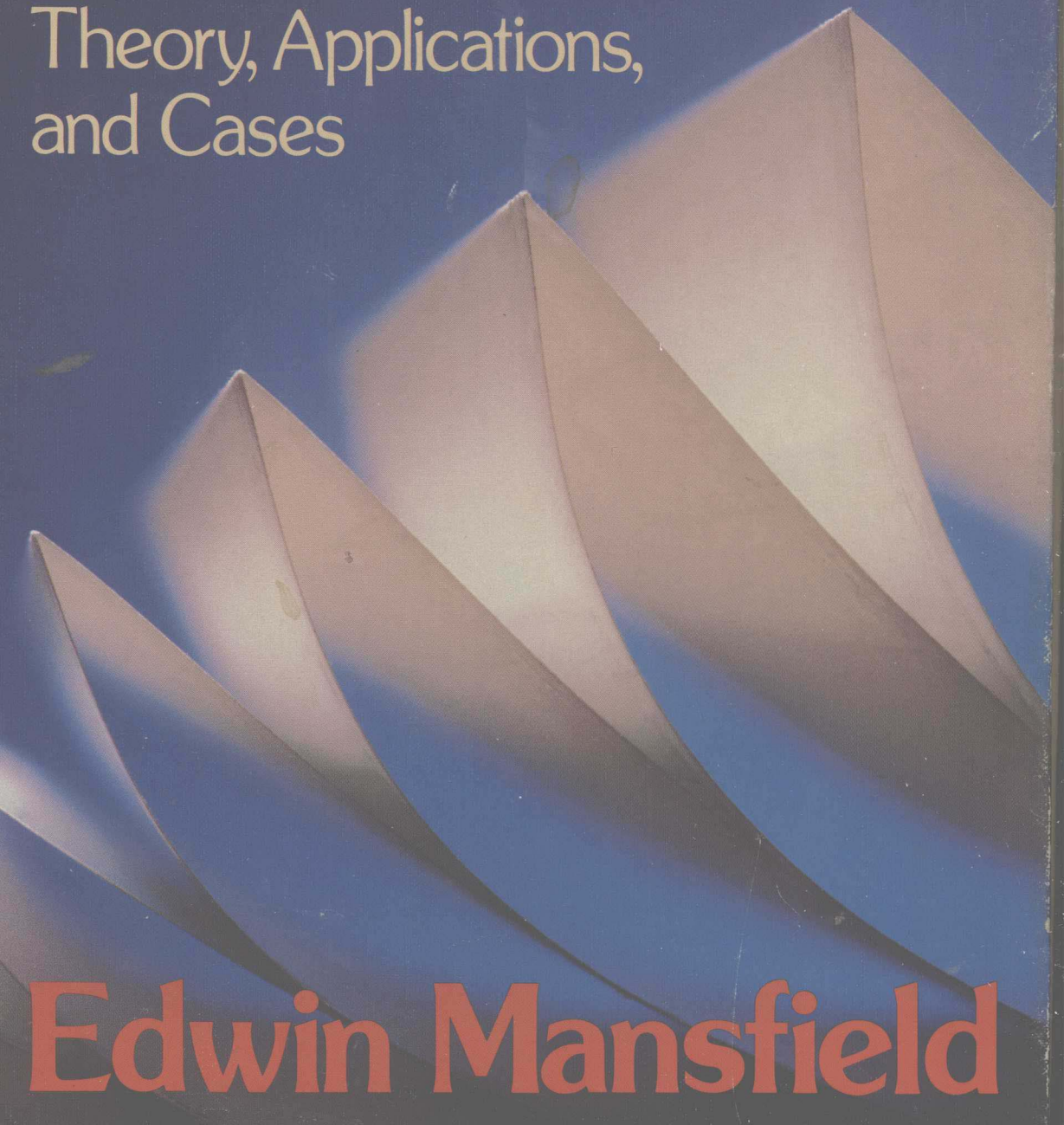
# MANAGERCS ECONOMICS

## Theory, Applications, and Cases



Edwin Mansfield

# *Managerial Economics*

*Edwin Mansfield*

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To "Richard" and Liv

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# *Preface*

As we enter the 1990s, the importance of managerial economics is becoming increasingly clear. Competition in world and regional markets is much tougher than in the past, and managers must be aware of modern analytical techniques if their firms are to survive, let alone prosper. Paralleling these changes has been a growth in demand for college graduates who understand and know how to use the wide variety of new tools developed by economists, statisticians, and others to help solve managerial problems.

This new textbook arises from my feeling, based on both teaching and consulting experience, that existing textbooks do not take up many of the central problems that managers must face—and that these new tools help to illuminate. For example, as discussed in more detail below, other textbooks pay virtually no attention to industrial innovation and international competitiveness, problems of overriding importance to today's managers. Also, they devote surprisingly *little* attention to well-known advances that have been made recently in the analysis of strategic behavior.

Moreover, I have found from my own teaching experience, at the University of Pennsylvania (both in the Wharton School and in the College of Arts and Sciences) and at Carnegie-Mellon's Graduate School of Industrial Administration, that existing textbooks do not go far enough in demonstrating how the techniques presented in a managerial economics course are actually used by firms. Students should be given *actual* case studies showing how these techniques have been *used* by decision makers. This strategy allows many of these techniques to be explained more clearly and interestingly than would be possible with superficial, vague stories or fabricated exercises.

*Real Cases and Examples.* To provide students with a convincing and varied demonstration that the techniques covered in the managerial economics course actually are used, and to show in detail how these techniques are used, about seventy cases and examples (each about a page long) are included in this text. Some ("Concepts in Context") describe how these techniques have been used. Others ("Analyzing Managerial Decisions") go further and ask the student to answer questions related to the techniques being described. (Answers to these questions are included.)

*"Consultant's Corner" and "Managerial Economics in Context."* Besides these seventy real cases and examples, each chapter contains a section ("Consultant's Corner") that provides a brief case, generally based on an actual situation, where the student is asked to provide practical advice to a manager. Answers are provided at the end of the book. In addition, each part of the book contains a case ("Managerial Economics in Context") that tries to bridge the material in various chapters, thus helping the student to integrate the material. Answers to these cases too are provided at the end of the book.

*Numerical Examples and Answers to Problems.* Because managerial economics centers on the application of quantitative techniques, it is important that the student be ushered through many numerical examples. For example, to understand how price should be set under various sets of circumstances, the student should be given numerical examples that help to lay bare the essence of each price-setting technique. I have included many sections that are devoted entirely to working out such numerical examples. Also, in contrast to practically all other texts, answers to the odd-numbered end-of-chapter problems are included at the end of the book. This provides the student with useful feedback; he or she can see how a problem can be solved, and whether he or she really understood the principles involved.

*Chapter on Industrial Innovation and Technological Change.* As is evident from managers' statements, corporate annual reports, and government documents (such as the 1989 Economic Report of the President), American firms—as well as those in other countries—are constantly faced with decisions concerning innovation and technological change. It is no exaggeration to say that these decisions are among the most important facing any firm, particularly now that the traditional U.S. technological lead over other major countries has evaporated in many industries. Other textbooks in managerial economics devote little or no space to this topic. This is the first —and to date, only—one to provide a full chapter on this score.

*Chapter on Oligopoly and Strategic Behavior.* In recent years, substantial advances have been made in the analysis of strategic behavior. These advances have had an impact on thinking in boardrooms as well as classrooms. From my discussions with students, teachers, and managers throughout the country, I am convinced that it is high time this material be incorporated into managerial economics textbooks. Thus, another innova-

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tion of this book is a full chapter devoted to oligopoly and strategic behavior. The added material concerning strategic behavior includes cases describing how the relevant models and techniques can be, and have been, used by managers.

*International Competitiveness.* No topic is of more interest to American managers than the competitive struggle with their foreign rivals. It is well known that many U.S. firms have succumbed to foreign competition, whereas others, like Caterpillar, have fought back with considerable success. To help make the principles and techniques of managerial economics come to life, and to show their power and applicability, considerable attention is devoted to case studies describing the reasons for Japanese success and the ways that American firms have responded. In this connection, we discuss the importance of firms' being *on* the industry production function and of optimal lot size, among other things. These too are unique features of this textbook.

*Software Packages.* Given the major role played by the computer in today's firms, it is important in any modern managerial economics text that the student be introduced to the software packages available to help solve managerial problems. This is particularly important in the case of regression techniques and linear programming, where few real calculations are carried out any longer by hand. In this book, appendices to Chapters 4 and 9 describe leading software packages in detail. Although this material is optional, experience indicates that it will be useful in many classes.

*Organization, Coverage, and Level.* Although this book contains a number of innovations, its overall organization and coverage is reasonably standard. All of the topics usually taken up in a book of this sort are included, and the order in which they appear is similar to that in other books. Those instructors who wish to ignore the new material on industrial innovation, strategic behavior, or software packages will find it easy to do so, since this material—included in Chapter 7, the latter part of Chapter 11, and the appendices to Chapters 4 and 9—is self-contained and can be omitted without loss of continuity. It is important to note as well that this book is designed to be used by students with a wide range of abilities and backgrounds, not just a highly select few.

*Mathematical Sophistication.* Only a very modest mathematical background is required for an understanding of *Managerial Economics.* The elements of differential calculus that are used are explained in Chapter 2. For many students, this material can be skipped, since they will already have taken calculus courses, or it can be used to review the mathematics they have learned before. The emphasis in this book is on providing students with solid and effective evidence concerning the power and applicability of modern managerial conomics, and on making sure that they can use these techniques correctly and imaginatively. To accomplish these objectives, it is neither necessary nor appropriate to deluge students with mathematics.

*Problems and Problem Sets.* While real cases and examples whet a student's interest and sharpen his or her competence and intuition, they ordinarily must be supplemented with a substantial number of problems and problem sets. Besides the numerical examples included in the body of the chapters, there are a substantial number of problems at the end of each chapter. (As pointed out above, the answers to the odd-numbered problems are given at the end of the book.)

*Study Guide.* Because of the importance of hands-on experience with the techniques of this course, I have written a study guide (*Managerial Economics: Problems and Exercises)* to supplement the text. This supplement contains hundreds of problem sets, problems, and review questions (as well as their answers), which should be helpful to students. Most of these problems and questions have been tested for effectiveness in the classroom.

*Instructor's Manual.* An *Instructor's Manual* will be available to accompany this text. It includes suggestions for lectures and classroom discussion, as well as a test bank of roughly seven hundred multiple-choice questions.

In writing this book, I have benefited from the comments and suggestions of many colleagues and students. Particular thanks go to the following teachers who have commented in detail on all or much of the manuscript: Richard S. Bower, The Tuck School; Robert Carbaugh, Central Washington University; Thomas M. Carroll, University of Nevada (Las Vegas); Michael Claudon, Middlebury College; George C. Dery, University of Lowell; Constantine Glezakos, California State University (Long Beach); Theodore Groves, University of California (San Diego); Robert Hansen, The Tuck School; George Hoffer, Virginia Commonwealth University; Todd Idson, University of Miami; Charles E. Krider, University of Kansas; Michael Magura, University of Toledo; Marshall Medoff, California State University (Long Beach); Stephen Sheppard, Virginia Polytechnic Institute and State University; Sheldon H. Stein, Cleveland State University; John Clair Thompson, University of Connecticut; James Wetzell, Virginia Commonwealth University; and Pamela Whalley, Western Washington University. Also, Anthony Romeo of Unilever and Lorne Switzer of Concordia University suggested useful material and made valuable comments.

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E.M.

Philadelphia, 1989

# *Contents*

**Part One**
**Introduction** **1**

Chapter 1
Introduction to Managerial Economics 3

Introduction 3
Problem #1: Should Black and Decker Redesign Its Product Line? 4
Problem #2: Should Caterpillar Tractor Change Its Pricing Policy? 5
Problem #3: How Should Heinz Distribute Its Ketchup? 6
Relationships of Managerial Economics to Other Disciplines 7
The Basic Process of Decision Making 9
The Theory of the Firm 11
The Role of Constraints 12
What Are Profits? 13
Reasons for the Existence of Profit 14
Organizational Factors and "Satisficing" 15
Managerial Interests and Sales Maximization 16

Managerial Economics and International Competitiveness 17
Summary 17
Questions and Problems 18

Chapter 2
Optimization Techniques 21

Introduction 21
Functional Relationships 21
Marginal Analysis 23
Relationship between Total, Marginal, and Average Values 25
The Concept of a Derivative 28
How to Find a Derivative 32
*Concepts in Context: The Allocation of the TANG Brand Advertising Budget 37*
Using Derivatives to Solve Maximization and Minimization Problems 40
*Analyzing Managerial Decisions: The Optimal Size of a Hospital 44*
The Marginal-Cost-Equals-Marginal-Revenue Rule and the Calculus of Optimization 45
*Concepts in Context: An Alleged Blunder in the Stealth Bomber's Design 46*
Partial Differentiation and the Maximization of Multivariable Functions 47
*Analyzing Managerial Decisions: The Effects of Advertising on the Sales of TANG 48*
Constrained Optimization 50
Lagrangian Multipliers 52
*Consultant's Corner: Planning to Meet Peak Engineering Requirements 55*
Comparing Incremental Costs with Incremental Revenues 55
Summary 57
Problems 58

**Part Two**
**Demand and Forecasting 61**

Chapter 3
Demand Theory 63

Introduction 63
The Market Demand Curve 63

Industry and Firm Demand Functions 67
*Concepts in Context: Walt Disney Productions and Attendance at Theme Parks 69*
The Price Elasticity of Demand 70
Point and Arc Elasticities 72
Using the Demand Function to Calculate the Price Elasticity of Demand 73
Price Elasticity and Total Money Expenditure 75
Total Revenue, Marginal Revenue, and Price Elasticity 77
*Analyzing Managerial Decisions: The Demand for Newsprint 79*
Determinants of the Price Elasticity of Demand 81
Uses of the Price Elasticity of Demand 82
Price Elasticity and Pricing Policy 83
The Income Elasticity of Demand 84
Using the Demand Function to Calculate the Income Elasticity of Demand 86
Cross Elasticities of Demand 86
*Consultant's Corner: Estimating the Quantity Demanded of Fresh Premium Salmon 87*
The Advertising Elasticity of Demand 88
*Analyzing Managerial Decisions: Using PIMS Data to Estimate Elasticities of Demand 89*
The Constant-Elasticity Demand Function 90
Summary 92
Problems 93

Chapter 4
Estimating Demand Functions 97

Introduction 97
The Identification Problem 97
Consumer Interviews 100
Market Experiments 101
L'eggs: A Market Experiment 102
Regression Analysis 102
Simple Regression Model 104
Sample Regression Line 105
Method of Least Squares 107
Coefficient of Determination 109
Multiple Regression 112
*Consultant's Corner: Price and Market Share for a New Electrical Drive 113*
*Concepts in Context: Color Balance and Shelf-Life Performance of Polaroid Film 114*
*Analyzing Managerial Decisions: How Good Are* Ward's *Projections of Auto Output? 117*

Multiple Coefficient of Determination 118
Testing Whether Any of the Independent Variables Affects the Dependent Variable: The *F*-Statistic 119
Standard Error of Estimate 120
Testing Whether a Particular Independent Variable Affects the Dependent Variable: The *t*-Statistic 121
Multicollinearity 122
Serial Correlation 123
*Analyzing Managerial Decisions: How Fed Economists Forecast Auto Output 125*
Further Analysis of the Residuals 127
The Demand Function for Cigarettes: A Case Study 129
Summary 131
Problems 132
Appendix: Software Packages to Carry Out Regression Analyses 138

**Chapter 5**
**Business and Economic Forecasting** **140**

Survey Techniques 141
Taking Apart a Time Series 142
How to Estimate a Linear Trend 145
How to Estimate a Nonlinear Trend 146
Seasonal Variation 149
Calculation of Seasonal Variation 150
*Analyzing Managerial Decisions: Forecasting the Demand for Blood Tests at North Carolina Memorial Hospital 152*
Cyclical Variation 153
Elementary Forecasting Techniques 155
How Leading Indicators Are Used 158
How Econometric Models Are Used 159
The Wharton Econometric Model 160
*Consultant's Corner: Deciding Whether to Finance the Purchase of an Oil Field 161*
*Analyzing Managerial Decisions: Forecasting Shipments of Cement by CEMCO 162*
The Purvere Corporation: A Numerical Example 163
"Study Your Residuals" 165
*Concepts in Context: How the Cummins Engine Company Forecasts Sales 166*
Summary 168
Problems 169
*Managerial Economics in Context: How to Forecast the Sales of Paper, According to McKinsey 172*
Appendix: Exponential Smoothing and Forecasting 174

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**Part Three**
**Production and Cost** 179

Chapter 6
**Production Theory** 181

Introduction 181
The Production Function with One Variable Input 181
The Law of Diminishing Marginal Returns 185
The Optimal Level of Utilization of an Input 186
The Rondo Corporation: A Numerical Example 187
The Production Function with Two Variable Inputs 187
*Analyzing Managerial Decisions: How to Determine the Optimal Horsepower for an Oil Pipeline 188*
*Concepts in Context: How Nucor Stays on the Production Function 191*
Isoquants 192
The Marginal Rate of Technical Substitution 193
The Optimal Combination of Inputs 196
The Beiswanger Company: A Numerical Example 199
The Miller Company: Another Numerical Example 200
Optimal Lot Size 201
What Toyota Taught the World 204
*Analyzing Managerial Decisions: Advantages of Just-in-Time Production 206*
Returns to Scale 207
The Output Elasticity 208
*Consultant's Corner: Choosing the Size of an Oil Tanker 209*
How Firms Obtain Information Concerning the Production Function: Competitive Benchmarking at Xerox 210
Measurement of Production Functions 211
Three Types of Statistical Analysis 212
The Telephone Industry in Canada: A Case Study 214
Summary 215
Problems 216
Appendix: Lagrangian Multipliers and Optimal Input Combinations 220

Chapter 7
**Technological Change and Industrial Innovation** 223

Technological Change 223
Labor Productivity 225

Total Factor Productivity 226
Using Total Factor Productivity to Track Factory Performance 227
*Consultant's Corner: Evaluating a Large-Scale Program of Product and Process Improvement 229*
Research and Development: A Learning Process 229
Parallel Development Efforts 230
*Concepts in Context: Parallel Development Efforts at IBM 232*
What Makes for Success? 233
Project Selection 234
Innovation 235
Do American Firms Neglect Process Innovation? 236
Time-Cost Trade-Offs 237
Innovation Time and Cost: Japan versus the United States 239
The Learning Curve 241
Applications of the Learning Curve 241
Henry Ford's Model T and Douglas Aircraft's DC-9 243
Technological Forecasting 244
Input-Output Models 246
Diffusion Models 248
*Analyzing Managerial Decisions: The Development and Introduction of Canon's Personal Copier 251*
Forecasting the Rate of Diffusion of Numerically Controlled Machine Tools 252
*Analyzing Managerial Decisions: The Spread of Industrial Robots in Japan and the United States 253*
Summary 254
Problems 255

Chapter 8
The Analysis of Costs 259

Introduction 259
Opportunity Costs 259
Short-Run Cost Functions 260
Average and Marginal Costs 262
*Concepts in Context: How Harley-Davidson Has Reduced Costs 263*
*Analyzing Managerial Decisions: The Effects of Output on the Cost of Producing Aircraft 266*
Long-Run Cost Functions 268
The Crosby Corporation: A Numerical Example 271
*Analyzing Managerial Decisions: How Should We Produce Steel? 272*
Economies of Scale in Producing Methanol from Coal: A Case Study 274
Measurement of Short-Run Cost Functions: The Choice of a Mathematical Form 276
Nature and Limitations of Available Data 277

Key Steps in the Estimation Process 279
A Hosiery Mill's Short-Run Cost Functions 281
A Transportation Firm's Short-Run Cost Functions 283
Long-Run Statistical Cost Estimation 284
The Long-Run Average Cost Function for Electric Power: A Case Study 287
The Survivor Technique 288
The Importance of Flexibility 289
Economies of Scope 290
Break-Even Analysis 292
Algebraic Break-Even Analysis 293
*Consultant's Corner: An Intrafirm Dispute over a Break-Even Chart 294*
Profit Contribution Analysis 294
Summary 295
Problems 296
Appendix: Break-Even Analysis and Operating Leverage 300

Chapter 9
Linear Programming 303

What Is Linear Programming? 303
Production Planning: One Output 304
How to Obtain a Graphical Solution 309
The Case of Unlimited Resources 311
*Concepts in Context: Using Linear Programming to Choose R and D Projects 313*
Production Planning: Multiple Products 314
Extreme Points and the Simplex Method 318
*Analyzing Managerial Decisions: Moving Sand at the Brisbane Airport 319*
The Dual Problem and Shadow Prices 320
Relationship between Primal and Dual Problems 321
Slack Variables 322
Algebraic Solution of Linear Programming Problems 323
Minimization of Shipping Costs at the Essex Corporation 326
What the Federal Reserve Told the Banks 328
*Analyzing Managerial Decisions: How H.J. Heinz Minimizes Its Shipping Costs 329*
*Consultant's Corner: Evaluating the Organization of a Shipping Program 331*
Summary 333
Problems 334
*Managerial Economics in Context: Apple's Lisa-Macintosh Development Project 336*
Appendix: A Software Package to Solve Linear Programming Problems 338

**Part Four**
**Market Structure, Strategic Behavior, and Pricing 341**

Chapter 10
**Perfect Competition, Monopoly, and Monopolistic Competition 343**

Market Structure 343
Market Price under Perfect Competition 345
*Consultant's Corner: Forecasting the Price of Salmon 346*
Shifts in Supply and Demand Curves 347
The Output Decision of a Perfectly Competitive Firm 348
Setting Marginal Cost Equal to Price 351
Long-Run Equilibrium of the Firm 353
Price and Output Decisions under Monopoly 355
The Raleigh Company: A Numerical Example 359
*Concepts in Context: Newspaper Monopoly in Detroit 360*
Allocation of Output among Plants 361
The Anderson Company: A Numerical Example 362
*Analyzing Managerial Decisions: Xerox's Reaction to the Savin 750 Copier 363*
Limit Pricing 365
Monopolistic Competition 366
Price and Output Decisions under Monopolistic Competition 367
Advertising Expenditures: A Simple Rule 369
*Analyzing Managerial Decisions: The Impact of Price Promotion on Retail Performance 370*
Using Graphs to Help Determine Advertising Expenditure 372
Advertising, the Price Elasticity of Demand, and Brand Loyalty: The Case of the Retail Coffee Market 374
Summary 375
Problems 376

Chapter 11
**Oligopoly and Strategic Behavior 381**

The Emergence of Oligopolistic Industries 382
Maturity and Decline of Oligopolistic Industries 383
*Concepts in Context: IBM, the Personal Computer Market, and Economies of Scale 384*
The Kinked Demand Curve: CEMCO Revisited 385
Collusive Agreements 387
*Analyzing Managerial Decisions: Global Oligopoly in the Disposable Syringe Market 388*
The Breakdown of Collusive Agreements 390

United Arab Emirates: A Dissenter in the OPEC Oil Cartel 391
The Thrust and Parry of Oligopolistic Rivalry 391
The Importance of Commitment 393
*Consultant's Corner: Using a Price Announcement to Preempt a Market 394*
Representing Oligopoly as a Game 395
The Prisoner's Dilemma 396
Does Cheating Pay? 397
A More Sophisticated Analysis 398
Most-Favored-Customer Clauses 399
Price Leadership 400
Ajax, Inc.: A Numerical Example 402
Entry and Limit Pricing 403
*Analyzing Managerial Decisions: Possible Entry-Deterring Tactics in Disposable Diapers 404*
Game Theory and the Deterrence of Entry 405
Du Pont's Attempt to Deter Entry into the Titanium Dioxide Industry 406
Advertising to Resist Entry: Maxwell House versus Folgers 407
Preemptive Strategies: The Case of Wal-Mart Stores 408
What Strategies Seem to Pay Off Best? 408
Summary 410
Problems 411

**Chapter 12**
**Pricing Techniques** **416**

Cost-Plus Pricing 417
Cost-Plus Pricing at Computron, Inc.: A Case Study 418
Cost-Plus Pricing at General Motors: Another Case Study 419
Does Cost-Plus Pricing Maximize Profit? 419
*Concepts in Context: Markups in Retail Grocery Stores 421*
The Clawson Corporation: A Numerical Example 422
The Multiple-Product Firm: Demand Interrelationships 423
Pricing of Joint Products: Fixed Proportions 424
The Avtech Company: A Numerical Example 426
Output of Joint Products: Variable Proportions 428
Price Discrimination 429
Airline Travel: A Case Study 431
Price Discrimination: A Pharmaceutical Example 432
Price Discrimination of Other Types 434
*Analyzing Managerial Decisions: Pricing Policy in the Electric Utility Industry 436*
Using Coupons for Price Discrimination 437
Tying at IBM and Xerox 437
Transfer Pricing 438

Transfer Pricing: A Perfectly Competitive Market for the Transferred Product 440
Transfer Pricing at Emhart, A.O. Smith, and Ford 441
The Orion Corporation: A Numerical Example 442
*Consultant's Corner: Settling Some Strife over a Pricing Formula 443*
*Analyzing Managerial Decisions: Transfer Pricing and Joint Products at Knox Chemical Corporation 444*
Summary 445
Problems 446
*Managerial Economics in Context: A Rocky Road for Caterpillar Tractor 450*

**Part Five**
**Risk Analysis, Capital Budgeting, and Government Relations 453**

Chapter 13
Risk Analysis 455

Risk and Probability 456
Probability Distributions and Expected Values 457
Comparisons of Expected Profit 458
How to Construct a Decision Tree 459
Should Tomco Oil Corporation Drill a Well? 461
*Concepts in Context: Bidding for the SS* Kuniang 463
The Expected Value of Perfect Information 464
Evaluating an Investment in a New Chemical Plant: A Case Study 465
*Consultant's Corner: Choosing Areas for Research Regarding Pollution Costs 466*
*Analyzing Managerial Decisions: Should Maxwell House Have Increased Its Price? 467*
Measuring Attitudes toward Risk: The Utility Approach 468
Constructing a Utility Function 469
Using a Utility Function 471
Attitudes toward Risk: Three Types 472
*Analyzing Managerial Decisions: Deciding Whether to Buy an Option on a New Flight-Safety System 474*
The Standard Deviation and Coefficient of Variation: Measures of Risk 476
Adjusting the Valuation Model for Risk 478
The Use of Risk-Adjusted Discount Rates 479
Simulation Techniques 481

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