Handbook of Quantitative Finance and Risk Management

Edited by

Cheng-Few Lee
Rutgers University

Alice C. Lee
State Street Corp.

John Lee
Center for PBBEF Research

Advisory Board

Ivan Brick, Rutgers University, USA
Stephen Brown, New York University, USA
Charles Q. Cao, Penn State University, USA
Chun-Yen Chang, National Chiao Tung University, Taiwan
Wayne Ferson, Boston College, USA
Lawrence R. Glosten, Columbia University, USA
Martin J. Gruber, New York University, USA
Richard E. Kihlstrom, University of Pennsylvania, USA
E. H. Kim, University of Michigan, USA
Robert McDonald, Northwestern University, USA
Ehud I. Ronn, University of Texas at Austin, USA

This handbook expects to be published by Springer by December 2009. Please send all comments and suggestions to C.F. Lee at lee@business.rutgers.edu
Preface

Quantitative finance and risk management is a combination of economics, accounting, statistics, econometrics, mathematics, stochastic process, and computer science and technology. This handbook is the most comprehensive handbook in quantitative finance and risk management, which integrates theory, methodology, and application. Because of the importance of quantitative finance and risk management in the finance industry, it has become one of the most popular subjects in business school and departments of mathematics, operation research, and statistics. In addition, the finance industry has many job opportunities for people with good training in quantitative finance and risk management. Thus, a handbook should have a broad audience and be of interest to academics, educators, students, and practitioners.

Based upon our years of experience in industry, teaching, research, textbook writing, and journal editing on the subject of quantitative finance and risk management, this handbook will review, discuss, and integrate theoretical, methodological and practical issues of quantitative finance and risk management. This handbook can be divided into five parts as follows:

- Part I. Overview of Quantitative Finance and Risk Management Research
- Part II. Portfolio Theory and Investment Analysis
- Part III. Options and Option Pricing Theory
- Part IV. Risk Management
- Part V. Theory, Methodology and Applications

Part I of this handbook covers 3 chapters; they are “Chapter A. Theoretical Framework of Finance,” “Chapter B. Investment, Dividend, Financing, and Production Policies,” and “Chapter C. Research Methods of Quantitative Finance and Risk Management.” Part II of this handbook covers 18 chapters of portfolio theory and investment analysis. Part III of this handbook includes 21 chapters of options and option pricing theory. Part IV of this handbook includes 23 chapters of theory and practice in risk management. Finally, part V of this handbook covers 44 chapters of theory, methodology and applications in quantitative finance and risk management.

In the preparation of this handbook, first, we would like to thank the member of advisory board and contributors of this handbook. In addition, we would like to make note that we appreciate the extensive help from the Editor Ms. Judith Pforr, our research assistants David Chen, Wei-Kang Shih and Shin-Ying Mai, and our secretary Ms. Miranda Mei-Lan Luo. Finally, we would like to thank the financial support from the Wintek Corporation and the Polaris Financial Group that allowed us to write the edition of this book.

There are undoubtedly some errors in the finished product, both typo-graphical and conceptual. I would like to invite readers to send suggestions, comments, criticisms, and corrections to the author Professor Cheng F. Lee at the Department of Finance and
Economics, Rutgers University at Janice H. Levin Building Room 141, Rockafeller Road, Piscataway, NJ 08854-8054.

January 2009
Cheng F. Lee
Alice C. Lee
John Lee
ABOUT THE EDITORS

Cheng-Few Lee is a Distinguished Professor of Finance at Rutgers Business School, Rutgers University and was chairperson of the Department of Finance from 1988–1995. He has also served on the faculty of the University of Illinois (IBE Professor of Finance) and the University of Georgia. He has maintained academic and consulting ties in Taiwan, Hong Kong, China and the United States for the past three decades. He has been a consultant to many prominent groups including, the American Insurance Group, the World Bank, the United Nations, The Marmon Group Inc., Wintek Corporation and Polaris Financial Group, etc.

Professor Lee founded the Review of Quantitative Finance and Accounting (RQFA) in 1990 and the Review of Pacific Basin Financial Markets and Policies (RPBFMP) in 1998, and serves as managing editor for both journals. He was also a co-editor of the Financial Review (1985–1991) and the Quarterly Review of Economics and Business (1987–1989). In the past thirty-six years, Dr. Lee has written numerous textbooks ranging in subject matters from financial management to corporate finance, security analysis and portfolio management to financial analysis, planning and forecasting, and business statistics. In addition, he has edited a popular book entitled “Encyclopedia of Finance” (with Alice C. Lee). Dr. Lee has also published more than 170 articles in more than twenty different journals in finance, accounting, economics, statistics, and management. Professor Lee has been ranked the most published finance professor worldwide during 1953–2002.

Professor Lee was the intellectual force behind the creation of the new Masters of Quantitative Finance program at Rutgers University. This program began in 2001 and has been ranked as one of the top ten quantitative finance programs in the United States. These top ten programs are Carnegie Mellon University, Columbia University, Cornell University, New York University, Princeton University, Rutgers University, Stanford University, University of California at Berkeley, University of Chicago, and University of Michigan.

Alice C. Lee is currently a Vice President in the Model Validation Group, Enterprise Risk Management, at State Street Corporation. Most recently, she was an Assistant Professor of Finance at San Francisco State University. She has over 20 years of experience and a diverse background, which includes academia, engineering, sales, and management consulting. Her primary areas of teaching and research are corporate finance and financial institutions. She is coauthor of Statistics for Business and Financial Economics, 2e (with Cheng F. Lee and John C. Lee) and Financial Analysis, Planning and Forecasting, 2e (with Cheng F. Lee and John C. Lee). In addition, she has co-edited other annual publications including Advances in Investment Analysis and Portfolio Management (with Cheng F. Lee).

John C. Lee is a Microsoft Certified Professional in Microsoft Visual Basic and Microsoft Excel VBA. He has a Bachelor and Masters degree in accounting from the University of Illinois at Urbana-Champaign.
John has worked over 20 years in both the business and technical fields as an accountant, auditor, systems analyst and as a business software developer. He is the author of the book on how to use MINITAB and Microsoft Excel to do statistical analysis which is a companion text to *Statistics of Business and Financial Economics*, of which he is one of the co-authors. John has been a Senior Technology Officer at the Chase Manhattan Bank and Assistant Vice President at Merrill Lynch. Currently, he is the Director of the Center for PBBEF Research.
Table of Contents for Handbook of Quantitative Finance and Risk Management

PREFACE

List of Contributors

Part I – Overview of Quantitative Finance and Risk Management Research
By
Cheng Few Lee, Rutgers University, USA
Alice C. Lee, State Street Corp., USA
John Lee, Center for PBBEF Research, USA

Chapter A. Theoretical Framework of Finance
A.1 Introduction
A.2 Discounted Cash-Flow Valuation Theory
A.3 M and M Valuation Theory
A.4 Markowitz Portfolio Theory
A.5 Capital Asset Pricing Model (CAPM)
A.6 Arbitrage Pricing Theory
A.7 Option Valuation
A.8 Futures Valuation and Hedging
A.9 Conclusion

Chapter B. Investment, Dividend, Financing, and Production Policies: Theory and Implications
B.1 Introduction
B.2 Investment and Dividend Interactions: The Internal-Versus-External Financing Decision
B.3 Interactions Between Dividend and Financing Policies
B.4 Interactions Between Financing and Investment Decisions
B.5 Implications of Financing and Investment Interactions for Capital Budgeting
Part II –Portfolio Theory and Investment Analysis

Introduction

Chapter 1   Foundation of Portfolio Theory

By
Cheng Few Lee, Rutgers University, USA
Alice C. Lee, State Street Corp., USA
John Lee, Center for PBBEF Research, USA

1.1 Introduction
1.2 Risk Classification and Measurement
1.3 Portfolio Analysis and Application
1.4 The Efficient Portfolio and Risk Diversification
1.5 Determination of Commercial Lending Rate
1.6 The Market Rate of Return and Market Risk Premium
1.7 Conclusion

Chapter 2  Risk-Aversion, Capital Asset Allocation, and Markowitz Portfolio-Selection Model

By
Cheng Few Lee, Rutgers University, USA
Joseph E. Finnerty, University of Illinois at Urbana-Champaign, USA
Hong-Yi Chen, Rutgers University, USA

2.1 Introduction
2.2 Measurement of Return and Risk
2.3 Utility Theory, Utility Functions, and Indifference Curves
2.4 Conclusion

Chapter 3  Capital Asset Pricing Model and Beta Forecasting

By
Cheng Few Lee, Rutgers University, USA
Joseph E. Finnerty, University of Illinois at Urbana-Champaign, USA
Donald H. Wort, California State University East Bay, USA

3.1 Introduction
3.2 A Graphical Approach to The Derivation of The Capital Asset Pricing Model
3.3 Mathematical Approach to The Derivation of The Capital Asset Pricing Model
3.4 The Market Model and Risk Decomposition
3.5 Growth Rates, Accounting Betas, and Variance in EBIT
3.6 Some Applications and Implications of The Capital Asset Pricing Model
3.7 Conclusion
Appendix 3A. Empirical Evidence For The Risk-Return Relationship

Chapter 4  Index Models for Portfolio Selection

By
Cheng Few Lee, Rutgers University, USA
Joseph E. Finnerty, University of Illinois at Urbana-Champaign, USA
Donald H. Wort, California State University East Bay, USA

4.1 Introduction
4.2 The Single-Index Model
4.3 Multiple Indexes and The Multiple-Index Model
4.4 Conclusion

Appendix 4A. A Linear-Programming Approach to Portfolio-Analysis Models
Appendix 4B. Expected Return, Variance, and Covariance For A Multi-Index Model

Chapter 5 Sharpe Measure, Treynor Measure and Optimal Portfolio Selection

By
Cheng Few Lee, Rutgers University, USA
Hong-Yi Chen, Rutgers University, USA
Jessica Mai, Rutgers University, USA

5.1 Introduction
5.2 Sharpe Performance-Measure Approach With Short Sales Allowed
5.3 Treynor-Measure Approach With Short Sales Allowed
5.4 Treynor-Measure Approach With Short Sales not Allowed
5.5 Impact of Short Sales on Optimal-Weight Determination
5.6 Economic Rationale of The Treynor Performance-Measure Method
5.7 Summary

Appendix 5A. Derivation of Equation (5.6)
Appendix 5B. Derivation of Equation (5.10)
Appendix 5C. Derivation of Equation (5.16)

Chapter 6 The Creation and Control of Speculative Bubbles in a Laboratory Setting

By
James S. Ang, Florida State University, USA
Dean Diavatopoulos, Villanova University, USA
Thomas V. Schwarz, Grand Valley State University, USA

6.1 Bubbles in the asset markets
6.2 Experimental design
6.3 Results and analysis
6.4 Conclusions

Chapter 7 Portfolio Optimization Models and Mean-Variance Spanning Tests

By
Wei-Peng Chen, Shih Hsin University, Taiwan
Huimin Chung, National Chiao Tung University, Taiwan
Keng-Yu Ho, National Taiwan University, Taiwan
Tsui-Ling Hseu, National Chiao Tung University, Taiwan
7.1 Introduction of Markowitz Portfolio-Selection Model
7.2 Measurement of Return and Risk
7.3 Efficient Portfolio
7.4 Mean-Variance Spanning Test
7.5 Alternative Computer Program to Calculate Efficient Frontier
7.6 Conclusion

Chapter 8 Combining Fundamental Measures for Stock Selection
By Kenton K. Yee, Columbia Business School, USA
8.1 Introduction
8.2 Bayesian Triangulation
8.3 Triangulation in Forensic Valuation
8.4 Bayesian Triangulation in Asset Pricing Settings
8.5 The Data Snooping Trap
8.6 Using Guidance from Theory to Mitigate Data Snooping
8.7 Avoiding Data-Snooping Pitfalls in Financial Statement Analysis
8.8 Conclusion
8.9 References
Appendix 8A. Proof of Theorem 8.1

Chapter 9 On Estimation Risk and Power Utility Portfolio Selection
By Robert R. Grauer, Simon Fraser University, Canada
Frederick C. Shen, Coventree Inc, Canada
9.1 Introduction
9.2 Literature Review
9.3 The Multiperiod Investment Model
9.4 The Data
9.5 Alternative Ways of Estimating the Joint Return Distribution
9.6 Alternate Ways of Evaluating Investment Performance
9.7 The Results
9.8 Summary and Concluding Comments
9.9 Addendum

Chapter 10 International Portfolio Management: Theory and Method
By
Wan-Jiun Paul Chiou, Shippensburg University, USA
Cheng Few Lee, Rutgers University, USA
10.1 Introduction
10.2 Overview of International Portfolio Management
10.3 Literature Review
10.4 Forming the Optimal Global Portfolio
10.5 The Benefits of International Diversification around the World
10.6 The Optimal Portfolio Components
10.7 Conclusion and Discussion

Chapter 11 The Le Châtelier Principle in the Markowitz Quadratic Programming Investment Model: A Case of World Equity Fund Market
By
Chin W. Yang, Clarion University of Pennsylvania, USA
Ken Hung, Texas A&M International University, USA
Jing Cui, Clarion University of Pennsylvania, USA
11.1 Introduction
11.2 Data and Methodology
11.3 The Le Châtelier Principle in The Markowitz Investment Model
11.4 An Application of The Le Châtelier Principle in The World Equity Market
11.5 Conclusion

Chapter 12 Risk-Averse Portfolio Optimization via Stochastic Dominance Constraints
By
Darinka Dentcheva, Stevens Institute of Technology, USA
Andrzej Ruszczynski, Rutgers University, USA
12.1 Introduction
12.2 The portfolio problem
12.3 Stochastic dominance
12.4 The dominance-constrained portfolio problem
12.5 Optimality and Duality
12.6 Numerical Illustration

Chapter 13 Portfolio Analysis
By
13.1 Introduction
13.2 Inputs for Portfolio Analysis
13.3 The Security Analyst's Job
13.4 Four Assumptions Underlying Portfolio Analysis
13.5 Different Approaches to Diversification
13.6 A Portfolio's Expected Return Formula
13.7 The Quadratic Risk Formula for a Portfolio
13.8 The Covariance Between Returns From Two Assets
13.9 Portfolio Analysis of A Two-Asset Portfolio
13.10 Mathematical Portfolio Analysis
13.11 Calculus Minimization of Risk: A Three-Security Portfolio
13.12 Conclusion

Chapter 14 Portfolio Theory, CAPM, and Performance Measures
By Luis Ferruz, University of Zaragoza, Spain
Fernando Gómez-Bezares, University of Deusto, Spain
Maria Vargas, University of Zaragoza, Spain
14.1 Portfolio Theory and CAPM: Foundations and Current Application
14.2 Performance Measures Related to Portfolio Theory and The CAPM: Classic Indices, Derivative Indices and New Approaches
14.3 Empirical Analysis: Performance Rankings and Performance Persistence
14.4 Summary and Conclusions

Chapter 15 Intertemporal Equilibrium Models, Portfolio Theory and the Capital Asset Pricing Model
By Stephen J. Brown, New York University, USA
15.1 Introduction
15.2 Intertemporal equilibrium models
15.3 Relationship to observed security returns
15.4 Intertemporal Equilibrium and the Capital Asset Pricing Model
15.5 Hansen Jagannathan Bounds
15.6 Are stochastic discount factors positive?
15.7 Conclusion

Chapter 16 Persistence, Predictability and Portfolio Planning
By
Michael J. Brennan, University of California at Los Angeles, USA
Yihong Xia, Wharton School, USA
16.1 Introduction
16.2 Detecting and Exploiting Predictability
16.3 Stock Price Variation and Variation in the Expected Returns
16.4 Economic Significance of Predictability
16.5 Forecasts of Equity Returns
16.6 Conclusion
Appendix 16A. The Optimal Strategy
Appendix 16B. The Unconditional Strategy
Appendix 16C. The Myopic Strategy
Appendix 16D. The Optimal Buy-and-Hold Strategy

Chapter 17 Portfolio Insurance Strategies – Review of Theory and Empirical Studies
By
Lan-chih Ho, Central Bank of the Republic of China, Taiwan
John Cadle, University of Birmingham, U.K.
Michael Theobald, University of Birmingham, U.K.
17.1 Basic Concept of Portfolio Insurance
17.2 Theory of Alternative Portfolio Insurance Strategies
17.3 Empirical Comparison of Alternative Portfolio Insurance Strategies
17.4 Recent Market Developments
17.5 Implications for Financial Market Stability
17.6 Summary

Chapter 18 Security Market Microstructure: The Analysis of a Non-Frictionless Market
By
Reto Francioni, Deutsche Bank, USA
Sonali Hazarika, Baruch College, USA
Martin Reck, Deutsche Bank, USA
Part III – Options and Option Pricing Theory

Introduction

Chapter 19  Option Strategies and Their Applications
   By
   Cheng Few Lee, Rutgers University, USA
   John Lee, Center for PBBEF Research, USA
   Wei-Kang Shih, Rutgers University, USA
   19.1 Introduction
   19.2 The Option market and related definition
   19.3 Put-call parity
   19.4 Risk-return characteristics of options
   19.5 Examples of Alternative Option Strategies
   19.6 Conclusion

Chapter 20  Option Pricing Theory and Firm Valuation
   By
   Cheng Few Lee, Rutgers University, USA
   Joseph E. Finnerty, University of Illinois at Urbana-Champaign, USA
   Wei-Kang Shih, Rutgers University, USA
   20.1 Introduction
   20.2 Basic concepts of Options
   20.3 Factors affecting option value
   20.4 Determining the value of options
20.5 Option pricing theory and capital structure
20.6 Warrants
20.7 Conclusion

Chapter 21 Applications of the Binomial Distribution to Evaluate Call Options
By
Alice C. Lee, State Street Corp., USA
John Lee, Center for PBBEF Research, USA
Jessica Mai, Rutgers University, USA
21.1 Introduction
21.2 What is an Option?
21.3 The Simple Binomial Option Pricing Model
21.4 The Generalized Binomial Option Pricing Model
21.5 Conclusion

Chapter 22 Multinomial Option Pricing Model
By
Cheng Few Lee, Rutgers University, USA
Jack C. Lee, National Chiao Tung University, Taiwan
22.1 Introduction
22.2 Multinomial Option Pricing Model
22.3 A Lattice Framework for Option Pricing
22.4 Conclusion
Appendix 22A.

Chapter 23 Two Alternative Binomial Option Pricing Model Approaches to Derive Black-Scholes Option Pricing Model
By
Cheng-Few Lee, Rutgers University, USA
Carle Shu Ming Lin, Rutgers University, USA
23.1 Introduction
23.2 The Two-State Option Pricing Model of Rendleman and Bartter
23.3 The Binomial Option Pricing Model of Cox, Ross and Rubinstein
23.4 Comparison of the Two Approaches
23.5 Conclusion
Appendix 23A.
Chapter 24 Normal, Lognormal Distribution and Option Pricing Model
By
Cheng Few Lee, Rutgers University, USA
Jack C. Lee, National Chiao Tung University, Taiwan
Alice C. Lee, State Street Corp., USA
24.1 Introduction
24.2 The Normal Distribution
24.3 The Lognormal Distribution
24.4 The Lognormal Distribution and Its Relationship to the Normal Distribution
24.5 Multivariate Normal and Lognormal Distributions
24.6 The normal Distribution as An Application to the Binomial and Poisson Distributions
24.7 Applications of the Lognormal Distribution in Option Pricing
24.8 Conclusion

Chapter 25 Bivariate Normal Option Pricing Models
By
Cheng Few Lee, Rutgers University, USA
Alice C. Lee, State Street Corp., USA
John Lee, Center for PBBEF Research, USA
25.1 Introduction
25.2 The Bivariate normal Density Function
25.3 American Call Option and the Bivariate Normal CDF
25.4 Valuating American Option
25.5 Non-Dividend-Paying Stocks
25.6 Dividend-Paying Stocks
25.7 Conclusion

Chapter 26 Displaced Log Normal and Lognormal American Option Pricing: A Comparison
By
Ren-Raw Chen, Rutgers University, USA
Cheng-Few Lee, Rutgers University, USA
Chapter 26  The American Option Pricing Model under the Lognormal Process
26.1 Introduction
26.2 The American Option Pricing Model under the Lognormal Process
26.3 The Geske-Roll-Whaley Model
26.4 Summary
Appendix 26A

Chapter 27  Itô’s Calculus and the Derivation of the Black-Scholes Option-Pricing Model
By George Chalamandaris, Athens University of Economics and Business, Greece
A.G. Malliaris, Loyola University Chicago, USA
27.1 Introduction
27.2 The Itô Process and Financial Modeling
27.3 Itô’s Lemma
27.4 Stochastic Differential-Equation Approach to Stock-Price Behavior
27.5 The Pricing of an Option
27.6 A Reexamination of Option Pricing
27.7 Extending The Risk-Neutral Argument: The Martingale Approach
27.8 Remarks on Option Pricing
27.9 Summary
Appendix 27A. An Alternative Method to Derive the Black-Scholes Option-Pricing Model

Chapter 28  Constant Elasticity of Variance (CEV) Option Pricing Model: Integration and Detailed Derivation (reprint)
By Ying Lin Hsu, National Chung Hsing University, Taiwan
T. I. Lin, National Chung Hsing University, Taiwan
Cheng Few Lee, Rutgers University, USA and National Chiao Tung University, Taiwan
28.1 Introduction
28.2 The CEV Diffusion and Its Transition Probability Density Function
28.3 Review of Noncentral Chi-square Distribution
28.4 The Noncentral Chi-square Approach to Option Pricing Model
28.5 Concluding Remarks
Appendix 28A. Proof of Feller’s Lemma
Chapter 29  Stochastic Volatility Option Pricing Models
By
Cheng Few Lee, Rutgers University, USA
Jack C. Lee, National Chiao Tung University, Taiwan
29.1 Introduction
29.2 Nonclosed-Form type of Option Pricing Model
29.3 Review of Characteristic Function
29.4 Closed-Form type of Option Pricing Model
29.5 Summary and Concluding Remarks
Appendix 29A. The market price of the risk

Chapter 30 Derivations and Applications of Greek Letters – Review and Integration
By
Hong-Yi Chen, Rutgers University, USA
Cheng-Few Lee, Rutgers University, USA
Weikang Shih, Rutgers University, USA
30.1 Introduction
30.2 DELTA (Δ)
30.3 THETA (Θ)
30.4 GAMMA (Γ)
30.5 VEGA (ν)
30.6 RHO (ρ)
30.7 Derivation of Sensitivity for Stock Options Respective with Exercise Price
30.8 Relationship between Delta, Theta, and Gamma
30.9 Conclusion

Chapter 31 A Further Analysis of Convergence Rate and Pattern of the Binomial Models
By
San-Lin Chung, National Taiwan University, Taiwan
Pai-Ta Shih, National Taiwan University, Taiwan
31.1 Brief Review of the Binomial Models
31.2 The Importance of Node Positioning for Monotonic Convergence
31.3 The Flexibility of GCRR Model for Node Positioning
31.4 Numerical Results of Various GCRR Models
31.5 Conclusion
Appendix 35A. Extrapolation formulae for various GCRR models

Chapter 32 Estimating Implied Probabilities From Option Prices and the Underlying
By
Bruce Mizrach, Rutgers University, USA
32.1 Introduction
32.2 Black Scholes Baseline
32.3 Empirical Departures from Black Scholes
32.4 Beyond Black Scholes
32.5 Histogram Estimators
32.6 Tree Methods
32.7 Local Volatility Functions
32.8 PDF Approaches
32.9 Inferences from the Mixture Model
32.10 Jump Processes
32.11 Conclusion

Chapter 33 Are Tails Fat Enough to Explain Smile
By
Ren-Raw Chen, Rutgers University, USA
Oded Palmon, Rutgers University, USA
John Wald, Pennsylvania State University, USA
33.1 Introduction
33.2 Literature Review
33.3 The Models
33.4 Data and Empirical Results
33.5 Conclusion
Appendix 33A.

Chapter 34 Option Pricing and Hedging Performance under Stochastic Volatility and
Stochastic Interest Rates
By
Gurdip Bakshi, University of Maryland, USA
Charles Cao, Penn State University, USA
Zhiwu Chen, Yale University, USA
Chapter 35  Application of the Characteristic Function in Financial Research

By
H.W. Chuang, National Taiwan University, Taiwan
Ying-Lin Hsu, National Chung Hsing University, Taiwan
Cheng-Few Lee, Rutgers University, USA

35.1. Introduction
35.2. The characteristic functions
35.3. CEV option pricing model
35.4. Options with stochastic volatility
35.5. Concluding remarks

Chapter 36  Asian Options

By
Itzhak Venezia, Hebrew University, Israel

36.1 Introduction
36.2 Valuation
36.3 Conclusion

Chapter 37  Numerical Valuation of Asian Options with Higher Moments in the Underlying Distribution

By
Kehluh Wang, National Chiao Tung University, Taiwan
Ming-Feng Hsu, Tatung University, Taiwan

37.1 Introduction
37.2 Definitions and the Basic Binomial Model
37.3 Edgeworth Binomial Model for Asian Option Valuation
37.4 Upper Bound and Lower Bound for European Asian Options
37.5 Upper Bound and Lower Bound for American Asian Options
37.6 Numerical Examples
37.7 Conclusion

Chapter 38 The Valuation of Uncertain Income Streams and the Pricing of Options
(Reprint)

By
Mark Rubinstein, University of California Berkley, USA

38.1 Introduction
38.2 Uncertain Income Streams: General Case
38.3 Uncertain Income Streams: Special Case
38.4 Options
38.5 Conclusion

Chapter 39 Binomial OPM, Black-Scholes OPM and Their Relationship: Decision
Tree and Microsoft Excel Approach

By
John Lee, Center for PBBEF Research, USA

39.1 Introduction
39.2 Call and Put Options
39.3 One Period Option Pricing Model
39.4 Two Period Option Pricing Model
39.5 Using Microsoft Excel to Create the Binomial Option Trees
39.6 Black-Scholes Option Pricing Model
39.7 Relationship Between the Binomial OPM and the Black-Scholes OPM
39.8 Decision Tree Black-Scholes Calculation
39.9 Summary

Appendix 39A. Excel VBA Code – Binomial Option Pricing Model

Part IV - Risk Management

Introduction

Chapter 40 Combinatorial Methods for Constructing Credit Risk Ratings

By
Alexander Kogan, Rutgers University, USA
Miguel A. Lejeune, George Washington University, USA

40.1 Introduction
Chapter 41 The Structural Approach to Modeling Credit Risk

By Jingzhi Huang, Pennsylvania State University, USA

41.1 Introduction
41.2 Structural credit risk models
41.3 Empirical Evidence
41.4 Conclusion

Chapter 42 An Empirical Investigation of the Rationales for Integrated Risk-Management Behavior

By Michael S. Pagano, Villanova University, USA

42.1 Introduction
42.2 Theories of Risk-management, Previous Research, and Testable Hypotheses
42.3 Data, Sample Selection, and Empirical Methodology
42.4 Empirical Results
42.5 Conclusion

Chapter 43 Copula, Correlated Defaults and Credit VaR

By Jow-Ran Chang, National Tsing Hua University, Taiwan
An-Chi Chen, KGI Securities Co. Ltd., Taiwan

43.1 Introduction
43.2 Methodology
43.3 Experimental Results
43.4 Conclusion

Chapter 44 Unspanned Stochastic Volatilities and and Interest Rate Derivatives Pricing

By
Chapter 44 Introduction

44.1 Term Structure Models with Spanned Stochastic Volatility
44.2 LIBOR Market Models with Stochastic Volatility and Jumps: Theory and Estimation
44.3 Nonparametric Estimation of the Forward Density
44.4 Conclusion

Appendix 44A. The Derivation for QTSMs

Chapter 45 Catastrophic Losses and Alternative Risk Transfer Instruments

By Jin-Ping Lee, Feng Chia University, Taiwan
Min-Teh Yu, Providence University, Taiwan

45.1 Introduction
45.2 Catastrophe bonds
45.3 Catastrophe equity puts
45.4 Catastrophe derivatives
45.5 Reinsurance with CAT-linked securities
45.6 Conclusion

Chapter 46 A Real Option Approach to the Comprehensive Analysis of Bank Consolidation Values

By Chuang-Chang Chang, National Central University, Taiwan
Pei-Fang Hsieh, National Central University, Taiwan
Hung-Neng Lai, National Central University, Taiwan

46.1 Introduction
46.2 The Model
46.3 Case Study
46.4 Results
46.5 Conclusion

Appendix 46A. The Correlations between the Standard Wiener Process Generated from a Bank’s Net Interest Income
Appendix 46B. The Risk-Adjusted Processes
Appendix 46C. The Discrete Version of the Risk-Adjusted Process
Chapter 47  Dynamic Econometric Loss Model: A Default Study of US Subprime Markets

By
C.H. Ted Hong, Beyondbond, Inc., USA

47.1 Introduction
47.2 Model Framework
47.3 Default Modeling
47.4 Prepayment Modeling
47.5 Delinquency Study
47.6 Conclusion

Appendix 47A. Default and Prepayment Definition
Appendix 47B. General Model Framework
Appendix 47C. Default Specification
Appendix 47D. Prepayment Specification

Chapter 48  The Effect of Default Risk on Equity Liquidity: Evidence Based on the Panel Threshold Model

By
Huimin Chung, National Chiao Tung University, Taiwan
Wei-Peng Chen, Shih-Hsin University, Taiwan
Yu-Dan Chen, National Chiao Tung University, Taiwan

48.1 Introduction
48.2 Data and Methodology
48.3 Empirical Results
48.4 Conclusion

Chapter 49  Put option approach to determine bank risk premium

By
Dar-Yeh Huang, National Taiwan University, Taiwan
Fu-Shuen Shie, National Taiwan University, Taiwan
Wei-Hsiung Wu, National Taiwan University, Taiwan

49.1 Introduction
49.2 Evaluating Insurer’s Liability by Option Pricing Model: Merton (1977)
49.3 Extensions of Merton (1977)
49.4 Applications for Merton (1977)
49.5 Conclusion
Appendix 49A. Proof of eq. (49.2.1)
Appendix 49B. Proof of eq. (49.2.2) and (49.2.3)

Chapter 50 Keiretsu Style Main Bank Relationships, R&D Investment, Leverage, and Firm Value: Evidence from Japanese Listed Companies
By
Hai-Chin Yu, Chung Yuan University, Taiwan
Chih-Sean Chen, Chung Yuan University, Taiwan
Der-Tzon Hsieh, National Taiwan University, Taiwan
50.1. Introduction
50.2. Literature Review
50.3. Data and Sample
50.4. Empirical Results and Analysis
50.5. Conclusions and Discussion

Chapter 51 On the Feasibility of Laddering
By
Joshua Ronen, New York University, USA
Bharat Sarath, Baruch College, USA
51.1. Introduction
51.2. The Model
51.3. Results
51.4. Conclusion

Chapter 52 Stock Returns, Extreme Values, and Conditional Skewed Distribution
By
Thomas C. Chiang, Drexel University, USA
Jiandong Li, Central University of Finance and Economics, P.R. China
52.1. Introduction
52.2. The AGARCH Model Based on the EGB2 Distribution
52.3. Data
52.4. Empirical Evidence
52.5. Distributional Fit Test
52.6 The Implication of the EGB2 Distribution
52.7 Conclusion

Chapter 53 Capital Structure in Asia and CEO Entrenchment
By
Kin Wai Lee, Nanyang Technological University, Singapore
Gillian Hian Heng Yeo, Nanyang Technological University, Singapore
53.1 Introduction
53.2 Prior Research and Hypothesis
53.3 Data and Method
53.4 Results
53.5 Conclusion

Chapter 54 A Generalized Model for Optimum Futures Hedge Ratio
By
Cheng-Few Lee, Rutgers University, USA
Jang-Yi Lee, Tunghai University, Taiwan
Kehluh Wang, National Chiao-Tung University, Taiwan
Yuan-Chung Sheu, National Chiao-Tung University, Taiwan
54.1 Introduction
54.2 GIG and GH Distributions
54.3 Futures Hedge Ratios
54.4 Estimation and Simulation
54.5 Concluding Remarks
Appendix 54A.

Chapter 55 The Sensitivity of Corporate Bond Volatility to Macroeconomic Announcements
By
Nikolay Kosturov, University of Oklahoma, USA
Duane Stock, University of Oklahoma, USA
55.1 Introduction
55.2 Theory and Hypotheses
55.3 Data and return computations
55.4 OLS Regressions of Volatility and Excess Returns
55.5 Conditional Variance Models
55.6 Alternative GARCH Models
55.7 Conclusion
Appendix 55A

Chapter 56 Raw Material Convenience Yields and Business Cycle
   By
   Chang-Wen Duan, Tamkang University, Taiwan
   William T. Lin, Tamkang University, Taiwan
   56.1 Introduction
   56.2 Characteristics of Study Commodities
   56.3 The Model
   56.4 Data
   56.5 Empirical Results
   56.7 Conclusion

Chapter 57 Alternative Methods to Determine Optimal Capital Structure: Theory and Application
   By
   Sheng-Syan Chen, National Taiwan University, Taiwan
   Cheng-Few Lee, Rutgers University, USA and National Chiao Tung University, Taiwan
   Han-Hsing Lee, National Chiao Tung University, Taiwan
   57.1 Introduction
   57.2 The Traditional Theory of Optimal Capital Structure
   57.3 Optimal Capital Structure in the Contingent Claims Framework
   57.4 Recent Development of Capital Structure Models
   57.5 Application and Empirical Evidence of Capital Structure Models
   57.6 Summary and Concluding Remarks

Chapter 58 Actuarial mathematics and its applications in quantitative finance
   By
   Cho-Jieh Chen, University of Alberta, Canada
58.1 Introduction to Actuarial Risks
58.2 Actuarial Discount and Accumulation Functions
58.3 Actuarial Mathematics of Insurance
58.4 Actuarial Mathematics of Annuity
58.5 Actuarial Premiums and Actuarial Reserves
58.6 Applications in Quantitative Finance
58.7 Conclusion

Chapter 59 The Prediction of Default With Outliers--Robust Logistic Regression
By
Chung-Hua Shen, National Taiwan University, Taiwan
Yi-Kai Chen, National University of Kaohsiung, Taiwan
Bor-Yi Huang, Shih Chien University, Taiwan
59.1 Introduction
59.2 Literature Review of Outliers in Conventional and in Logit Regression
59.3 Five Validation Tests
59.4 Source of Data and Empirical Model
59.5 Empirical Results
59.6 Conclusion

Chapter 60 Term Structure of Default-Free and Defaultable Securities: Theory and Evidence
By
Hai Lin, Xiamen University, China
ChunChi Wu, University of Missouri, USA
60.1 Introduction
60.2 Definitions and Notations
60.3 Bond Pricing in Dynamic Term Structure Model Framework
60.4 Dynamic Term Structure Models (DTSMs)
60.5 Models of Defaultable Bonds
60.6 Interest Rate and Credit Default Swaps
60.7 Concluding Remarks

Chapter 61 Liquidity Risk and Arbitrage Pricing Theory (Reprint)
By
Umut Cetin, Technische University Wein, USA
Chapter 61  The Model of Debt Issuance, Refunding, and Maturity (Reprint)
   By
   Robert A. Jarrow, Cornell University, USA
   Philip Protter, Cornell University, USA

   61.1 Introduction
   61.2 The Model
   61.3 The Extended First Fundamental Theorem
   61.4 The Extended Second Fundamental Theorem
   61.5 Example (Extended Black-Scholes Economy)
   61.6 Discontinuous Supply Curve Evolutions
   61.7 Conclusion

Appendix 61A.

Chapter 62  An integrated Model of Debt Issuance, Refunding, and Maturity (Reprint)
   By
   Manak C. Gupta, Temple University, USA
   Alice C. Lee, State Street Corp., USA

   62.1 Introduction
   62.2 The Model
   62.3 Operationalizing the model
   62.4 Numerical illustration
   62.5 Conclusions

Part V – Theory, Methodology and Applications

Introduction

Chapter 63  Business Models: Applications to Capital Budgeting, Equity Value and
   Return Attribution
   By
   Thomas S. Y. Ho, Thomas Ho Company, Ltd, USA
   Sang Bin Lee, Hanyang University, Korea

   63.1 Introduction
   63.2 The Model Assumptions
   63.3 Simulation Results of the Capital Budgeting Decisions
   63.4 Relative Valuation of Equity
   63.5 Equity Return Attribution
   63.6 Conclusions

29
Appendix 63A. Derivation of the Risk Neutral Probability
Appendix 63B. The Model for the Fixed Operating Cost at time T
Appendix 63C. The Valuation Model Using the Recombining Lattice
Appendix 63D. Input Data of the Model

Chapter 64  Dividends vs. Reinvestments in Continuous Time: A More General Model
By
Ren-Raw Chen, Rutgers University, USA
Ben Logan
Oded Palmon, Rutgers University, USA
Larry Shepp, Rutgers University, USA
64.1  Introduction
64.2  The Model
64.3  The Solution
64.4  Expected Bankruptcy Time
64.5  Further Remarks
64.6  Conclusion

Chapter 65  Segmenting financial services market: An Empirical Study of Statistical and Non-parametric Methods
By
Kenneth Lawrence, New Jersey Institute of Technology, USA
Dinesh Pai, Rutgers University, USA
Ronald Klimberg, St. Joseph’s University, USA
Stephen Kudbya, New Jersey Institute of Technology, USA
Sheila Lawrence, Rutgers University, USA
65.1  Introduction
65.2  Methodology
65.3  Evaluating the Classification Function
65.4  Experimental Design
65.5  Results
65.6  Conclusions

Chapter 66  Spurious Regression and Data Mining in Conditional Asset Pricing Models
By
Wayne Ferson, University of Southern California, USA
Sergei Sarkissian, McGill University, USA
Timothy Simin, Pennsylvania State University, USA

66.1 Introduction
66.2 Spurious Regression and Data Mining in Predictive Regressions
66.3 Spurious Regression, Data Mining and Conditional Asset Pricing
66.4 The Data
66.5 The Models
66.6 Results for Predictive Regressions
66.7 Results for Conditional Asset Pricing Models
66.8 Solutions to the Problems of Spurious Regression and Data Mining
66.9 Robustness of the Results
66.10 Conclusions

Chapter 67   Issues Related with the Errors-In-Variables Problems in Asset Pricing Tests

By
Dongcheol Kim, Korea University Business School, Korea

67.1 Introduction
67.2 The Errors-In-Variables Problem
67.3 A Correction for the Errors-In-Variables Bias
67.4 Results
67.5 Conclusions

Chapter 68   MCMC Estimation of Multiscale Stochastic Volatility Models

By
German Molina, Statistical and Applied Mathematical Sciences Institute, USA
Chuan-Hsiang Han, National Tsing Hua University, Taiwan
Jean-Pierre Fouque, University of California, USA

68.1 Introduction
68.2 Multiscale Modeling and MCMC Estimation
68.3 Simulation Study
68.4 Empirical Application: FX Data
68.5 Implication on Derivatives Pricing and Hedging
68.6 Conclusions

Appendix 68A.  Proof of Independent Factor Equivalence

31
Appendix 68B. Full Conditionals

Chapter 69  Regime Shifts and the Term Structure of Interest Rates
By
Chien-Chung Nieh, Tamkang University, Taiwan
Shu Wu, The University of Kansas, USA
Yong Zeng, The University of Missouri at Kansas City, USA
69.1 Introduction
69.2 Regime-switching and Short-term Interest Rate
69.3 Regime-switching Term Structure Models in Discrete Time
69.4 Regime-switching Term Structure Models in Continuous Time
69.5 Conclusions

Chapter 70  ARM Processes and Their Modeling and Forecasting Methodology
By
Benjamin Melamed, Rutgers Business School, USA
70.1 Introduction
70.2 Overview of ARM Processes
70.3 The ARM Modeling Methodology
70.4 The ARM Forecasting Methodology
70.5 Example: ARM Modeling of an S&P 500 Time Series
70.6 Summary

Chapter 71  Alternative Econometric Methods for Information-based Equity-selling Mechanisms
By
Cheng Few Lee, Rutgers University, USA
Yi Lin Wu, National Tsing Hua University, Taiwan
71.1 Introduction
71.2 The information contents of equity-selling mechanisms
71.3 Alternative econometric methods for information-based equitieselling mechanisms
71.4 Conclusions

Chapter 72  Implementation Problems and Solutions in Stochastic Volatility Models of the Heston Type
Chapter 72 The Transform-based Solution for Heston’s Stochastic Volatility Model

By Jia-Hau Guo, Soochow University, Taiwan  
Mao-Wei Hung, National Taiwan University, Taiwan

72.1 Introduction
72.2 The Transform-based Solution for Heston’s Stochastic Volatility Model
72.3 Solutions to the Discontinuity Problem of Heston’s Formula
72.4 Summary

Chapter 73 Revisiting Volume Versus GARCH Effects Using Univariate and Bivariate GARCH Models: Evidence from US Stock Markets

By Zhuo Qiao, University of Macau, China  
Wing-Keung Wong, Hong Kong Baptist University, Hong Kong

73.1 Introduction
73.2 The Mixture of Distribution Hypothesis
73.3 Data and methodology
73.4 Empirical Findings in NYSE
73.5 Conclusions
Appendix 73A.

Chapter 74 Application of Fuzzy Set Theory to Finance Research: Method and Application

By Shin-Yun Wang, National Dong Hwa University, Taiwan  
Cheng-Few Lee, Rutgers University, USA

74.1 Introduction
74.2 Fuzzy set
74.3 Applications of fuzzy set theory
74.4 A example of fuzzy binomial OPM
74.5 A example of real option
74.6 Fuzzy regression
74.7 Conclusion

Chapter 75 Hedonic Regression Analysis in Real Estate Markets: A Primer

By Ben J. Sopranzetti, Rutgers University, USA
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>75.1</td>
<td>Introduction</td>
</tr>
<tr>
<td>75.2</td>
<td>The Theoretical Foundation</td>
</tr>
<tr>
<td>75.3</td>
<td>The Data</td>
</tr>
<tr>
<td>75.4</td>
<td>The Linear Model</td>
</tr>
<tr>
<td>75.5</td>
<td>Empirical Specification</td>
</tr>
<tr>
<td>75.6</td>
<td>The Semi-Log Model</td>
</tr>
<tr>
<td>75.7</td>
<td>The Box-Cox Model</td>
</tr>
<tr>
<td>75.8</td>
<td>Problems with Hedonic Modeling</td>
</tr>
<tr>
<td>75.9</td>
<td>Recent Developments</td>
</tr>
<tr>
<td>75.10</td>
<td>Summary</td>
</tr>
</tbody>
</table>

Chapter 76  Numerical Solutions of Financial Partial Differential Equations
By
Gang Nathan Dong, Rutgers University, USA

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>76.1</td>
<td>Introduction</td>
</tr>
<tr>
<td>76.2</td>
<td>The Model</td>
</tr>
<tr>
<td>76.3</td>
<td>Discretization</td>
</tr>
<tr>
<td>76.4</td>
<td>Finite Difference</td>
</tr>
<tr>
<td>76.5</td>
<td>Finite Volume</td>
</tr>
<tr>
<td>76.6</td>
<td>Finite Element</td>
</tr>
<tr>
<td>76.7</td>
<td>Empirical Result</td>
</tr>
<tr>
<td>76.8</td>
<td>Conclusion</td>
</tr>
<tr>
<td>76.9</td>
<td>Further Reading</td>
</tr>
</tbody>
</table>

Chapter 77  A Primer on the Implicit Financing Assumptions of Traditional Capital Budgeting Approaches
By
Ivan Brick, Rutgers University, USA
Daniel Weaver, Rutgers University, USA

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>77.1</td>
<td>Introduction</td>
</tr>
<tr>
<td>77.2</td>
<td>Textbook Approaches to NPV</td>
</tr>
<tr>
<td>77.3</td>
<td>Theoretical Valuation of Cash Flows</td>
</tr>
<tr>
<td>77.4</td>
<td>An Example</td>
</tr>
<tr>
<td>77.5</td>
<td>Personal Tax and Miller Equilibrium</td>
</tr>
<tr>
<td>77.6</td>
<td>Concluding Remarks</td>
</tr>
</tbody>
</table>
Chapter 78 Determinants of Flows into U.S. Based International Mutual Funds
By
Dilip K. Patro, Office of the Comptroller of the Currency, USA
78.1 Introduction
78.2 Motivation and Hypotheses
78.3 Data
78.4 Methodology and Empirical Results
78.5 Conclusions
Appendix 78A. Econometric Analysis of Panel Data

Chapter 79 Predicting prices using defensive forecasting
By
Glenn Shafer, Rutgers University, USA
Sam Ring, Rutgers University, USA
79.1 Introduction
79.2 Game-theoretic probability
79.3 Defensive Forecasting
79.4 Predicting Bond Yields
79.5 Conclusion

Chapter 80 Range Volatility Models and Their Applications in Finance
By
Ray Y Chou, Academia Sinica, Taiwan
Heng-chih Chou, Ming Chuan University, Taiwan
Nathan Liu, National Chiao Tung University, Taiwan
80.1 Introduction
80.2 The Price Range Estimators
80.3 The Range-based Volatility Models
80.4 The realized range volatility
80.5 The Financial Applications and Limitations of the Range Volatility
80.6 Summary

Chapter 81 Examining the Impact of US IT Stock Market on Other IT Stock Markets
By
Zhuo Qiao, University of Macau, China
Venus Khim-Sen Liew, Universiti Malaysia Sabah, Malaysia
Wing-Keung Wong, Hong Kong Baptist University, Hong Kong

81.1 Introduction
81.2 Data and Methodology
81.3 Empirical Results
81.4 Conclusions

Appendix 81A.

Chapter 82 Application of Alternative ODE in Finance and Economics Research
By
Cheng Few Lee, Rutgers University, USA
Junmin Shi, Rutgers University, USA

82.1 Introduction of ODE
82.2 Application of ODE in Deterministic system
82.3 Application of ODE in Stochastic system
82.4 Conclusion

Chapter 83 Application of Simultaneous Equation in Finance Research
By
Carl R. Chen, University of Dayton, USA
Cheng Few Lee, Rutgers University, USA

83.1 Introduction
83.2 Two-stage and three-stage least squares method
83.3 Application of simultaneous equation in finance research
83.4 Summary and concluding remark

Chapter 84 The Fuzzy Set and Data mining Applications in Accounting and Finance
By
Wikil Kwak, University of Nebraska at Omaha, USA
Yong Shi, University of Nebraska at Omaha, USA and Chinese Academy of Sciences, China
Cheng-few Lee, Rutgers University, USA

84.1 Introduction
84.2 A Fuzzy Approach to International Transfer Pricing
84.3 A Fuzzy Set Approach to Human Resource Allocation of a CPA Firm
84.4 A Fuzzy Set Approach to Accounting Information System Selection

36
84.5. Fuzzy Set Formulation to Capital Budgeting
84.6. A Data Mining Approach to Firm Bankruptcy Predictions
84.7. Summary and Conclusions

Chapter 85 Forecasting S&P 100 Volatility: The Incremental Information Content of Implied Volatilities and High Frequency Index Returns (Reprint)

By
Bevan J. Blair, Ingenious Asset Management, UK
Ser-Huang Poon, University of Manchester, UK
Stephen J. Taylor, Lancaster University, UK
85.1 Introduction
85.2 Data
85.3 Methodology for forecasting volatility
85.4 Results
85.5 Conclusions

Chapter 86 Detecting Structural Instability in Financial Time Series

By
Derann Hsu, University of Wisconsin – Milwaukee
86.1 Introduction
86.2 Genesis of the Literature
86.3 Problems of Multiple Change Points
86.4 Here Came the GARCH and Its Brethrens
86.5 Examples of Structural Shift Analysis in Financial Time Series
86.6 Implications of Structural Instability to Financial Theories and Practice
86.7 Direction of Future Research and Developments
86.8 Epilogue

Chapter 87 The Instrument Variable Approach to Correct For Endogeneity in Finance

By
Chia-Jane Wang, Manhattan College, USA
87.1 Introduction
87.2 Endogeneity: The Statistical Issue
87.3 Instrumental Variables Approach to Endogeneity
87.4 Validity of Instrumental Variables
87.5 Detection of Weak Instruments and Inferences
87.6 Applications of Instrumental Variables in Finance Research
87.7 Conclusion

Chapter 88 Bayesian Inference of Financial Models Using MCMC Algorithms
By
Xianghua Liu, Rutgers University, USA
Liuling Li, Rutgers University, USA
Hiroki Tsurumi, Rutgers University, USA
88.1 Introduction
88.2 Bayesian Inference and MCMC Algorithms
88.3 CKLS Model with ARMA-GARCH Errors
88.4 Copula Model for FTSE100 and SP500
88.5 Concluding Remarks

Chapter 89 On Capital Structure and Entry Deterrence
By
Fathali Firoozi, University of Texas at San Antonio, USA
Donald Lien, University of Texas at San Antonio, USA
89.1 Introduction
89.2 The Setting
89.3 Equilibrium
89.4 Capital Structure and Entry Deterrence
89.5 Concluding Remarks

Chapter 90 VAR Models: Estimation, Inferences and Applications
By
Yangru Wu, Rutgers University, USA
Xing Zhou, Rutgers University, USA
90.1 Introduction
90.2 A Brief Discussion of VAR Models
90.3 Applications of VARs in Finance
90.4 Summary

Chapter 91 Signalling Models and Product Market Games in Finance: Do We Know
What We Know?

By
Kose John, New York University, USA
Anant Sunderam, Tuck School, USA

91.1 Introduction
91.2 Supermodularity: Definitions
91.3 Supermodularity in Signalling Models
91.4 Supermodularity in Product Market Games
91.5 Empirical Evidence
91.6 Conclusion

Appendix 91A. Proof of Proposition 2

Chapter 92 Estimation of Short- and Long-Term VaR for Long-Memory Stochastic Volatility Models

By
Hwai-Chung Ho, Academia Sinica and National Taiwan University, Taiwan
Fang-I Liu, National Taiwan University, Taiwan

92.1 Introduction
92.2 Long Memory in Stochastic Volatility
92.3 VaR Calculation
92.4 Conclusions

Chapter 93 Time Series Modeling and Forecasting of the Volatilities of Asset Returns

By
Tze Leung Lai, Stanford University, USA
Haipeng Xing, SUNY at Stony Brook, USA

93.1 Introduction
93.2 Conditional heteroskedasticity models
93.3 Regime-switching, change-point and spline-GARCH models of volatility
93.4 Multivariate volatility models and applications to mean-variance portfolio optimization
93.5 Conclusion

Chapter 94 Listing effects and the private company discount in bank acquisitions

By
Atul Gupta, Bentley University, USA
Lalatendu Misra, University of Texas at San Antonio, USA

94.1 Introduction
94.2 Why acquiring firms may pay less for unlisted targets
94.3 Sample characteristics
94.4 Event Study Analysis
94.5 Findings based on multiples
94.6 Cross-sectional analysis
94.7 Conclusions

Chapter 95  An ODE Approach for the Expected Discounted Penalty at Ruin in a jump-diffusion model (Reprint)

By
Cheng Few Lee, Rutgers University, USA
Yu-Ting Chen, National Chao Tung University, Taiwan
Yuan-Chung Sheu, National Chao Tung University, Taiwan

95.1 Introduction
95.2 Integro-Differential Equation
95.3 Explicit Formula for $\Phi$ - ODE Method
95.4 The Constant Vector $Q$ - Second Method
95.5 Concluding Remarks

Appendix 95 A. Proofs
Appendix 95 B. Toolbox for Phase-Type Distributions
Appendix 95 C. First Order Derivative of $\Phi$ at Zero

Chapter 96  Alternative Models for Estimating the Cost of Equity Capital for Property/Casualty Insurers (Reprint)

By
Alice Lee, San Francisco State University, USA
J. D. Cumming, Temple University, USA

96.1 Introduction
96.2 Prior work
96.3 Model specification and estimation
96.4 Data description and cost of equity capital estimates
96.5 Evaluations of simulations and estimates
96.6 Summary and concluding remarks
Chapter 97  Implementing a Multi-Factor Term Structure Model
By
Ren-Raw Chen, Fordham University, USA
Louis O. Scott, Morgan Stanley, USA
97.1  Introduction
97.2  A Multi-Factor Term Structure Model
97.3  Pricing Options in the Multi-Factor Model
97.4  Calibrating A Multi-Factor Model
97.5  Conclusion

Chapter 98  Taking Positive Interest Rates Seriously (Reprint)
By
Enlin Pan, Independent consultant, Chicago, USA
Liuren Wu, Baruch College, USA
98.1.  Introduction
98.2.  Background
98.3.  The Model
98.4.  The Hump-Shaped Forward Rate Curve
98.5.  Fitting the U.S. Treasury Yields and U.S. Dollar Swap Rates
98.6.  Extensions: Jumps in Interest Rates
98.7.  Conclusion
Appendix 98A.  Factor Representation
Appendix 98B.  Extended Kalman Filter and Quasi Likelihood

Chapter 99  Positive Interest Rates and Yields: Additional Serious Considerations
(Reprint)
By
Jonathan E. Ingersoll, Jr., Yale School of Management, USA
99.1  Introduction
99.2  A Non-Zero Bound for Interest Rates
99.3  The Cox-Ingersoll-Ross and Pan-Wu Term Structure Models
99.4  Bubble-Free Prices
99.5  Multivariate Affine Term-Structure Models with Zero Bounds on Yields
99.6  Non-Affine Term Structures with Yields Bounded at Zero
99.7  Non-zero Bounds for Yields
99.8  Conclusion
Appendix 99A.

Chapter 100 Functional Forms for Performance Evaluation: Evidence from Closed-end Country Funds (Reprint)

By
Cheng-Few Lee, Rutgers University, USA
Dilip K. Patro, Office of the Comptroller of the Currency, USA
Bo Liu, Citigroup Global Market Inc., USA
100.1 Introduction and Motivation
100.2 Literature Review
100.3 Model Estimation
100.4 Data and Methodology
100.5 Empirical Results
100.6 Conclusion

Chapter 101 A semimartingale BSDE related to the minimal entropy martingale measure (Reprint)

By
Michael Mania, A. Razmadze Mathematical Institute, Georgia
Marina Santacroce, Politecnico di Torino, Italy
Revaz Tevzadze, Institute of Cybernetics, Georgia
101.1 Introduction
101.2 Some basic definitions, conditions and auxiliary facts
101.3 Backward Semimartingale equation for the value process
101.4 Conclusion

Chapter 102 The density process of the minimal entropy martingale measure in a stochastic volatility model with jumps (Reprint)

By
Fred Espen Benth, University of Oslo and Agder University College, Norway
Thilo Meyer-Brandis, University of Oslo, Norway
102.1 Introduction
102.2 The market
102.3 The minimal entropy martingale measure
102.4 The density process
102.5 The entropy price of derivatives and integro-partial differential equations
102.6 Conclusion

Chapter 103 Arbitrage Detection from Stock Data: An Empirical Study
By
Cheng-Der Fuh, National Central University and Academia Sinica, Taiwan
Szu-Yu Pai, National Taiwan University, Taiwan
103.1 Introduction
103.2 Arbitrage Detection: Volatility Change
103.3 Arbitrage Detection: The Change of the Mean
103.4 Empirical Study
103.5 Conclusions and Further Research

Chapter 104 Detecting Corporate Failure
By
Yanzhi Wang, Yuan Ze University, Taiwan
Lin Lin, National Chi-Nan University, Taiwan
Jenifer Piesse, University of London, UK
Hsien-chang Kuo, National Chi-Nan University, Taiwan
104.1 Introduction
104.2 The Possible Causes of Bankruptcy
104.3 The Methods of Bankruptcy
104.4 Prediction Model for Corporate Failure
104.5 The Selection of Optimal Cut-off Point
104.6 Recent development
104.7 Conclusion

Chapter 105 Genetic Programming for Option Pricing
By
N. K. Chidambaran, Fordham University, USA
105.1 Introduction
105.2 Genetic Program Elements
105.3 Black-Scholes Example
105.4 Extensions
105.5 Conclusion
Chapter 106  A Constant Elasticity of Variance (CEV) Family of Stock Price Distributions in Option Pricing: Review and Integration (Reprint)

By
Ren-Raw Chen, Rutgers University, USA
Cheng Few Lee, Rutgers University, USA

106.1 Introduction
106.2 The CEV Diffusion and Its Transition Density
106.3 The CEV Option Pricing Models
106.4 Computing the Non-Central Chi-Square Probabilities
106.5 Summary and Future Research
Appendix 106A.

Part VI– References

Part VII– Index
Subject Index
Author Index