms is to maximize *profit,* which is the difference between revenue and cost. Senior managers of a firm might have other concerns as well, including social responsibility and personal career objectives. However, the primary responsibility of senior managers to the owners of the firm is to focus on the *bottom line*: maximizing profit.

Managers have a variety of roles in the profit maximization process. The production manager seeks to minimize the cost of producing a particular good or service. The market research manager determines how many units of any particular product can be sold at a given price, which helps to determine how much output to produce and what price to charge. The R&D manager promotes the development of new products that will be attractive to consumers. The most senior manager, usually called the *chief executive officer* (CEO), must insure that all managerial functions are coordinated so that the firm makes as much profit as possible.

Trade-Offs

People and firms face trade-offs because they can't have everything. Managers must focus on the trade-offs that directly or indirectly affect profits. Evaluating trade-offs often involves *marginal*reasoning: considering the effect of a small change. Key trade-offs include:

- **How to produce.** To produce a given level of output, a firm trades off inputs, deciding whether to use more of one and less of another. Car manufacturers choose between metal and plastic for many parts, which affects the car's weight, cost, and safety.
- **What prices to charge.** Some firms, such as farms, have little or no control over the prices at which their goods are sold and must sell at the price determined in the market. However, many other firms set their prices. When a manager of such a firm sets the price of a product, the manager must consider whether raising the price by a dollar increases the profit margin on each unit sold by enough to offset the loss from selling fewer units. Consumers, given their limited budgets, buy fewer units of a product when its price rises. Thus, ultimately, the manager's pricing decision is constrained by the scarcity under which consumers make decisions.
- **Whether to innovate.** One of the major trade-offs facing managers is whether to maximize profit in the short run or in the long run. For example, a forward-looking firm may invest substantially in innovation—designing new products and better production methods—which lowers profit in the short run, but may raise profit in the long run.

Other Decision Makers

It is important for managers of a firm to understand how the decisions made by consumers, workers, managers of other firms, and governments constrain their firm. Consumers purchase products subject to their limited budgets. Workers decide on which jobs to take

and how much to work given their scarce time and limits on their abilities. Rivals may introduce new, superior products or cut the prices of existing products. Governments around the world may tax, subsidize, or regulate products.

Thus, managers must understand how others make decisions. Most economic analysis is based on the assumption that decision makers are optimizers: they do the best they can with their limited resources. However, we also consider some contexts in which economic decision makers do not successfully optimize when we describe psychological biases and cognitive limits in decision making—a topic referred to as *behavioral economics*.
Interactions between economic decision makers take place primarily in markets. A **market** is an exchange mechanism that allows buyers to trade with sellers. A market may be a town square where people go to trade food and clothing, or it may be an international telecommunications network over which people buy and sell financial securities. When we talk about a single market, we refer to trade in a single good or group of goods that are closely related, such as soft drinks, movies, novels, or automobiles. The primary participants in a market are firms that supply the product and consumers who buy it, but government policies such as taxes also play an important role in the operation of markets.

Strategy

When competing with a small number of rival firms, senior managers consider how their firm's products are positioned relative to those of its rivals. The firm uses a strategy—a battle plan that specifies the *actions* or *moves* that the firm will make to maximize profit. A strategy might involve choosing the level of output, the price, or the type of advertising now and possibly in the future. For example, in setting its production levels and prices, Pepsi's managers must consider what choices Coca-Cola's managers will make. One tool that is helpful in understanding and developing such strategies is *game theory*, which we use in several chapters.

1.2 Economic Models

Economists use economic models to explain how managers and other decision makers make decisions and to interpret the resulting market outcomes. A **model** is a description of the relationship between two or more variables. Models are used in many fields. For example, astronomers use models to describe and predict the movement of comets and meteors, medical researchers use models to describe and predict the effect of medications on diseases, and meteorologists use models to predict weather.
Business economists construct models dealing with economic variables and use such models to describe and predict how a change in one variable will affect another variable. Such models are useful to managers in predicting the effects of their decisions and in understanding the decisions of others. Models allow managers to consider hypothetical situations—to use a *what-if analysis*—such as "What would happen if we raised our prices by 10%?" or "Would profit rise if we phased out one of our product lines?" Models help managers predict answers to what-if questions and to use those answers to make good decisions.

Mini-Case Using an Income Threshold Model in China

According to an *income threshold model*, no one who has an income level below a particular threshold buys a particular consumer durable, such as a refrigerator or car. The theory also holds that almost everyone whose income is above that threshold buys the product. If this theory is correct, we predict that as most people's incomes rise above the threshold in emergent economies, consumer durable purchases will increase from near zero to large numbers very quickly. This prediction is consistent with evidence from Malaysia, where the income threshold for buying a car is about $4,000.

In China, incomes have risen rapidly and now exceed the threshold levels for many types of durable goods. As a result, many experts correctly predicted that the greatest consumer durable goods sales boom in history would take place there. Anticipating this boom, many companies have greatly increased their investments in durable goods manufacturing plants in China. Annual foreign direct investments (FDI) have gone from $916 million a year in 1983 to $120 billion in 2014, overtaking the United States as the world's largest recipient of FDI. In expectation of this growth potential, even traditional political opponents of the People's Republic—Taiwan, South Korea, and Russia—are investing in China.

One of the most desirable durable goods is a car. Li Rifu, a 46-year-old Chinese farmer and watch repairman, thought that buying a car would improve the odds that his 22- and 24-year-old sons would find girlfriends, marry, and produce grandchildren. Soon after Mr. Li purchased his Geely King Kong for the equivalent of $9,000, both sons met girlfriends, and his older son got married.

Four-fifths of all new cars sold in China are bought by first-time customers. An influx of first-time buyers was responsible for Chinese car sales increasing by a factor of 15 between 2000 and 2015. By 2014, China was producing more than the United States and Japan combined.[2]
[2] The sources for Mini-Cases are available at the back of the book.

Simplifying Assumptions

Everything should be made as simple as possible, but not simpler.

—Albert Einstein

A model is a simplification of reality. The objective in building a model is to include the essential issues, while leaving aside the many complications that might distract us or disguise those essential elements. For example, the income threshold model focuses on only the relationship between income and purchases of durable goods. Prices, multiple car purchases by a single consumer, and other factors that

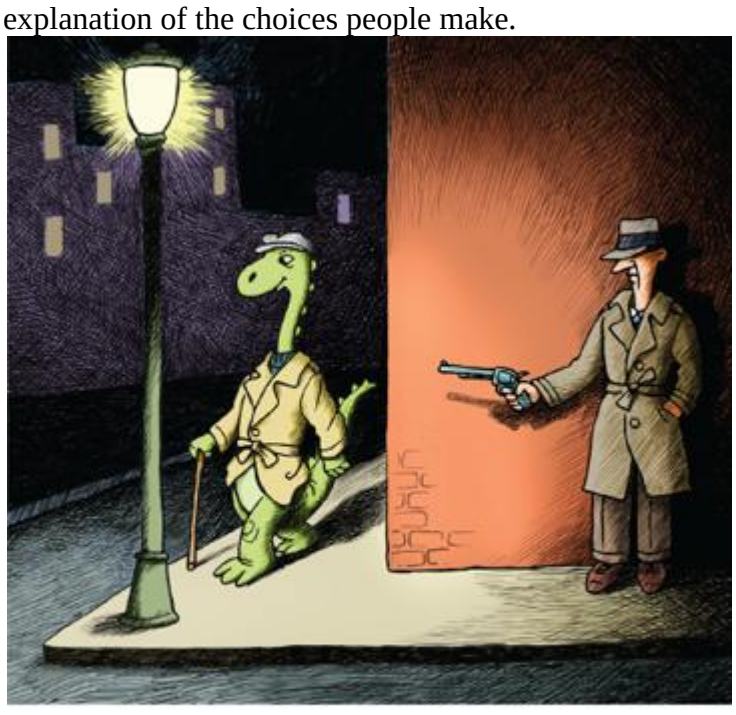
might affect durable goods purchases are left out of the model. Despite these simplifications, the model—if correct—gives managers a good general idea of how the automobile market is likely to evolve in countries such as China.

We have described the income threshold model in words, but we could have presented it using graphs or mathematics. Representing economic models using mathematical formulas in spreadsheets has become very important in managerial decision making. Regardless of how the model is described, an economic model is a simplification of reality that contains only its most important features. Without simplifications, it is difficult to make predictions because the real world is too complex to analyze fully.

Economists make many *assumptions* to simplify their models. When using the income threshold model to explain car purchasing behavior in China, we *assume* that factors other than income, such as the color of cars, do not have an important effect on the decision to buy cars. Therefore, we ignore the color of cars that are sold in China in describing the relationship between income and the number of cars consumers want. If this assumption is correct, by ignoring color, we make our analysis of the auto market simpler without losing important details. If we're wrong and these ignored issues are important, our predictions may be inaccurate. Part of the skill in using economic models lies in selecting a model that is appropriate for the task at hand.

Testing Theories

Blore's Razor: When given a choice between two theories, take the one that is funnier.
Economic *theory* refers to the development and use of a model to formulate *hypotheses*, which are proposed explanations for some phenomenon. A useful theory or hypothesis is one that leads to clear, testable predictions. A theory that says "If the price of a product rises, the quantity demanded of that product falls" provides a clear prediction. A theory that says "Human behavior depends on tastes, and tastes change randomly at random intervals" is not very useful because it does not lead to testable predictions and provides little explanation of the choices people make.



An alternative theory.

Economists test theories by checking whether the theory's predictions are correct. If a prediction does not come true, they might reject the theory—or at least reduce their confidence in the theory. Economists use a model until it is refuted by evidence or until a better model is developed for a particular use.

A good model makes sharp, clear predictions that are consistent with reality. Some very simple models make sharp or precise predictions that are incorrect. Some more realistic and therefore more complex models make ambiguous predictions, allowing for any possible outcome, so they are untestable. Neither incorrect models nor untestable models are helpful. The skill in model building lies in developing a model that is simple enough to make clear predictions but realistic enough to be accurate. Any model is only an approximation of reality. A good model is one that is a close enough approximation to be useful.

Although economists agree on the methods they use to develop and apply testable models, they often disagree on the specific content of those models. One model might present a logically consistent argument that prices will go up next quarter. Another, using a different but equally logical theory, may contend that prices will fall next quarter. If the economists are reasonable, they will agree that pure logic alone cannot resolve their dispute. Indeed, they will agree that they'll have to use empirical evidence—facts about the real world—to find out which prediction is correct. One goal of this book is to teach managers how to think like economists so that they can build, apply, and test economic models to deal with important managerial problems.

Positive and Normative Statements

Economic analysis sometimes leads to predictions that seem undesirable or cynical. For instance, an economist doing market research for a producer of soft drinks might predict that "if we double the amount of sugar in this soft drink we will significantly increase sales to children." An economist making such a statement is not seeking to undermine the health of children by inducing them to consume excessive amounts of sugar. The economist is only making a scientific prediction about the relationship between cause and effect: more sugar in soft drinks is appealing to children.

Such a scientific prediction is known as a **positive statement**: a testable hypothesis about matters of fact such as cause-and-effect relationships. *Positive* does not mean that we are certain about the truth of our statement; it indicates only that we can test the truth of the statement.

An economist may test the hypothesis that the quantity of soft drinks demanded decreases as the price increases. Some may conclude from that study that "The government should tax soft drinks so that people will not consume so much sugar." Such a statement is a value judgment. It may be based on the view that people *should* be protected from their own unwise choices, so the government *should* intervene.

This judgment is *not* a scientific prediction. It is a **normative statement**: a belief about whether something is good or bad. A normative statement cannot be tested because a value judgment cannot be refuted by evidence. A normative statement concerns what somebody believes *should* happen; a positive statement concerns what *is* or what *will* happen. Normative statements are sometimes called *prescriptive* statements because they prescribe a course of action, while positive statements are sometimes called *descriptive* statements because they describe reality. Although a normative conclusion can be drawn without first conducting a positive analysis, a policy debate will be better informed if a positive analysis is conducted first.[3]

3 Some argue that, as (social) scientists, we economists should present only positive analyses. Others argue that we shouldn't give up our right to make value judgments just like the next person (who happens to be biased, prejudiced, and pigheaded, unlike us).

Good economists and managers emphasize positive analysis. This emphasis has implications for what we study and even for our use of language. For example, many economists stress that they study people's *wants* rather than their *needs*. Although people need certain minimum levels of food, shelter, and clothing to survive, most people in developed economies have enough money to buy goods well in excess of the minimum levels necessary to maintain life. Consequently, in wealthy countries, calling something a "need" is often a value judgment. You almost certainly have been told by someone that "you *need* a college education." That person was probably making a value judgment—"you *should* go to college"—rather than a scientific prediction that you will suffer terrible economic deprivation if you do not go to college. We can't test such value judgments, but we can test a (positive) hypothesis such as "Graduating from college or university increases lifetime income."

Summary

1. **Managerial Decision Making.** Economic analysis helps managers develop strategies to pursue their objectives effectively in the presence of scarcity. Various managers within a firm face different objectives and different constraints, but the overriding objective in most private sector firms is to maximize profits. Making decisions subject to constraints implies making trade-offs. To make good managerial decisions, managers must understand how consumers, workers, other managers, and governments will act. Economic theories normally (but not always) assume that all decision makers attempt to maximize their well-being given the constraints they face.
2. **Economic Models.** Managers use models based on economic theories to help make predictions and decisions, which they use to run their firms. A good model is simple to use and makes clear, testable predictions that are supported by evidence. Economists use models to construct *positive* hypotheses such as causal statements linking changes in one variable, such as income, to its effects, such as purchases of automobiles. These positive propositions can be tested. In contrast, *normative* statements, which are value judgments, cannot be tested.