Handbook of Quantitative Finance and Risk Management

Editors

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Springer

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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. Due to the importance of quantitative finance and risk management in the finance industry, it has become one of the most popular subjects in business schools 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 on 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 is organized 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 three chapters: they are "Chapter 1. Theoretical Framework of Finance," "Chapter 2. Investment, Dividend, Financing, and Production Policies," and "Chapter 3. 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.

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

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About the Editors

Cheng-Few Lee is Distinguished Professor of Finance at Rutgers Business School, Rutgers University and was chairperson of the Department of Finance from 1988 to 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.

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 36 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 edited a popular book entitled *Encyclopedia of Finance* (with Alice C. Lee). Dr. Lee has also published more than 170 articles in more than 20 different journals in finance, accounting, economics, statistics, and management. Professor Lee was ranked the most published finance professor worldwide during the period 1953–2008.

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 located at Carnegie Mellon University, Columbia University, Cornell University, New York University, Princeton University, Rutgers University, Stanford University, University of California at Berkley, University of Chicago, and University of Michigan.

Alice C. Lee is currently a Director 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 more than 20 years of experience and has 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 more than 20 years' experience in both the business and technical fields as an accountant, auditor, systems analyst, and as a business software developer. He has authored a book on how to use MINITAB and Microsoft Excel to do statistical analysis; this book 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. He is currently Director of the Center for PBBEF Research.

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