

MBA精选教材·英文改编版



QUANTITATIVE ANALYSIS FOR MANAGEMENT

[第9版]

面向管理的 数量分析

Barry Render Ralph M. Stair, Jr. Michael E. Hanna 著
王明进 黄涛 改编



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出版者序言

自 2001 年 12 月加入世界贸易组织以来,中国进一步加强了与世界各国的政治、经济、文化各方面的交流与合作,这一切都注定中国将在未来世界经济发展中书写重要的一笔。

然而,中国经济的发展正面临着前所未有的人才考验,在许多领域都面临着人才匮乏的问题,特别是了解国际贸易规则、能够适应国际竞争需要的国际管理人才,更是中国在未来国际竞争中取胜的决定性因素。因此,制定和实施人才战略,培养大批优秀人才,是我们在新一轮国际竞争中赢得主动的关键。

工商管理硕士(MBA)1910 年首创于美国哈佛大学,随后 MBA 教育历经百年风雨不断完善,取得了令世人瞩目的成绩。如今,美国 MBA 教育已经为世界企业界所熟知,得到社会的广泛承认和高度评价。MBA 教育在我国虽起步较晚,但在过去十余年里,我国的 MBA 教育事业发展非常迅速,也取得了相当显著的成绩。

目前,国内的 MBA 教育市场呈现一片繁荣景象,但繁荣的背后却隐藏着种种亟待解决的问题。其中一个就是教材的问题。目前,国内市场上国外引进版教材在一定程度上还存在新旧好坏参差不齐的现象,这就需要读者在使用引进版教材时进行仔细的甄别。

北京大学出版社推出的《MBA 精选教材·英文影印版》弥补了国内 MBA 教材市场的缺憾,给国内 MBA 教材市场注入了一股新鲜的血液。全套丛书基本覆盖了北京大学 MBA 的主修课程,包括:管理学、营销学、战略管理、管理信息系统、运作管理、人力资源管理、商务沟通、国际金融、金融管理、决策分析、货币银行学、会计学等。另外,在十几门主课的基础上又增加了几门高级选修课程,包括:国际会计学、组织行为学、投资学、商务学、财务报表解析、管理会计、管理沟通、商业伦理学、企业家精神等。

本套丛书的筛选大体上本着以下几点原则:(1)出“新”。克服以往教材知识陈旧、落后的弊端,大部分教材都与国外原版书同步出版。(2)出“好”。本套丛书收入了美国哈佛大学、斯坦福大学、麻省理工学院等著名院校所采用的教材,如《管理学》、《营销管理架构》、《管理信息系统》、《人力资源管理》、《财务会计》、《管理会计》、《面向管理的数量分析》等;本套丛书还收入了著名学术界宗师包括斯蒂芬·罗宾斯(《管理学基础》)、菲利普·科特勒(《营销管理架构》)、查尔斯·霍恩格伦(《财务会计》)等人的学术巨著。(3)出“精”。大多数教材都是再版多次,经过不断的修改和完善而成的。

本套《MBA 精选教材·英文影印版》集合了美国经济学界和管理学界各个学科领域专家的权威巨著,该丛书经过北京大学光华管理学院及其他著名高校知名学者的精心选编,包括了大量精深的理论指导和丰富的教学案例,真正称得上是一套优中选精的 MBA 教材。

致谢

本套教材是我社与国外一流专业出版公司合作出版的,是从大量外版教材中选出的最优秀的一部分。在选书的过程中我们得到了很多专家学者的支持和帮助,可以说每一本书都经过处于教学一线的专家、学者们的精心审定,北京大学出版社英文影印版教材的顺利出版离不开他们

的无私帮助,在此,我们对审读并对本套图书提出过宝贵意见的老师们表示衷心的感谢,他们是:

北京大学光华管理学院:符国群、李东、梁钧平、陆正飞、王建国、王其文、杨岳全、于鸿君、
张国有、张圣平、张志学、朱善利

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本套丛书的顺利出版还得到了培生教育出版集团(Pearson Education)北京办事处的大力支持,对他们的付出我们也致以深深的谢意。

教辅材料说明

教材,顾名思义教学之材料,它和普通的书籍有一个很大的区别,就是必须“方便教师教学”。所以,好的教材更需有完备的教学辅助材料相匹配,且每一本教材都要有教辅材料,只有配备了齐全的辅助材料才能称其为完整的教材。《MBA 精选教材·英文影印版》系北京大学出版社获全球最大的教育出版集团——美国培生教育出版集团(Pearson Education)独家授权之英文影印版本。培生教育出版集团旗下的国际知名教育图书出版公司 Prentice Hall/Addison Wesley/Longman 出版的高品质的经济管理类出版物,已成为全美乃至全球高校采用率最高的教材,享誉全球教育界、工商界。我社在选择此套教材的过程中,尽量选择了教辅材料齐全的教材,这些教辅材料包括:教学指导用书、教学提纲、测试题、解答题、课堂演示文稿等,以书、幻灯片、CD、CD-ROM 等形式出现。同时,这些材料还可通过访问培生教育出版集团的相关网址:
<http://www.prenhall.com>、<http://www.pearsoned.com>、<http://www.aw.com> 免费下载。

欲获得相关教辅材料的教师烦请填写每本书后面所附的《教学支持说明》,以确保此教辅材料仅为教师获得。

出版声明

本套丛书是对国外原版教材的直接影印,由于各个国家政治、经济、文化背景的不同,原书中出版者和作者所持观点及结论尚需商榷,请广大读者在阅读过程中加以认真分析和鉴别。我们希望本套丛书的出版能够促进中外文化学术交流,推进国内经济与管理专业的教学,为中国经济走向世界作出一份贡献。

我们欢迎所有关心中国 MBA 教育的专家学者对我们的工作进行指导,欢迎每一位读者给我们提出宝贵的意见和建议。

北京大学出版社
经济与管理图书事业部

2006 年 1 月

改 编 者 序 言

Barry Render 等人所著的《面向管理的数量分析》(第 9 版)是一本介绍管理科学数量分析工具的入门性教材,书中涵盖了管理科学中常用的定量分析工具和方法,包括决策分析、预测技术、库存控制、线性和非线性规划、网络模型、运输与分配模型、排队论、模拟建模、项目管理、马尔可夫分析等。

本书的主要特色在于:在介绍每一部分内容时,作者力求通俗易懂,通过大量的图形和表格,让学生能够对相关问题的清晰直观的了解,并注重学生的动手能力的培养。全书以 EXCEL 为主要的计算机实现手段,并配以大量的案例和习题,让学生能够充分发掘这一常用软件的功能,解决经济管理中的各种现实问题。从 MBA 教学实践来看,这种方法不需要学生掌握复杂的专用软件,锻炼了学生对数据进行深入分析的能力,又能在管理实践中予以采用,因此受到了 MBA 学生的广泛欢迎,甚至有学生会说“原来 EXCEL 还能这么用”。目前国内相关课程的教科书往往以理论介绍和应用模型为主,以 EXCEL 实现手段作为主线的不多,因此本书很适合 MBA 学生学习使用。

为了使本教材更适合国内的教学需要以及版权方面的原因,我们对本书进行了改编,删除了原书中的第 2 章(概率的概念与应用)、第 4 章(回归模型)、第 17 章(统计质量控制)。其主要原因是,这些章只是介绍了相关领域比较简单的内容,在 MBA 的统计分析或质量管理(或运营管理)课程中,一般都会对相应内容作更为深入系统的介绍。另外,从内容上看,其他章节对删除部分也没有什么依赖性。

本书余下的 14 章自成体系,以线性规划、整数规划为主,适合作为一个学期 MBA 学生的《规划与决策》、《管理运筹学》或《数据、模型与决策》等课程的教材。在教学中,可以采用课堂教授与上机实践相结合的手段,用实践案例表现规划方法的具体应用,以达到良好的教学效果。

王明进 黄涛
于北京大学光华管理学院
2007 年 10 月

关于本书

适用对象

适用于本科生和 MBA、EMBA 的管理科学、定量分析、决策模型类课程。

内容简介

本书是一本有关运筹学、管理科学和数量分析的优秀教科书。本书聚焦于问题的建模和利用计算机实现建模两个重点,同时广泛吸收了近二十年来管理科学和数量分析的原则。本版新书在保持并进一步强调应用性特色的同时,继续为读者论述了数量分析技术在各种组织决策环境中的应用方法和技巧,并展示了各种模型的技术方法,讨论了它们的假设条件和使用的局限性,并说明了这些技术在组织中的应用。

作者简介

Barry Render 是美国 Rollins 大学 Roy E. Crummer 商学院著名的管理科学教授。他从辛那提大学获得运作研究学的理学硕士学位和定量分析学博士学位。他曾在乔治·华盛顿大学、新奥尔良大学、波士顿大学和乔治·梅森大学教学,在那里他因为决策科学方面的成就获得 GM 教授基金,同时还担任决策科学部的主席。

本书特色

- 本书被美国哈佛大学等名校采用,流行于全世界。
- 本书的每一个章节都有 1—4 个案例,与其他同类书籍相比,数量更多,更便于老师和学生使用。
- 本书文字简洁易懂,便于应用;书中采用的软件包括 QM for Windows、Excel QM 和 Excel。

本版更新

- 所有的决策理论模型都被组合到一个章节中。决策树和效用理论与决策表一起被介绍。
- 增加了库存控制模型一章的内容。在第 6 章库存控制模型中,现包括 JIT、MPR 和 EPR 等内容,更加全面地介绍了库存模型。

教辅资源

教师手册

题库

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ABOUT THE AUTHORS

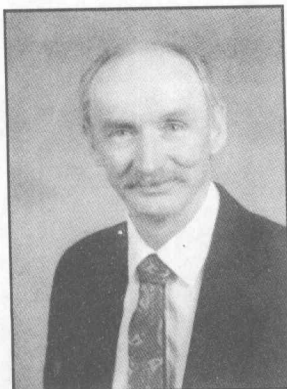


Barry Render is the Charles Harwood Distinguished Professor of Management Science at the Roy E. Crummer Graduate School of Business at Rollins College in Winter Park, Florida. He received his M.S. in Operations Research and his Ph.D. in Quantitative Analysis at the University of Cincinnati. He previously taught at George Washington University, the University of New Orleans, Boston University, and George Mason University, where he held the GM Foundation Professorship in Decision Sciences and was Chair of the Decision Science Department. Dr. Render has also worked in the aerospace industry for General Electric, McDonnell Douglas, and NASA.

Professor Render has co-authored ten textbooks with Prentice-Hall, including *Managerial Decision Modeling with Spreadsheets*, *Operations Management*, *Principles of Operations Management*, *Service Management*, *Introduction to Management Science*, and *Cases and Readings in Management Science*. His more than one hundred articles on a variety of management topics have appeared in *Decision Sciences*, *Production and Operations Management*, *Interfaces*, *Information and Management*, the *Journal of Management Information Systems*, *Socio-Economic Planning Sciences*, and *Operations Management Review*, among others.

Dr. Render has also been honored as an AACSB Fellow and named as a Senior Fulbright Scholar in 1982 and again in 1993. He was twice vice-president of the Decision Science Institute Southeast Region and served as Software Review Editor for Decision Line from 1989 to 1995. He has also served as Editor of the *New York Times* Operations Management special issues from 1996 to 2001. Finally, Professor Render has been actively involved in consulting for government agencies and for many corporations, including NASA; the FBI; the U.S. Navy; Fairfax County, Virginia; and C&P Telephone.

He teaches operations management courses in Rollins College's MBA and Executive MBA programs. In 1995 he was named as that school's Professor of the Year, and in 1996 was selected by Roosevelt University to receive the St. Claire Drake Award for Outstanding Scholarship.



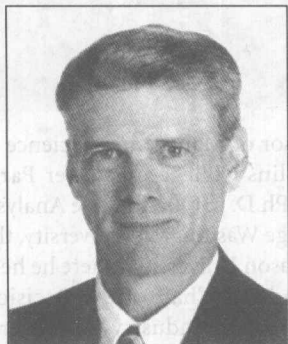
Ralph Stair is a retired professor in the College of Business at Florida State University. He received a B.S. in Chemical Engineering from Purdue University and an MBA from Tulane University. Under the guidance of Ken Ramsing and Alan Eliason, he received his Ph.D. in operations management from the University of Oregon.

He has taught at the University of Oregon, the University of Washington, the University of New Orleans, and Florida State University. He has twice taught in Florida State University's Study Abroad Program in London. Over the years, his teaching has been concentrated in the areas of information systems, operations research, and operations management.

Dr. Stair is a member of several academic organizations, including the Decision Sciences Institute and INFORMS, and he regularly participates at national meetings. He has published numerous articles and books, including *Managerial Decision Modeling with Spreadsheets*, *Introduction to Management Science*, *Cases and Readings in Management Science*, *Production and Operations Management: A Self-Correction Approach*, *Fundamentals of Information Systems*, *Principles of Information Systems*, *Introduction to Information Systems*, *Computers in Today's World*, *Principles of Data Processing*, *Learning to Live*

with Computers, Programming in BASIC, Essentials of BASIC Programming, Essentials of FORTRAN Programming, and Essentials of COBOL Programming.

Dr. Stair divides his time between Florida and Colorado. He enjoys skiing, biking, kayaking, and other outdoor activities.



Michael E. Hanna is Professor of Decision Sciences at the University of Houston—Clear Lake (UHCL). He has a B.A. in Economics, an M.S. in Mathematics, and a Ph.D. in Operations Research from Texas Tech University. For over twenty years, he has been teaching courses in statistics, management science, forecasting, and other quantitative methods. His dedication to teaching has been recognized with the Beta Alpha Psi teaching award in 1995.

Professor Hanna has authored a textbook in management science, published over thirty articles and professional papers, and has served on the Editorial Advisory Board of *Computers and Operations Research*. In 1996, the UHCL Chapter of Beta Gamma Sigma presented him with the Outstanding Scholar Award.

At UHCL, Professor Hanna has served as program coordinator of the Decision Sciences unit and as Director of the Center for Economic Development and Research. In 2001, he received the UHCL President's Distinguished Service Award. He recently completed a second term as Vice-President of the Decision Sciences Institute (DSI). He has been active in DSI serving on the Innovative Education Committee, the Regional Advisory Committee, and the Nominating Committee. For the Southwest DSI, he has held several positions including President, and he received the Southwest DSI Distinguished Service Award in 1997.

Dr. Stair is a retired professor in the College of Business at Florida State University. He received a B.S. in Chemical Engineering from Tulane University and an MBA from Tulane University. Under the guidance of Ken Rummel and Alan Larson, he received his Ph.D. in operations management from the University of Oregon. He has taught at the University of Oregon, the University of Washington, the University of New Orleans, and Florida State University. He has two research interests in Florida State University's Study Abroad Program in London. Over the years, his teaching has been concentrated in the areas of information systems, operations research, and operations management. Dr. Stair is a member of several academic organizations, including the Decision Sciences Institute and INFORMS, and he regularly participates at national meetings. He has published numerous articles and books, including *Managerial Decision Modeling with Spreadsheets*, *Introduction to Management Science: Cases and Readings in Management Science*, *Production and Operations Management: A Self-Correction Approach*, *Introduction to Information Systems*, *Principles of Information Systems*, *Introduction to Information Systems*, *Computers in Today's World*, *Principles of Data Processing*, *Learning to Live*

PREFACE

OVERVIEW

The ninth edition of *Quantitative Analysis for Management* maintains the focus on the application of mathematical models in decision-making. Emphasis is placed on model building and computer applications so that students see how these models are used in business today. The mathematical details of more complex algorithms (such as the simplex and transportation algorithms) are presented in separate chapters making it easy for instructors to omit these if they so chose. The modeling aspects and computer solutions associated with these algorithms are contained in other chapters.

In the presentation of new techniques, a managerial problem that students can appreciate is first presented. This provides motivation for learning the mathematical techniques that follow. Then the mathematical model with all the necessary assumptions is provided. Plentiful examples illustrate the use of these techniques. With over 40 years of experience teaching quantitative methods, the authors have found that this is an effective pedagogy that students appreciate.

The only mathematical prerequisite for this textbook is algebra. We use standard notation, terminology, and equations throughout the book. Careful verbal explanation is provided for the mathematical notation and equations used.

Computer output is provided for many examples. The use of QM for Windows, Excel QM, and Excel allow the instructors to choose the software that works best in their situations.

NEW AND UPDATED FEATURES

The features that have been popular in previous editions have been updated and expanded. These are summarized here.

- *Modeling in the Real World* boxes demonstrate the application of the quantitative analysis approach to every technique discussed in the book.
- *Procedure* boxes summarize the more complex quantitative techniques, presenting them as a series of easily understandable steps.
- *Margin notes* highlight the important topics in the text.
- *History* boxes provide interesting asides related to the development of techniques and the people who originated them.
- *QA in Action* boxes summarize published articles illustrating how real organizations have used quantitative analysis to solve problems. The QA in Action boxes have been updated with many new applications.
- *Solved Problems*, included at the end of each chapter, serve as models for students in solving their own homework problems.
- *Discussion Questions* are presented at the end of each chapter to test the student's understanding of the concepts and definitions.
- *Problems* included in every chapter are applications-oriented and test the student's ability to solve exam-type problems. These are graded by level of difficulty: introductory (one bullet), moderate (two bullets), and challenging (three bullets). Many new problems have been added.

- *Internet Homework Problems* provide additional problems for students to work. These are available on the Companion Website.
- *Self Tests* allow students to test their knowledge of important terms and concepts in preparation for quizzes and examinations.
- *Case Studies*, at the end of each chapter, provide additional challenging managerial applications.
- *Glossaries*, at the end of each chapter, define important terms.
- *Key Equations*, provided at the end of each chapter, list the equations presented in that chapter.
- *End-of-Chapter Bibliographies* provide a current selection of more advanced books and articles.
- The software *QM for Windows*, developed by Professor Howard Weiss, uses the full capabilities of Windows to solve quantitative analysis problems. Instructions and screen captures are presented either in the chapters or in the appendices.
- *Excel QM* and *Excel* are used to solve problems throughout the ninth edition. Instructions and screen captures are given either in the chapters or in the appendices.
- *CD-ROM Modules* provide additional coverage of topics in quantitative analysis.
- The Companion Website at www.prenhall.com/render provides additional problems, cases, and other material for almost every chapter.

MAJOR CHANGES TO NINTH EDITION

Cohesive Treatment of Decision Models. All models for decision theory have been combined into one chapter. Decision trees and utility theory are now presented along with decision tables.

New Chapter on Regression Analysis. Due to requests by numerous users of previous editions, we have added a chapter on regression analysis. This includes simple linear regression, multiple regression, and brief discussion of nonlinear regression. Statistical inference on the overall model is presented. Other topics include dummy or indicator variables, model building, and cautions and pitfalls of using regression analysis.

Expanded Coverage of Forecasting. With the new chapter on regression providing an introduction to dummy variables, the forecasting chapter has been expanded to include the additive approach to decomposition. Dummy variables are used in regression models to incorporate seasonal variations into the forecasts.

Enhanced Inventory Chapter. Responding to user demand, we have now included just-in-time (JIT), materials requirements planning (MRP), and enterprise resource planning (ERP) in the inventory chapter. This provides a more complete introduction to inventory models in one chapter.

CD-ROM MODULES

To streamline the book, six topics are contained in modules available on the student CD-ROM included with the book. The six modules are:

- Analytic Hierarchy Process
- Dynamic Programming

- Decision Theory and the Normal Distribution
- Game Theory
- Mathematical Tools: Matrices and Determinants
- Calculus-Based Optimization

SOFTWARE

Excel. Excel is the featured software tool of the ninth edition. For students already familiar with Excel, instructions and screen captures are provided to highlight functions and tools that are directly related to quantitative analysis. New appendices provide succinct instructions and examples in several chapters. Excel is used for computations with the normal distribution, the binomial distribution, Bayes' theorem, simple and multiple regression, the analytic hierarchy process, Markov analysis, matrix operations, and other models. From the previous edition, Excel is also used for linear and nonlinear programming, simulation, and forecasting.

Excel QM. Excel QM is an Excel add-in that makes the use of Excel even easier. It is used to solve many of the problems and examples found in the text. The use of Excel QM is integrated into most chapters.

QM for Windows. QM for Windows, developed by Professor Howard Weiss, has long been a preferred software package for quantitative techniques. It is menu-driven and very easy-to-use so that students with limited computer experience find it very user friendly. The full version of this software is on the Student CD-ROM and updates to this valuable package are available to the student at www.prenhall.com/weiss.

COMPANION WEBSITE

Our updated Companion Website may be accessed at www.prenhall.com/render. Internet Homework Problems are available to provide more opportunities for students to practice the techniques they have learned.

SUPPLEMENTS

The supplements have been updated to provide the students and instructors with the best teaching and learning package available. Here is a brief list of these supplements.

- **Instructor's Resource CD-ROM.** The Instructor's Resource CD-ROM includes electronic files for the complete Instructor's Solutions Manual, the Test Item File in Word, the computerized Test Item File (TestGen), and updated PowerPoint presentations.
- **Student CD-ROM.** The Student CD-ROM includes Excel QM, QM for Windows, and modules with six additional topics.
- **Instructor's Solutions Manual.** The Instructor's Solutions Manual, updated by the authors, is available to adopters in print form, on the Instructor's Resource CD-ROM and can be accessed online at the Prentice Hall Instructor Resource Center. Solutions to all Internet Homework Problems and Internet Case Studies are also included in this manual.
- **Test Item File.** The updated Test Item File is available to adopters in print form, on the Instructor's Resource CD-ROM and online at the Prentice Hall Instructor Resource Center.

- **Test Generator.** The print test item file is designed for use with the test-generating software. This computerized package allows instructors to custom design, save, and generate classroom tests. The test program permits instructors to: edit, add, or delete questions from the test banks; edit existing graphics and create new graphics; analyze test results; and organize a database of tests and student results. This software allows for greater flexibility and ease of use. It provides many options for organizing and displaying tests, along with a search and sort feature.

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