

清华金融学系列英文版教材

Fundamentals of
Futures and
Options Markets
Fourth Edition

期货与期权市场

基本原理 (第4版)

John C. Hull / 著



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期货与期权市场基本原理

第4版

Fundamentals of Futures and Options Markets

【Fourth Edition】

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出 版 说 明

为了适应经济全球化的发展趋势,满足国内广大读者了解、学习和借鉴国外先进的管理经验和掌握经济理论的前沿动态,清华大学出版社与国外著名出版公司合作影印出版一系列英文版经济管理方面的图书。我们所选择的图书,基本上是已再版多次、在国外深受欢迎、并被广泛采用的优秀教材,绝大部分是该领域中较具权威性的经典之作。在选书的过程中,我们得到了很多专家、学者的支持、帮助和鼓励,在此表示谢意!清华金融学系列英文版教材由清华大学经济管理学院和北京大学经济学院朱武祥、刘群艺、宋逢明、杨忻等老师审阅,在此一并致谢!

由于原作者所处国家的政治、经济和文化背景等与我国不同,对书中所持观点,敬请广大读者在阅读过程中注意加以分析和鉴别。

我们期望这套影印书的出版对我国经济科学的发展能有所帮助,对我国经济管理专业的教学能有所促进。

欢迎广大读者给我们提出宝贵的意见和建议;同时也欢迎有关的专业人士向我们推荐您所接触到的国外优秀图书。

清华大学出版社第三编辑室

2001.8

总序

世纪之交, 中国与世界的发展呈现最显著的两大趋势——以网络为代表的信息技术的突飞猛进, 以及经济全球化的激烈挑战。无论是无远弗界的因特网, 还是日益密切的政治、经济、文化等方面的国际合作, 都标示着 21 世纪的中国是一个更加开放的中国, 也面临着一个更加开放的世界。

教育, 特别是管理教育总是扮演着学习与合作的先行者的角色。改革开放以来, 尤其是 20 世纪 90 年代之后, 为了探寻中国国情与国际上一切优秀的管理教育思想、方法和手段的完美结合, 为了更好地培养高层次的“面向国际市场竞争、具备国际经营头脑”的管理者, 我国的教育机构与美国、欧洲、澳洲以及亚洲一些国家和地区的大量的著名管理学院和顶尖跨国企业建立了长期密切的合作关系。以清华大学经济管理学院为例, 2000 年, 学院顾问委员会成立, 并于 10 月举行了第一次会议, 2001 年 4 月又举行了第二次会议。这个顾问委员会包括了世界上最大的一些跨国公司和几家顶尖企业的最高领导人, 其阵容之大、层次之高, 超过了世界上任何一所商学院。在这样高层次、多样化、重实效的管理教育国际合作中, 教师和学生与国外的交流机会大幅度增加, 越来越深刻地融入到全球性的教育、文化和思想观念的时代变革中, 我们的管理教育工作者和经济管理学习者, 更加真切地体验到这个世界正发生着深刻的变化, 也更主动地探寻和把握着世界经济发展和跨国企业运作的脉搏。

我国管理教育的发展, 闭关锁国、闭门造车是绝对不行的, 必须同国际接轨, 按照国际一流的水准来要求自己。正如朱镕基总理在清华大学经济管理学院成立十周年时所发的贺信中指出的那样: “建设有中国特色的社会主义, 需要一大批掌握市场经济的一般规律, 熟悉其运行规则, 而又了解中国企业实情的经济管理人才。清华大学经济管理学院就要敢于借鉴、引进世界上一切优秀的经济管理学院的教学内容、方法和手段, 结合中国的国情, 办成世界第一流的经管学院。”作为达到世界一流的一个重要基础, 朱镕基总理多次建议清华的 MBA 教育要加强英语教学。我体会, 这不仅因为英语是当今世界交往中重要的语言工具, 是连接中国与世界的重要桥梁和媒介, 而且更是中国经济管理人才参与国际竞争, 加强国际合作, 实现中国企业的国际战略的基石。推动和实行英文教学并不是目的, 真正的目的在于培养学生——这些未来的企业家——能够具备同国际竞争对手、合作伙伴沟通和对抗的能力。按照这一要求, 清华大学经济管理学院正在不断推动英语教学的步伐, 使得英语不仅是一门需要学习的核心

课程，而且渗透到各门专业课程的学习当中。

课堂讲授之外，课前课后的大量英文原版著作、案例的阅读对于提高学生的英文水平也是非常关键的。这不仅是积累相当的专业词汇的重要手段，而且是对学习者思维方式的有效训练。

我们知道，就阅读而言，学习和借鉴国外先进的管理经验和掌握经济理论动态，或是阅读翻译作品，或是阅读原著。前者属于间接阅读，后者属于直接阅读。直接阅读取决于读者的外文阅读能力，有较高外语水平的读者当然喜欢直接阅读原著，这样不仅可以避免因译者的疏忽或水平所限而造成的纰漏，同时也可以尽享原作者思想的真实表达。而对于那些有一定外语基础，但又不能完全独立阅读国外原著的读者来说，外文的阅读能力是需要加强培养和训练的，尤其是专业外语的阅读能力更是如此。如果一个人永远不接触专业外版图书，他在获得国外学术信息方面就永远会比别人差半年甚至一年的时间，他就会在无形中减弱自己的竞争能力。因此，我们认为，有一定外语基础的读者，都应该尝试一下阅读外文原版，只要努力并坚持，就一定能过了这道关，到那时就能体验到直接阅读的妙处了。

在掌握大量术语的同时，我们更看重读者在阅读英文原版著作时对于西方管理者或研究者的思维方式的学习和体会。我认为，原汁原味的世界级大师富有特色的表达方式背后，反映了思维习惯，反映了思想精髓，反映了文化特征，也反映了战略偏好。知己知彼，对于跨文化的管理思想、方法的学习，一定要熟悉这些思想、方法所孕育、成长的文化土壤，这样，有朝一日才能真正“具备国际战略头脑”。

以往，普通读者购买和阅读英文原版还有一个书价的障碍。一本外版书少则几十美元，多则上百美元，一般读者只能望书兴叹。随着全球经济合作步伐的加快，目前在出版行业有了一种新的合作出版的方式，即外文影印版，其价格几乎与国内同类图书持平。这样一来，读者可以不必再为书价发愁。清华大学出版社这些年在这方面一直以独特的优势领先于同行。早在1997年，清华大学出版社敢为人先，在国内最早推出一批优秀商学英文版教材，规模宏大，在企业界和管理教育界引起不小的轰动，更使国内莘莘学子受益良多。

为了配合清华大学经济管理学院推动英文授课的急需，也为了向全国更多的MBA试点院校和更多的经济管理学院的教师和学生提供学习上的支持，清华大学出版社再次隆重推出与世界著名出版集团合作的英文原版影印商学教科书，也使广大工商界人士、经济管理类学生享用到最新最好质优价廉的国际教材。

祝愿我国的管理教育事业在社会各界的大力支持和关心下不断发展、日进日新；祝愿我国的经济建设在不断涌现的大批高层次的面向国际市场竞争、具备国际经营头脑的管理者的勉力经营下早日中兴。

赵纯均 教授

清华大学经济管理学院院长
全国工商管理硕士教育指导委员会副主任

**To
My Students**

Preface

This book has been written for undergraduate and graduate elective courses offered by business, economics, and other faculties. Many practitioners who want to acquire a working knowledge of futures and options markets will also find the book useful.

I was persuaded to write this book by colleagues who liked my other book *Options, Futures, and Other Derivatives*, but found the material a little too advanced for their students. *Fundamentals of Futures and Options Markets* (formerly *Introduction to Futures and Options Markets*) covers some of the same ground as *Options, Futures, and Other Derivatives*—but in a way that readers who have had limited training in mathematics will find easier to understand. One important difference between this book and my other one is that there is no calculus in this book.

The text can be used in a number of different ways. Instructors who like to focus on one- and two-step binomial trees when valuing options may wish to cover only the first 10 chapters. Instructors who feel that swaps are adequately covered by other courses can choose to omit Chapter 6. There are many different ways in which Chapters 11 to 21 can be used. Instructors who feel that the material in Chapters 14, 16, 17, or 18 is too specialized can skip one or more of these chapters. Some instructors may choose to devote relatively more time to futures and swaps markets (Chapters 1 and 6); others may choose to structure their course mostly around options markets (Chapters 7 to 21). The three new Chapters (19 to 21) contain very little mathematics and do not rely heavily on earlier material. I find they work well when used in the last two to three weeks of a course regardless of what is covered earlier.

Chapter 1 provides an introduction to futures and options markets and outlines the different ways in which they can be used. Chapter 2 describes the mechanics of how futures and forward contracts work. Chapter 3 shows how forward and futures prices can be determined in a variety of different situations by using pure arbitrage arguments. Chapter 4 discusses how futures contracts can be used for hedging. Chapter 5 deals with interest rate markets. Chapter 6 covers swaps. Chapter 7 describes the mechanics of how options markets work. Chapter 8 develops some relationships that must hold in options markets if there are to be no arbitrage opportunities. Chapter 9 outlines a number of different trading strategies involving options. Chapter 10 shows how options can be priced using one- and two-step binomial trees. Chapter 11 discusses the pricing of stock options using the Black–Scholes model. Chapter 12 extends the ideas in Chapter 11 to cover options on stock indices and currencies. Chapter 13 extends the ideas in Chapter 11 to futures options. Chapter 14 discusses volatility smiles. Chapter 15 provides a detailed treatment of hedge parameters such as delta, gamma, and vega. It also discusses portfolio insurance. Chapter 16 explains how to calculate and use the value-at-risk measure. Chapter 17 covers the use of multistep binomial trees to value American options. Chapter 18 focuses on interest rate options. Chapter 19 covers exotic options, mortgage-backed securities, and nonstandard swaps. Chapter 20 covers some relatively new derivative products: credit derivatives, weather derivatives, energy derivatives, and

insurance derivatives. Chapter 21 describes some well-publicized derivatives disasters and reviews the lessons we can learn from them.

At the end of each chapter (except the last one) there are seven quiz questions that students can use to provide a quick test of their understanding of the key concepts. The answers to these are at the end of the book.

What's New?

The major changes in this edition include:

1. Three new chapters have been added (Chapters 19, 20, and 21). These are entitled *Exotic Options and Other Nonstandard Products*; *Credit, Weather, Energy, and Insurance Derivatives*; and *Derivative Mishaps and What We Can Learn from Them*. In my experience, students really enjoy covering the material in these chapters.
2. Chapter 5 on *Interest Rate Markets* has been rewritten to make it more relevant and easier to understand.
3. Chapter 14 on *Volatility Smiles* has been rewritten so that it accurately reflects current trading practices. This chapter now appears earlier in the book than the corresponding chapter in the third edition.
4. Chapter 16 on *Value at Risk* has been rewritten to reflect developments in this area.
5. The notation has been improved. For example, S_0 and F_0 are now used to refer to the spot price and the forward/futures price today.
6. Many new problems have been added.

Material has been updated throughout the book and the presentation improved.

Software

New Excel-based software, DerivaGem, is included with the book. This software is a great improvement over that included with previous editions. It has been carefully designed to complement the material in the text. Users can calculate options prices, imply volatilities, and calculate Greek letters for European options, American options, exotic options, and interest rate options. The software can be used to display binomial trees (see, for example, Figures 17.3 to 17.9) and to produce many different charts showing the impact of different variables on either option prices or the Greek letters.

The software is described more fully at the end of the book. Updates to the software can be downloaded from my Web site

<http://www.rotman.utoronto.ca/~hull>

Slides

Several hundred PowerPoint slides can be downloaded from my Web site. They use only standard fonts. Instructors adopting the book are welcome to adapt the slides to meet their own needs.

Answers to Questions

Solutions to all end-of-chapter problems (except quiz questions) were available only in the Instructors Manual for the first three editions of this book. Over the years, many people have asked me to make the solutions more generally available. I have hesitated

to do this because it would prevent instructors from using the problems as assignment questions.

In this edition I have dealt with this issue by dividing the end-of-chapter problems into two groups: "Questions and Problems" and "Assignment Questions." There are over 200 Questions and Problems, and answers to these are in the Solutions Manual for *Fundamentals of Futures and Options Markets*, which is published by Prentice Hall. There are about 70 Assignment Questions. Solutions to these are available only in the Instructors Manual.

Acknowledgments

Many people have played a part in the production of this book. Academics, students, and practitioners who have made excellent and useful suggestions include Farhang Aslani, Emilio Barone, Giovanni Barone-Adesi, George Blazenko, Laurence Booth, Phelim Boyle, Peter Carr, Don Chance, J.-P. Chateau, Brian Donaldson, Jerome Duncan, Steinar Ekern, Robert Eldridge, David Fowler, Louis Gagnon, Mark Garmann, Dajiang Guo, Bernie Hildebrandt, Jim Hilliard, Basil Kalymon, Patrick Kearney, Cheng-kun Kuo, Elizabeth Maynes, Izzy Nelken, Paul Potvin, Richard Rendleman, Gordon Roberts, Edward Robbins, Chris Robinson, John Rumsey, Klaus Schurger, Eduardo Schwartz, Michael Selby, Piet Sercu, Yochanan Shachmurove, Bill Shao, Stuart Turnbull, Yisong Tian, Ton Vorst, George Wang, Zhanshun Wei, Bob Whaley, Alan White, Qunfeng Yang, and Jozef Zemek. Huafeng (Florence) Wu provided excellent research assistance.

I would particularly like to thank Alan White. Alan is a colleague at the University of Toronto with whom I have been carrying out joint research in options and futures for the last 18 years. We have spent many hours discussing different issues concerning options and futures markets. Many of the new ideas in this book, and many of the new ways used to explain old ideas, are as much Alan's as mine.

Special thanks are due to many people at Prentice Hall for their enthusiasm, advice, and encouragement. I would particularly like to thank Mickey Cox (my editor), P. J. Boardman (the editor-in-chief), and Richard DeLorenzo (the production editor). I am also grateful to Scott Barr, Leah Jewell, Paul Donnelly, and Maureen Riopelle, who at different times have played key roles in the development of this book.

I welcome comments on the book from readers. My e-mail address is

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简 明 目 录

前 言	
第一章 导论	1
第二章 远期和期货市场机制	16
第三章 远期和期货价格的确定	40
第四章 利用期货套期保值策略	73
第五章 利率市场	99
第六章 互换	133
第七章 期权市场机制	160
第八章 股票期权价格的特征	182
第九章 期权的交易策略	202
第十章 二叉树模型介绍	218
第十一章 股票期权的评价; Black-Scholes 模型	232
第十二章 股票指数期权与货币期权	255
第十三章 期货期权	271
第十四章 波动率	285
第十五章 希腊字母 (套期保值参数)	299
第十六章 风险的评价	330
第十七章 运用二叉树模型 (对美式期权) 定价	354
第十八章 利率期权	374
第十九章 新型期权以及其他非标准产品	394
第二十章 信用、天气、能源及保险衍生证券	412
第二十一章 衍生证券的滥用及其给我们的教训	422
小测验答案	432
词汇表	456
世界主要期货与期权交易所	475
附表: 当 $x < 0$ 时 $N(x)$ 表	477
附表: 当 $x > 0$ 时 $N(x)$ 表	478
索引	479

Contents

Preface	xvii
Chapter 1. Introduction.....	1
1.1 Futures Contracts.....	1
1.2 History of Futures Markets.....	2
1.3 The Over-the-Counter Market.....	3
1.4 Forward Contracts	4
1.5 Options Contracts	4
1.6 History of Options Markets	6
1.7 Types of Traders.....	7
1.8 Hedgers.....	7
1.9 Speculators	9
1.10 Arbitrageurs	12
1.11 Summary.....	13
Quiz.....	13
Questions and Problems.....	14
Assignment Questions.....	15
Chapter 2. Mechanics of Futures and Forward Markets.....	16
2.1 Closing Out Futures Positions.....	16
2.2 The Specification of the Futures Contract	17
2.3 Convergence of Futures Price to Spot Price.....	19
2.4 The Operation of Margins	20
2.5 Newspaper Quotes	23
2.6 Keynes and Hicks	27
2.7 Delivery	28
2.8 Types of Traders.....	29
2.9 Regulation.....	30
2.10 Accounting and Tax.....	31
2.11 Forward Contracts	34
2.12 Foreign Exchange Quotes	36
2.13 Summary.....	36
Suggestions for Further Reading	37
Quiz.....	38
Questions and Problems.....	38
Assignment Questions.....	39
Chapter 3. Determination of Forward and Futures Prices.....	40
3.1 Investment Assets vs. Consumption Assets.....	40
3.2 Short Selling.....	40
3.3 Measuring Interest Rates	42
	xi

3.4	Assumptions and Notation.....	44
3.5	Forward Price for an Investment Asset	45
3.6	Known Income	48
3.7	Known Yield	50
3.8	Valuing Forward Contracts	51
3.9	Are Forward Prices and Futures Prices Equal?	52
3.10	Stock Index Futures	53
3.11	Forward and Futures Contracts on Currencies	57
3.12	Futures on Commodities	60
3.13	The Cost of Carry	63
3.14	Delivery Options	63
3.15	Futures Prices and the Expected Future Spot Price	64
3.16	Summary	66
	Suggestions for Further Reading.....	67
	Quiz	68
	Questions and Problems.....	68
	Assignment Questions	70
	Appendix. Proof that Forward and Futures Prices Are Equal When Interest Rates Are Constant	71
Chapter 4.	Hedging Strategies Using Futures.....	73
4.1	Basic Principles	73
4.2	Arguments for and against Hedging.....	76
4.3	Basis Risk.....	79
4.4	Minimum Variance Hedge Ratio	84
4.5	Stock Index Futures	87
4.6	Rolling the Hedge Forward.....	91
4.7	Summary	93
	Suggestions for Further Reading.....	94
	Quiz	94
	Questions and Problems.....	95
	Assignment Questions	96
	Appendix. Proof of the Minimum Variance Hedge Ratio Formula	98
Chapter 5.	Interest Rate Markets.....	99
5.1	Types of Rates	99
5.2	Zero Rates	100
5.3	Bond Pricing.....	100
5.4	Determining Treasury Zero Rates.....	102
5.5	Forward Rates	104
5.6	Forward Rate Agreements.....	106
5.7	Theories of the Term Structure.....	107
5.8	Day Count Conventions.....	108
5.9	Quotations	109
5.10	Treasury Bond Futures	110
5.11	Eurodollar Futures	116
5.12	Duration.....	118
5.13	Duration-Based Hedging Strategies	122
5.14	Summary	126

Suggestions for Further Reading	127
Quiz.....	128
Questions and Problems.....	128
Assignment Questions.....	131
Chapter 6. Swaps.....	133
6.1 Mechanics of Interest Rate Swaps	133
6.2 The Comparative-Advantage Argument	139
6.3 Swap Quotes and LIBOR Zero Rates	143
6.4 Valuation of Interest Rate Swaps.....	145
6.5 Currency Swaps	148
6.6 Valuation of Currency Swaps.....	151
6.7 Credit Risk.....	153
6.8 Summary.....	155
Suggestions for Further Reading	155
Quiz.....	156
Questions and Problems.....	157
Assignment Questions.....	158
Chapter 7. Mechanics of Options Markets.....	160
7.1 Types of Options	160
7.2 Option Positions	163
7.3 The Underlying Assets	165
7.4 Specification of Stock Options	166
7.5 Newspaper Quotes	169
7.6 Trading	171
7.7 Commissions.....	172
7.8 Margins.....	173
7.9 The Options Clearing Corporation	174
7.10 Regulation.....	175
7.11 Taxation.....	175
7.12 Warrants, Executive Stock Options, and Convertibles	177
7.13 Over-the-Counter Markets	177
7.14 Summary.....	178
Suggestions for Further Reading	179
Quiz.....	179
Questions and Problems.....	179
Assignment Questions.....	181
Chapter 8. Properties of Stock Options.....	182
8.1 Factors Affecting Option Prices.....	182
8.2 Assumptions and Notation	186
8.3 Upper and Lower Bounds for Option Prices	186
8.4 Put–Call Parity	190
8.5 Early Exercise. Calls on a Non-Dividend-Paying Stock.....	193
8.6 Early Exercise. Puts on a Non-Dividend-Paying Stock.....	194
8.7 Effect of Dividends	196
8.8 Empirical Research.....	197
8.9 Summary.....	198

Suggestions for Further Reading.....	199
Quiz	199
Questions and Problems.....	200
Assignment Questions.....	201
Chapter 9. Trading Strategies Involving Options	202
9.1 Strategies Involving a Single Option and a Stock.....	202
9.2 Spreads.....	204
9.3 Combinations.....	211
9.4 Other Payoffs	214
9.5 Summary	215
Suggestions for Further Reading.....	215
Quiz	215
Questions and Problems.....	216
Assignment Questions.....	217
Chapter 10. Introduction to Binomial Trees.....	218
10.1 A One-Step Binomial Model	218
10.2 Risk-Neutral Valuation	221
10.3 Two-Step Binomial Trees	223
10.4 A Put Example	226
10.5 American Options	227
10.6 Delta	228
10.7 Binomial Trees in Practice.....	229
10.8 Summary	229
Suggestions for Further Reading.....	230
Quiz	230
Questions and Problems.....	231
Assignment Questions.....	231
Chapter 11. Valuing Stock Options: The Black–Scholes Model	232
11.1 Assumptions about How Stock Prices Evolve.....	232
11.2 Expected Return.....	235
11.3 Volatility.....	237
11.4 Estimating Volatility from Historical Data.....	237
11.5 Assumptions Underlying Black–Scholes	239
11.6 The Black–Scholes/Merton Analysis.....	240
11.7 Risk-Neutral Valuation	243
11.8 Implied Volatilities	244
11.9 The Causes of Volatility.....	245
11.10 Dividends	246
11.11 Summary.....	248
Suggestions for Further Reading.....	249
Quiz	249
Questions and Problems	250
Assignment Questions	251
Appendix. The Early Exercise of American Call Options on Dividend-Paying Stocks	253

Chapter 12. Options on Stock Indices and Currencies	255
12.1 A Simple Rule	255
12.2 Pricing Formulas.....	257
12.3 Binomial Trees.....	257
12.4 Options on Stock Indices.....	258
12.5 Currency Options.....	265
12.6 Summary.....	267
Suggestions for Further Reading	268
Quiz.....	268
Questions and Problems.....	269
Assignment Questions.....	270
Chapter 13: Futures Options	271
13.1 Nature of Futures Options.....	271
13.2 Quotes	273
13.3 Reasons for the Popularity of Futures Options.....	273
13.4 Put–Call Parity	276
13.5 Bounds for Futures Options.....	277
13.6 Valuation of Futures Options Using Binomial Trees	278
13.7 A Futures Price as an Asset Providing a Yield	279
13.8 Black’s Model for Valuing Futures Options	280
13.9 Comparison of Futures Option and Spot Option Prices	281
13.10 Summary.....	282
Suggestions for Further Reading.....	282
Quiz	283
Questions and Problems.....	283
Assignment Questions.....	284
Chapter 14. Volatility Smiles.....	285
14.1 Put–Call Parity Revisited.....	285
14.2 Foreign Currency Options.....	286
14.3 Equity Options	289
14.4 The Volatility Term Structure and Volatility Matrices	291
14.5 When a Single Large Jump Is Anticipated	292
14.6 Empirical Research.....	293
14.7 Summary.....	295
Suggestions for Further Reading	295
Quiz.....	296
Questions and Problems.....	297
Assignment Questions.....	298
Chapter 15. The Greek Letters.....	299
15.1 Illustration.....	299
15.2 Naked and Covered Positions.....	300
15.3 A Stop-Loss Strategy.....	300
15.4 Delta Hedging	302
15.5 Theta	310
15.6 Gamma.....	313
15.7 Relationship Among Delta, Theta, and Gamma	317

15.8	Vega	317
15.9	Rho	319
15.10	Hedging in Practice	320
15.11	Scenario Analysis	320
15.12	Creating Options Synthetically for Portfolio Insurance	321
15.13	Stock Market Volatility	324
15.14	Summary	324
	Suggestions for Further Reading	326
	Quiz	326
	Questions and Problems	327
	Assignment Questions	328
Chapter 16.	Value at Risk	330
16.1	The VaR Measure	330
16.2	Historical Simulation	332
16.3	Model-Building Approach	334
16.4	Linear Model	337
16.5	Quadratic Model	340
16.6	Estimating Volatilities and Correlations	342
16.7	Comparison of Approaches	346
16.8	Stress Testing and Back Testing	347
16.9	Summary	347
	Suggestions for Further Reading	348
	Quiz	349
	Questions and Problems	349
	Assignment Questions	351
	Appendix. Cash-Flow Mapping	352
Chapter 17.	Valuation Using Binomial Trees	354
17.1	The Binomial Model for a Non-Dividend-Paying Stock	354
17.2	Using the Binomial Tree for Options on Indices, Currencies, and Futures Contracts	360
17.3	The Binomial Model for a Dividend-Paying Stock	363
17.4	Extensions of the Basic Tree Approach	366
17.5	Alternative Procedure for Constructing Trees	369
17.6	Monte Carlo Simulation	370
17.7	Summary	371
	Suggestions for Further Reading	371
	Quiz	372
	Questions and Problems	372
	Assignment Questions	373
Chapter 18.	Interest Rate Options	374
18.1	Exchange-Traded Interest Rate Options	374
18.2	Embedded Bond Options	376
18.3	Black's Model	376
18.4	European Bond Options	378
18.5	Interest Rate Caps	381
18.6	European Swap Options	386