

英文版



企业数量分析 教程与案例

QUANTITATIVE BUSINESS
ANALYSIS

TEXT AND CASES



SAMUEL E. BODILY
ROBERT L. CARRAWAY
SHERWOOD C. FREY, JR.
PHILLIP E. PFEIFER

世界财经与管理教材大系



东北财经大学出版社



McGraw-Hill 出版公司

F224.0

37

世界财经与管理教材大系
商务与法律系列·英文版

企业数量分析 教程与案例

Quantitative Business Analysis Text and Cases

塞缪尔·E. 博迪利

罗伯特·L. 卡拉韦

小舍伍德·C. 弗雷

菲利普·E. 法伊弗

Samuel E. Bodily

Robert L. Carraway

Sherwood C. Frey, Jr.

Phillip E. Pfeifer

东北财经大学出版社
McGraw-Hill 出版公司

图书在版编目 (CIP) 数据

企业数量分析: 教程与案例: 英文 / (美) 博迪利 (Bodily, S. E.) 等著 .—大连:
东北财经大学出版社, 1998.8

(世界财经与管理教材大系·商务与法律系列)

ISBN 7 - 81044 - 470 - 0

I. 企… II. 博… III. 企业管理 - 经济计量分析 - 英文 IV. F224.0

中国版本图书馆 CIP 数据核字 (98) 第 19565 号

辽宁省版权局著作权合同登记号: 图字 06 - 1998 - 122 号

Samuel E. Bodily, Robert L. Carraway, Sherwood C. Frey, Jr., Phillip
E. Pfeifer: Quantitative Business Analysis: Text and Cases

Copyright © 1998 by The McGraw-Hill Companies, Inc.

This edition is published jointly by McGraw-Hill Book Co. and Dongbei University of Fi-
nance & Economics Press, for sale in P. R. China only.

All Rights Reserved.

本书英文影印版由 McGraw-Hill 出版公司和东北财经大学出版社合作出版, 仅限中国
境内销售, 未经出版者书面许可, 不得以任何方式抄袭、复制或节录本书的任何部分。

版权所有, 侵权必究。

东北财经大学出版社 合作出版
McGraw-Hill 出版公司

东北财经大学出版社发行

(大连市黑石礁尖山街 217 号 邮政编码 116025)

北京万国电脑图文有限公司制版 东北财经大学印刷厂印刷

开本: 787×1092 毫米 1/16 字数: 995 千字 印张: 42 插页: 2

1998 年 8 月第 1 版

1998 年 8 月第 1 次印刷

策划编辑: 方红星

封面设计: 张智波

定价: 66.00 元

ISBN 7 - 81044 - 470 - 0/F·1153

出版者的话

但凡成事，均缘于势。得势则事成，失势则事不顺。顺势而行，如顺水行舟；借势而动，如假梯登高；造势而为，如太空揽月。治学、从政、经商、置业，均不可一日失势。势者，长处、趋势也。

今日中国，是开放的中国；当今世界，是开放的世界。改革开放，大势所趋，势不可挡。经济开放、文化开放、政治开放，世界需要一个开放的中国，中国更要融入开放的世界。借鉴国际惯例，学习他人之长，已经到了不可不为之时。

借鉴国际惯例，学习他人之长，已属老生常谈，但学什么、如何学、以何为蓝本为众多志士仁人所关注。可喜的是，由赤诚图文信息有限公司精心策划，ITP、McGraw-Hill 及 Simon & Schuster 等国际出版公司特别授权，东北财经大学出版社荣誉出版的“世界财经与管理教材大系”现已隆重面世！她以“紧扣三个面向，精选五大系列，奉献百部名著，造就亿万英才”的博大胸襟和恢弘气势，囊括经济学、管理学、财务与会计学、市场营销学、商务与法律等财经、管理类主干学科，并根据大学教育、研究生教育、工商管理硕士（MBA）和经理人员培训项目（ETP）等不同层次的需要，相应遴选了具有针对性的教材，可谓体系完整，蔚为大观。所选图书多为哈佛、斯坦福、麻省理工、伦敦商学院、埃维商学院等世界一流名校的顶尖教授、权威学者的经典之作，在西方发达国家备受推崇，被广为采用，经久不衰，大有“洛阳纸贵”之势。

借鉴国际惯例，毕竟只是因势而动；推出国粹精品，才是造势而为。在借鉴与学习的同时，更重要的是弘扬民族精神，创建民族文化。“民族的，才是国际的”。我们提倡学他人之长，但更希望立自己之势。

势缘何物，势乃人为。识人、用人、育人、成人，乃人本之真谛。育人才、成能人，则可造大势。育人、成人之根本在教育，教育之要件在教材，教材之基础在出版。换言之，人本之基础在书本。

凡事均需讲效益，所谓成事，亦即有效。高效可造宏基，无效难以为继，此乃事物发展之规律。基于此，我们崇尚出好书、出人才、出效益！

东北财经大学出版社

1998年8月

THE IRWIN/MCGRAW-HILL SERIES

Operations And Decision Sciences

OPERATIONS MANAGEMENT

Chase, Aquilano, and Jacobs,
**Production and Operations
Management: Manufacturing
and Services,**
Eighth Edition

Chu, Hottenstein, and Greenlaw,
PROSIM III for Windows,
Third Edition

Cohen and Apte,
Manufacturing Automation

Davis, Aquilano, and Chase,
**Fundamentals of Operations
Management,**
Second Edition

Dilworth,
Operations Management,
Second Edition

Flaherty,
Global Operations Management

Fitzsimmons and Fitzsimmons,
**Service Management:
Operations, Strategy,
Information Technology,**
Second Edition

Hill,
**Manufacturing Strategy: Text
& Cases,**
Second Edition

Hopp and Spearman,
Factory Physics

Lambert and Stock,
**Strategic Logistics
Management,**
Third Edition

Leenders and Fearon,
**Purchasing and Materials
Management,**
Eleventh Edition

Lotfi and Pegels,
**Decision Support Systems for
Operations & Management
Science,**
Third Edition

Melnyk and Denzler,
**Operations Management: A
Value-Driven Approach**

Moses and Seshadri,
**HOM Operations Management
Software for Windows**

Nahmias,
**Production and Operations
Analysis,**
Third Edition

Nicholas,
**Competitive Manufacturing
Management**

Noori and Radford,
**Production and Operations
Management**

Sanderson and Uzumeri,
Managing Product Families

Schroeder,
**Operations Management:
Decision Making in the
Operations Function,**
Fourth Edition

Schonberger and Knod,
**Operations Management:
Customer-Focused Principles,**
Sixth Edition

Stevenson,
**Production/Operations
Management,**
Fifth Edition

Vollmann, Berry, and Whybark,
**Manufacturing Planning &
Control Systems,**
Fourth Edition

QUANTITATIVE METHODS AND MANAGEMENT SCIENCE

Bodily, Carraway, Frey, Pfeifer,
**Quantitative Business Analysis:
Casebook**

Bodily, Carraway, Frey, Pfeifer,
**Quantitative Business Analysis:
Text and Cases**

Bonini, Hausman, and Bierman,
**Quantitative Analysis for
Business Decisions,**
Ninth Edition

Hesse,
**Managerial Spreadsheet
Modeling and Analysis**

Lotfi and Pegels,
**Decision Support Systems for
Operations and Management
Science,**
Third Edition

Stevenson,
**Introduction to Management
Science,**
Second Edition

Turban and Meredith,
**Fundamentals of Management
Science,**
Sixth Edition

BUSINESS STATISTICS

Aczel,
Complete Business Statistics,
Third Edition

Bowerman and O'Connell,
**Applied Statistics: Improving
Business Processes**

Bryant and Smith,
**Practical Data Analysis: Case
Studies in Business Statistics,**
Volumes I and II

Butler,
Business Research Sources

Cooper and Schindler,
Business Research Methods,
Sixth Edition

Delurgio,
**Forecasting Principles and
Applications**

Doane, Mathieson, and Tracy,
Visual Statistics

Duncan,
**Quality Control & Industrial
Statistics,**
Fifth Edition

Gitlow, Oppenheim, and
Oppenheim,
**Quality Management: Tools and
Methods for Improvement,**
Second Edition

Hall,
**Computerized Business
Statistics,**
Fourth Edition

Hanke and Reitsch,
**Understanding Business
Statistics,**
Second Edition

Lind and Mason,
**Basic Statistics for Business
and Economics,**
Second Edition

Mason and Lind,
**Statistical Techniques in
Business and Economics,**
Ninth Edition

Merchant, Goffinet, Koehler,
Basic Statistics Using Excel

Neter, Kutner, Nachtsheim, and
Wasserman,
**Applied Linear Statistical
Models,**
Fourth Edition

Neter, Kutner, Nachtsheim, and
Wasserman,
**Applied Linear Regression
Models,**
Third Edition

Shin,
**The Irwin Statistical Software
Series: Minitab, SAS, SPSS
Guides,**
Second Edition;
Statgraphics

Siegel,
Practical Business Statistics,
Third Edition

Webster,
Essentials of Business Statistics

Wilson and Keating,
Business Forecasting,
Third Edition

To our families, for the patience and support they offer our professional lives, for the pleasure and purpose they add to the rest of our lives.

This book contains the text and cases forming the core of what has been and continues to be a highly successful MBA-level course in quantitative business analysis. The course represents an alternative to the traditional technique-driven, compartmentalized, quantitative methods course. Instead, it is a course that is

- decision and action oriented, not technique and numbers driven;
- integrated in both form and pedagogy within a business curriculum, not compartmentalized;
- managerially exciting, not methodologically dull.

It contains all of the usual topics of existing quantitative courses. Students develop the skill and the perspective to use quantitative techniques artfully to gain insight into the resolution of practical business problems. They not only master the specific techniques, but also develop the ability to garner information from commonly available sources and to recognize when a particular technique is appropriate, when additional analysis is called for, and when to end the analysis and make the decision. The most widely applicable methodologies of decision and risk analysis, probability and statistics, competitive analysis, and management science are thus integrated with personal judgment and intuition in a way that is meaningful to MBA and executive learners alike.

Two key components of the course are: (1) field-based (i.e., they actually happened) cases drawn from all functional areas of business, and (2) clearly-written, pragmatically-focused text explaining technical concepts and the strategic frameworks of quantitative analysis. The cases feature realistic, unstructured business settings wherein the methodologies of the course can be usefully and creatively applied to the decisions of the practicing manager. They thus provide vivid answers to the questions, Why is this stuff useful?

The text, which has its origin in “technical notes” used for years in the course, gives the background theory and technical details necessary to perform solid, insightful quantitative analysis of business issues. It thus provides answers to the questions, What do I do now?, which are triggered by the complex issues raised in the cases.

The Cases

Just what is a case? The answer must recognize that cases play a variety of roles in a course. They may be focused on understanding core tools and concepts, on applying methodology appropriately, on defining the limits of good practice, or on inventing new methods and adapting existing ones for the problem at hand.

Some cases in this book are highly structured, focused on a single issue, with needed data laid out. These cases can be used to develop methodology; the cases are not intended merely to present institutional information and provide practical enrichment. Such a case is more than a problem or exercise; it requires some initial assumptions, which may lead to alternative answers, and the analysis must be explained by the student in the case context.

Some of the cases are appraisal cases, where the analysis is partly or wholly done. The student will evaluate the work, applying what has been learned about good practice, and perhaps push the analysis further.

Finally, and more commonly in this book, many cases are unstructured, with multiple issues and data challenges (missing or incomplete data, choices among data, or data preparation needed). In these cases, the student must diagnose the situation, perform the analysis, and explain the use of the analysis and its limits. The intent here is not to produce apprehension, but to show that skills can be confidently applied to realistic situations. Some of the student's fear that may arise when using cases comes from concern that there is a single right answer and that the student will be unable to find it. If students can see that many reasonable assumptions may be made (some more reasonable than others, to be sure) and that they can do a variety of analyses (some more insightful than others), they will find their own way and complement their efforts with ideas that emerge in class.

A common theme cutting across all cases, and indeed across the entire course, is the need to make real *decisions*. The cases thus avoid being academic exercises, but assume the vitality of business itself. Thus, *decision analysis* becomes an accurate descriptor of all the cases in this book and is a critical framework from which this new type of quantitative methods course hangs.

What makes a strong case? A leading characteristic is the aforementioned *decision orientation*. *Relevance* is key; students recognize that the resolution of the situation matters to them. A strong case demonstrates a *need to know* something not currently known. It involves the *practice of skills*, including new and recently acquired skills. And it requires some *internaliza-*

tion of concepts and the *articulation* of the reasoning process. Students will see that they are involved in situations that can be key to their careers.

In addition to these characteristics, these cases provide integration with other courses. Issues come up from other disciplines that provide bridges to other courses. If these issues are not immediately put aside in class and built upon, the course is not pigeon holed: "That's *quant*, not management, and therefore not for me." These cases provide many opportunities for joint class sessions, where the regular instructor can be joined by a professor of accounting, ethics, economics, finance, marketing, operations, or human resources to bring together two streams of concepts and to solidify the role of quantitative analysis in each of the business functions.

The Text

The course's dedication to student-centered learning places both responsibility and ownership of the learning process squarely on the shoulders of the student. The cases force the student to confront tricky issues and complex situations. The text provides a readily-available source of guidance on how to structure and resolve the issues and situations. The general flow of learning embraced by the course and supported by this book is then: analyze a case and draw on the text as the need arises. The cases challenge; the text prescribes how to address those challenges.

The text is organized as follows: Chapter 1 is an overview of the process of quantitative business analysis, using a simple but realistic example. The four major components of good analysis are introduced: *alternatives*, *assumptions*, *assessment*, and *performance*. Each of these components is the topic of one of the following four chapters, which together with Chapter 1 comprise Part I, the core of the text.

The remaining chapters build on the four basic components of analysis, each representing a more advanced treatment of one (or more) of the components. Chapter 6 addresses the issue of how to restructure *assumptions* in a way that helps mitigate risk. Chapters 7–10 address complications arising from how to evaluate *performance*. Chapters 11–14 address issues of how to calibrate *assessments* of uncertainty in key assumptions. Chapters 15–17 address complications associated with having a large number of *alternatives* to consider (Chapter 15 also addresses complications associated with how performance is assessed, when assumptions are difficult to structure).

Concluding remarks

The cases are organized alphabetically, not according to particular methodological approach. This organization allows flexibility in the use of the cases and preserves student responsibility to determine what should be done with each case. Of course, the cases are not to be taught in alphabetical order. The *Instructor's Manual* describes the typical use of each case, refers to the appropriate text for each case, and provides sample course outlines. (Many of

the cases have also been used in executive education in short, non-degree programs. They would fit nicely in courses more narrowly focused in decision analysis, management science, or forecasting and regression. For short courses, any subset of these cases can be selected for custom publishing by Irwin/McGraw-Hill.)

The course based on this book assumes virtually no prerequisites. Although calculus is not needed, some algebra is assumed, but rarely getting as far, for example, as solving two equations in two unknowns. Although no prior probability or statistics is presumed, some familiarity can help the student. The principal requirements are clear thinking, the ability to conceptualize, and the ability to cut to the core of an issue.

Even though this book of texts and cases is software neutral, the electronic spreadsheet is assumed to be a fundamental tool available to the student. The spreadsheet is a very helpful way for instructors to provide the right amount of help to students. Spreadsheets containing data from case exhibits and, sometimes, the setup for analysis are available with the *Instructor's Manual*. They may also be downloaded from the QBA home page accessible through the Darden School's home page (<http://www.darden.virginia.edu/>) on the Internet. It will be necessary to use @Risk or Crystal Ball, and the Solver within Excel or What'sBest! to do some of the cases. Other software tools, such as TreePlan Precision Tree, or DPL, may be useful to students in the course but are not necessary.

A complete instructor's manual, with sample course outlines and an extensive teaching note for each case, is available from Irwin/McGraw-Hill. To the instructor's advantage the authors have put as much effort and time into teaching notes as the cases. Each note is the product of many teaching meetings and discussions of pedagogy.

The production of this book reaffirms our commitment to what we have been doing in our quantitative analysis course for many years. We are glad to see that others in our discipline are also interested in this approach, as evidenced by many sessions on the topic at the meetings of such professional societies as the Institute for Operations Research and Management Sciences, and the Decision Sciences Institute. We welcome the interest and hope that our experience may be found useful elsewhere.

Please provide feedback (especially about successes and failures with these cases), new case ideas, and innovative ways of teaching. Write to any of the authors at Darden Graduate Business School, University of Virginia, Box 6550, Charlottesville, VA 22906-6550, or send e-mail.

Samuel E. Bodily (bodilys@virginia.edu)
Robert L. Carraway (carrawayr@virginia.edu)
Sherwood C. Frey, Jr. (scf@virginia.edu)
Phillip E. Pfeifer (pep8s@virginia.edu)

We thank the students at the Darden School for their comments and contributions during the development and refinement of these cases. We gratefully acknowledge the resources of the Darden School for case writing support in the form of research assistants, travel expenses, and summer salaries. Debbie A. Quarles provided able assistance in keeping track of various versions of the manuscript and proof pages. Many individuals contributed to specific cases including the following:

Edward R. Case	<i>T. Rowe Price</i>
Dana Clyman	<i>Athens Glass Works, Harimann International</i>
John L. Colley, Jr.	<i>Oakland A's (A)</i>
Glenn A. Ferguson	<i>Edgcomb Metals (A)</i>
James V. Gelly	<i>Lesser Antilles Lines</i>
Lonnie Gorban	<i>Lightweight Aluminum Company</i>
C. William Hosler	<i>Foulke Consumer Products, Inc.; Sleepmore</i>
	<i>Mattress Manufacturing: Plant Consolidation</i>
James C. McLean	<i>American Lawbook Corporation</i>
Donna M. Packard	<i>Jade Shampoo (A) and (B)</i>
Michel Schlosser	<i>Dhahran Roads (A) and (B)</i>
Douglas L. Schwartz	<i>Roadway Construction Company</i>
Steven R. Scorgie	<i>The Waldorf Property</i>
George R. Stearns	<i>Piedmont Airlines (A)</i>
Ann C. Stephans	<i>Oakland A's (A)</i>
William T. Stewart	<i>Edgcomb Metals (A)</i>
Hasmeeth S. Uppal	<i>Harimann International</i>
Larry Weatherford	<i>CyberLab (A), (B), and Supplement; Shumway,</i>
	<i>Horch, and Sager (A); Sprigg Lane (A),</i>
	<i>Wachovia Bank and Trust Company N.A. (B):</i>
	<i>Supplement</i>

We acknowledge Harvard Business School Publishing for their permission to use the following cases: C. K. Coolidge, Inc. (A), Freemark Abbey Winery, Maxco, Inc., and the Gambit Company.

We thank the many companies and individuals who willingly cooperated with the field research needed for the cases. We are pleased to note that there are many managers who recognize the educational value of field-based course materials and, as a result, who generously contributed their time and experience. Some of the companies are named in the cases; others for a variety of reasons chose to have their material disguised. Although the cases in this book are written as fact, almost all of them have some facts disguised. In some, individual names have been changed; in others, some of the numbers are changed. Some are written from general experience, without a specific sponsoring company. We are pleased if the cases appear to be totally realistic, but the reader should be aware that names, numbers and situations are not all real.

We benefited (as will the users) from the efforts of Darden editors Bette Collins, Stephen Smith, and Elaine Moran.

We appreciate very much the comments and evaluations of Sergios Koreisha, University of Oregon; Frederick Davidson, Mary Washington College; Terry P. Harrison, Penn State University; Peter M. Ellis, Utah State University; and James G. Morris, University of Wisconsin.

Finally, we thank the Irwin/McGraw-Hill editors Dick Hercher, for approving this project, and Wanda Zeman, for shepherding it along.

世界财经与管理教材大系

内容简介

本书适用于管理学、企业数量分析、数量方法、数量模型等课程，全面介绍了分析企业问题的核心数量工具和技术，是经过达登商学院多届学生使用的非常成功的MBA教材。

作者简介

塞缪尔·E.博迪利，弗吉尼亚大学达登工商管理研究生院教授。

罗伯特·L.卡拉弗，弗吉尼亚大学达登工商管理研究生院教授。

小舍伍德·C.弗雷，弗吉尼亚大学达登工商管理研究生院教授。

菲利普·E.法伊弗，弗吉尼亚大学达登工商管理研究生院教授。

商务与法律系列

1. 商学导论(Madura)
2. 商务沟通(Lehman)
3. 商务英语(Guffey)
4. 商务决策的数量方法(Curwin)
5. 企业数量分析(Bodily)
6. 韦斯特商法学(Clarkson)
7. 美国联邦税制(1998年版)(Murphy)



ISBN 7-81044-470-0



9 787810 444705 >

ISBN 7-81044-470-0/F · 1153

定价：66.00 元

Chapter 1 Proactive Decision Making 1

- Routine Decisions 2
- The Challenges of Proactive Decision Making 3
- Alternatives 3
- Assumptions—Structure 4
- Assumptions—Assessments 5
- Performance 6
- Summary 7

Chapter 2 Alternatives 9

- Small Number of Alternatives 9
- Sequential Decisions 11
- A Single Decision Quantity 12
- Two or More Decision Quantities 17
- Decision Rules 17
- Summary 18

Chapter 3 Structuring Assumptions in Decision Making 19

- Structuring Relationships Using an Influence Diagram 20
- Structuring a Sequence of Decisions and Uncertainties Using a Decision Tree 26

- Influence Diagrams with Uncertain Quantities 31
- Final Examples of How to Develop an Influence Diagram 34
- The Use of Influence Diagrams and Decision Trees 37
- Case: Destiny Consulting Group 39

Chapter 4 Assessment 42

- Sensitivity Analysis 43
- The Language of Probability 48
- Uncertainties with a Few Potential Outcomes 48
- Uncertainties with Many Potential Outcomes 51
- Summary Measures of Probability Distributions 52
- Deriving the Probability Distribution for Performance 55
- Summary 56

Chapter 5 Performance 59

- Relevant Monetary Flows 59
- Evaluating Alternatives under Uncertainty 62
- Few Potential Outcomes 62

Many Potential Outcomes 67
Summary 74

Chapter 6 Risk Management 76

Value of Information 76
 Perfect Information 77
 Imperfect Information 79
Value of Control 81
 Perfect Control 82
 Control of Continuously
 Ranging Quantities 82
Adding Value and Reducing Risk 83
Summary 86

Chapter 7 Evaluating Multiperiod Performance 87

Cash Flow 88
 An Example 89
Time Value of Money 91
 Accumulated Value 92
 Present Value and Net Present Value 94
 Formulas for Accumulated and Present
 Value Calculations 97
 Streams in Perpetuity 97
 Pretax versus Aftertax Analyses 98
The Reinvestment Rate 98
 Hurdle Rate 99
 Internal Rate of Return 99
 Nominal versus Effective Rates
 of Return 101

Chapter 8 Multiobjective and Multistakeholder Choice 103

The Generic Choice Problem 103
 Example 104
First-Round Eliminations 105
 Dominance 105
Decision Rules without Trade-
 off Judgments 107
 The Lexicographic Rule 108
 Satisficing 108

Rate and Weight: Linear Additive
 Scoring Rules 109
 Rating Alternatives 109
 Weighting Attributes 110
 Assumptions of Rate and Weight 115
Multiple Stakeholder Problems 116
Appendix 1 Comments on the
 Dependence of Weights on the
 Scaling of Attributes 116
Exercises 119

Chapter 9 Risk Preference and Utility 120

The Utility of
 Monetary Consequences 120
Risk Aversion 123
 Constant Risk Aversion: Negative
 Exponential Utility 124
 Decreasing Risk Aversion:
 Logarithmic Utility 126
Using a Utility Curve for Risk
 Analysis 129
Separation of Risk-Return and Mean-
 Variance Analysis 131
Corporate Risk Policy 132
Exercises 133

Chapter 10 Competitor Analysis 134

Characterizing Competitive
 Situations 135
Matrix Format 137
Classical Structures 141
 No (or Little) Conflict 141
 Prisoner's Dilemma 142
 Preemption 144
Summary 145

Chapter 11 Probability Distributions 147

The Language of Probability
 Distributions 147
 The Probability Mass Function 148

The Cumulative Distribution Function	149
Continuous and Many-Valued Uncertain Quantities	152
Assessment: Capturing Personal Judgment	156
An Example of Assessing a Probability Distribution	159
Assessment: Using Historical Data as a Guide	160
Identifying Suitable Data	161
Using the Suitable Data as a Guide	162
Adjusting Data for One Distinguishing Factor	167
Assessment: Appealing to Underlying Structure	168
The Binomial Distribution	169
The Normal Distribution	172
The Poisson Distribution	177
The Exponential Distribution	178
Subjective Biases and Assessment	180
Summary	182

Chapter 12 Sampling 183

Forecasting Sample Results	184
Forecasting a Sample Average	186
Forecasting a Sample Proportion	188
Using Sample Results to Draw Inferences about the Underlying Probability Distribution	191
Inferences about the Mean of the Underlying Probability Distribution	192
Inferences about the Underlying Probability	194
Using Sample Results to Forecast Future Sample Results	195
Using Sample Results to Forecast a Future Sample Average	196
Using Sample Results to Forecast a Future Sample Proportion	197
Summary	198

Chapter 13 Time-Series Forecasting 199

Basic Approaches for	
One-Period Forecasts	200
Simple Approaches	200
Moving Average	201
Smoothed Average	202
Comparison of Forecasts	203
Precision	204
Bias	205
Exploiting Multiperiod Patterns	207
Treating Seasonality	208
Deseasonalizing a Time Series	208
Forecasting the	
Deseasonalized Series	211
Reseasonalizing the Forecast	213
Generating the Probability Distribution Forecast	213
Decomposition of Time Series into Seasonality and	
Trend Components	213
Separating out Seasonality	214
Extrapolating Trend and	
Cycle Components	215
Holt's Model: Exponential Smoothing with Trend	217
Winter's Model: Exponential Smoothing with Trend and Seasonality	220
Other Advanced Techniques	221
Considerations in Preparing and Using a Forecast	222

Chapter 14 Regression: Forecasting Using Explanatory Factors 224

The Simple Linear Model	224
Fitting the Model Using "Least Squares"	227
Important Properties of the Least-Squares Regression Line	229
Summary Regression Statistics	230
Standard Error of Estimate	232
Adjusted R Square	233