Quantitative Modeling Of Derivative Securities From Theory To Practice

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Fixed Income Securities and Derivatives Handbook

ALENA HUDSON

Modeling, Pricing, and Hedging in Energy and Commodity Markets Springer
The series of recent financial crises have thrown open the world of quantitative finance and financial modeling. This book brings together proven and new methodologies from finance, physics and engineering, along with years of industry and academic experience to provide a cookbook of models for dealing with the challenges of today's markets.
Principles, Mathematics, Algorithms World Scientific
Supercharge options analytics and hedging using the power of Python Derivatives Analytics with Python shows you how to implement market-consistent valuation and hedging approaches using advanced financial models, efficient numerical techniques, and the powerful capabilities of the Python programming language. This unique guide offers detailed explanations of all theory, methods, and processes, giving you the background and tools necessary to value stock index options from a sound foundation. You'll find and use self-contained Python scripts and modules and learn how to apply Python to advanced data and derivatives analytics as you benefit from the 5,000+ lines of code that are provided to help you reproduce the results and graphics presented. Coverage includes market data analysis, risk-neutral valuation, Monte Carlo simulation, model calibration, valuation, and dynamic hedging, with models that exhibit stochastic volatility, jump components, stochastic short rates, and more. The companion website features all code and IPython Notebooks for immediate execution and automation. Python is gaining ground in the derivatives analytics space, allowing institutions to quickly and efficiently deliver portfolio, trading, and risk management results. This book is the finance professional's guide to exploiting Python's capabilities for efficient and performing derivatives analytics. Reproduce major stylized facts of equity and options markets yourself Apply Fourier transform techniques and advanced Monte Carlo pricing Calibrate advanced option pricing models to market data Integrate advanced models and numeric methods to dynamically hedge options Recent developments in the Python ecosystem enable analysts to implement analytics tasks as performing as with C or C++, but using only about one-tenth of the code or even less. Derivatives Analytics with Python — Data Analysis, Models, Simulation, Calibration and Hedging shows you what you need to know to supercharge your derivatives and risk analytics efforts.
Advanced Quantitative Finance with C++ Academic Press
CD-ROM contains: MAPLE student version 5.0; online version of text; MATLAB GUI; IDEAL software (embedded in online text).
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Presents a multitude of topics relevant to the quantitative finance community by combining the best of the theory with the usefulness of applications Written by accomplished teachers and researchers in the field, this book presents quantitative finance theory through applications to specific practical problems and comes with accompanying coding techniques in R and MATLAB, and some generic pseudo-algorithms to modern finance. It also offers over 300 examples and exercises that are

appropriate for the beginning student as well as the practitioner in the field. The Quantitative Finance book is divided into four parts. Part One begins by providing readers with the theoretical backdrop needed from probability and stochastic processes. We also present some useful finance concepts used throughout the book. In part two of the book we present the classical Black-Scholes-Merton model in a uniquely accessible and understandable way. Implied volatility as well as local volatility surfaces are also discussed. Next, solutions to Partial Differential Equations (PDE), wavelets and Fourier transforms are presented. Several methodologies for pricing options namely, tree methods, finite difference method and Monte Carlo simulation methods are also discussed. We conclude this part with a discussion on stochastic differential equations (SDE’s). In the third part of this book, several new and advanced models from current literature such as general Lvy processes, nonlinear PDE's for stochastic volatility models in a transaction fee market, PDE's in a jump-diffusion with stochastic volatility models and factor and copulas models are discussed. In part four of the book, we conclude with a solid presentation of the typical topics in fixed income securities and derivatives. We discuss models for pricing bonds market, marketable securities, credit default swaps (CDS) and securitizations. Classroom-tested over a three-year period with the input of students and experienced practitioners Emphasizes the volatility of financial analyses and interpretations Weaves theory with application throughout the book Utilizes R and MATLAB software programs Presents pseudo-algorithms for readers who do not have access to any particular programming system Supplemented with extensive author-maintained web site that includes helpful teaching hints, data sets, software programs, and additional content Quantitative Finance is an ideal textbook for upper-undergraduate and beginning graduate students in statistics, financial engineering, quantitative finance, and mathematical finance programs. It will also appeal to practitioners in the same fields.

A Guide to Theory and Practice Springer Science & Business Media

Paul Wilmott on Quantitative Finance, Second Edition provides a thoroughly updated look at derivatives and financial engineering, published in three volumes with additional CD-ROM. Volume 1: Mathematical and Financial Foundations; Basic Theory of Derivatives; Risk and Return. The reader is introduced to the fundamental mathematical tools and financial concepts needed to understand quantitative finance, portfolio management and derivatives. Parallels are drawn between the respectable world of investing and the not-so-respectable world of gambling. Volume 2: Exotic Contracts and Path Dependency; Fixed Income Modeling and Derivatives; Credit Risk In this volume the reader sees further applications of stochastic mathematics to new financial problems and different markets. Volume 3: Advanced Topics; Numerical Methods and Programs. In this volume the reader enters territory rarely seen in textbooks, the cutting-edge research. Numerical methods are also introduced so that the models can now all be accurately and quickly solved. Throughout the volumes, the author has included numerous Bloomberg screen dumps to illustrate in real terms the points he raises, together with essential Visual Basic code, spreadsheet explanations of the models, the reproduction of term sheets and option classification tables. In addition to the practical orientation of the book the author himself also appears throughout the book—in cartoon form, readers will be relieved to hear—to personally highlight and explain the key sections and issues discussed. Note: CD-ROM/DVD and other supplementary materials are not included as part of eBook file.

Financial Engineering and Computation John Wiley & Sons
This book contains lectures delivered at the celebrated Seminar in Mathematical Finance at the Courant Institute. The lecturers and presenters of papers are prominent researchers and practitioners in the field of quantitative financial modeling. Most are faculty members at leading universities or Wall Street practitioners. The lectures deal with the emerging science of pricing and hedging derivative securities and, more generally, managing financial risk. Specific articles concern topics such as option theory, dynamic hedging, interest-rate modeling, portfolio theory, price forecasting using statistical methods, etc. Contents:Estimation and Data-Driven Models:Transition Densities for Interest Rate and Other Nonlinear Diffusions (Y Aït-Sahalia)Hidden Markov Experts (A Weigend & S-M Shi)When is Time Continuous? (A Lo et al.)Asset Prices are Brownian Motion: Only in Business Time (H Geman et al.)Hedging Under Stochastic Volatility (K Ronnie Sircar)Model Calibration and Volatility Smile:Determining Volatility Surfaces and Option Values from an Implied Volatility Smile (P Carr & D Madan)Reconstructing the Unknown Local Volatility Function (T Coleman et al.)Building a Consistent Pricing Model from Observed Option Prices (J-P Laurent & D Leisen)Weighted Monte Carlo: A New Technique for Calibrating Asset-Pricing Models (M Avellaneda et al.)Pricing and Risk Management:One-and Multi-Factor Valuation of Mortgages: Computational Problems and Shortcuts (A Levin)Simulating Bermudan Interest-Rate Derivatives (P Carr & G Yang)How to Use Self-Similarities to Discover Similarities of Path-Dependent Options (A Lipton)Monte Carlo Within a Day (J Cárdenas et al.)Decomposition and Search Techniques in Disjunctive Programs for Portfolio Selection (K Wyatt) Readership: Students and researchers in economics, finance and applied mathematics. Keywords:

Back to Basic Principles World Scientific
Written by the quantitative research team of Deutsche Bank, the world leader in innovative equity derivative transactions, this book acquaints readers with leading-edge thinking in modeling and hedging these transactions. Equity Derivatives offers a balanced, integrated presentation of theory and practice in equity derivative markets. It provides a theoretical treatment of each new modeling and hedging concept first, and then demonstrates their practical application. The book covers: the newest and fastest-growing class of derivative instruments, fund derivatives; cutting-edge developments in equity derivative modeling; new developments in correlation modeling and understanding volatility skews; and new Web-based implementation/delivery methods. Marcus Overhaus, PhD, Andrew Ferraris, DPhil, Thomas Knudsen, PhD, Frank Mao, PhD, Ross Milward, Laurent Nguyen-Ngoc, PhD, and Gero Schindlmayr, PhD, are members of the Quantitative Research team of Deutsche Bank's Global Equity Division, which is based in London and headed by Dr. Overhaus.

Derivatives, Quantitative Models and Risk Management CreateSpace Finance and energy markets have been an active scientific field for some time, even though the development and applications of sophisticated quantitative methods in these areas are relatively new—and referred to in a broader context as energy finance. Energy finance is often viewed as a branch of mathematical finance, yet this area continues to provide a rich source of issues that are fuelling new and exciting research developments. Based on a special thematic year at the Wolfgang Pauli Institute (WPI) in Vienna, Austria, this edited collection features cutting-edge research from leading scientists in the fields of energy and commodity finance. Topics discussed include modeling and analysis of energy and commodity markets, derivatives hedging and pricing, and optimal investment strategies and modeling of emerging markets, such as power and emissions. The book also confronts the challenges one faces in energy markets from a quantitative point of view, as well as the recent advances in solving these problems using advanced mathematical, statistical and numerical methods. By addressing the emerging area of quantitative energy finance, this volume will serve as a valuable resource for graduate-level students and researchers studying financial mathematics, risk management, or energy finance.

Quantitative Analysis, Derivatives Modeling, and Trading Strategies John Wiley & Sons

This invaluable book contains lectures delivered at the celebrated Seminar in Mathematical Finance at the Courant Institute. The lectures and presenters of papers are prominent researchers and practitioners in the field of quantitative financial modeling. Most are faculty members at leading universities or Wall Street practitioners. The lectures deal with the emerging science of pricing and hedging derivative securities and, more generally, managing financial risk. Specific articles concern topics such as option theory, dynamic hedging, interest-rate modeling, portfolio theory, price forecasting using statistical methods, etc.

Problems and Solutions in Mathematical Finance Academic Press Analytical Finance is a comprehensive introduction to the financial engineering of equity and interest rate instruments for financial markets. Developed from notes from the author’s many years in quantitative risk management and modeling roles, and then for the Financial Engineering course at Mälardalen University, it provides exhaustive coverage of vanilla and exotic mathematical finance applications for trading and risk management, combining rigorous theory with real market application. Coverage includes: • Date arithmetic’s, quote types of interest rate instruments • The interbank market and reference rates, including negative rates• Valuation and modeling of IR instruments; bonds, FRN, FRA, forwards, futures, swaps, CDS, caps/floors and others • Bootstrapping and how to create interest rate curves from prices of traded instruments• Risk measures of IR instruments• Option Adjusted Spread and embedded options• The term structure equation, martingale measures and stochastic processes of interest rates; Vasicek, Ho-Lee, Hull-While, CIR• Numerical models; Black-Derman-Toy and forward induction using Arrow-Debreu prices and Newton–Raphson in 2 dimension• The Heath-Jarrow-Morton framework• Forward measures and general option pricing models• Black log-normal and, normal model for derivatives, market models and managing exotics instruments• Pricing before and after the financial crisis, collateral discounting, multiple curve framework, cheapest-to-deliver curves, CVA, DVA and FVA

An Introduction to the Mathematics of Financial Derivatives World Scientific

Detailed guidance on the mathematics behind equity derivatives Problems and Solutions in Mathematical Finance Volume II is an innovative reference for quantitative practitioners and students, providing guidance through a range of mathematical problems encountered in the finance industry. This volume focuses solely on equity derivatives problems, beginning with basic problems in derivatives securities before moving on to more advanced applications, including the construction of volatility surfaces to price exotic options. By providing a methodology for solving theoretical and practical problems, whilst explaining the limitations of financial models, this book helps readers to develop the skills they need to advance their careers. The text covers a wide range of derivatives pricing, such as European, American, Asian, Barrier and other exotic options. Extensive appendices provide a summary of important formulae from calculus, theory of probability, and differential equations, for the convenience of readers. As Volume II of the four-volume Problems and Solutions in Mathematical Finance series, this book provides clear explanation of the mathematics behind equity derivatives, in order to help readers gain a deeper understanding of their mechanics and a firmer grasp of the calculations. Review the fundamentals of equity derivatives Work through problems from basic securities to advanced exotics pricing Examine numerical methods and detailed derivations of closed-form solutions Utilise formulae for probability, differential equations, and more Mathematical finance relies on mathematical models, numerical methods, computational algorithms and simulations to make trading, hedging, and investment decisions. For the practitioners and graduate students of quantitative finance, Problems and Solutions in Mathematical Finance Volume II provides essential guidance principally towards the subject of equity derivatives.

Equity Derivatives John Wiley & Sons

A framework for financial market modeling, the benchmark approach extends beyond standard risk neutral pricing theory. It permits a unified treatment of portfolio optimization, derivative pricing, integrated risk management and insurance risk modeling. This book presents the necessary mathematical tools, followed by a thorough introduction to financial modeling under the benchmark approach, explaining various quantitative methods for the fair pricing and hedging of derivatives.

Quantitative Finance Routledge

The quantitative nature of complex financial transactions makes them a fascinating subject area for mathematicians of all types. This book gives an insight into financial engineering while building on introductory probability courses by detailing one of the most fascinating applications of the subject.

Quantitative Modeling of Derivative Securities Oxford University Press

This book addresses selected practical applications and recent developments in

the areas of quantitative financial modeling in derivatives instruments, some of which are from the authorsOCO own research and practice. While the primary scope of this book is the fixed-income market (with further focus on the interest rate market), many of the methodologies presented also apply to other financial markets, such as the credit, equity, and foreign exchange markets. This book, which assumes that the reader is familiar with the basics of stochastic calculus and derivatives modeling, is written from the point of view of financial engineers or practitioners, and, as such, it puts more emphasis on the practical applications of financial mathematics in the real market than the mathematics itself with precise (and tedious) technical conditions. It attempts to combine economic insights with mathematics and modeling so as to help the reader develop intuitions. In addition, the book addresses the counterparty credit risk modeling, pricing, and arbitraging strategies, which are relatively recent developments and are of increasing importance. It also discusses various trading structuring strategies and touches upon some popular credit/IR/FX hybrid products, such as PRDC, TARN, Snowballs, Snowbears, CCDS, credit extinguishers."
Financial Modeling John Wiley & Sons
Versatile for Several Interrelated Courses at the Undergraduate and Graduate Levels Financial Mathematics: A Comprehensive Treatment provides a unified, self-contained account of the main theory and application of methods behind modern-day financial mathematics. Tested and refined through years of the authors' teaching experiences, the book encompasses a breadth of topics, from introductory to more advanced ones. Accessible to undergraduate students in mathematics, finance, actuarial science, economics, and related quantitative areas, much of the text covers essential material for core curriculum courses on financial mathematics. Some of the more advanced topics, such as formal derivative pricing theory, stochastic calculus, Monte Carlo simulation, and numerical methods, can be used in courses at the graduate level. Researchers and practitioners in quantitative finance will also benefit from the combination of analytical and numerical methods for solving various derivative pricing problems. With an abundance of examples, problems, and fully worked out solutions, the text introduces the financial theory and relevant mathematical methods in a mathematically rigorous yet engaging way. Unlike similar texts in the field, this one presents multiple problem-solving approaches, linking related comprehensive techniques for pricing different types of financial derivatives. The book provides complete coverage of both discrete- and continuous-time financial models that form the cornerstones of financial derivative pricing theory. It also presents a self-contained introduction to stochastic calculus and martingale theory, which are key fundamental elements in quantitative finance.
Theory and Applications Springer
A clear, practical guide to working effectively with derivative securities products Derivatives Essentials is an accessible, yet detailed guide to derivative securities. With an emphasis on mechanisms over formulas, this book promotes a greater understanding of the topic in a straightforward manner, using plain-English explanations. Mathematics are included, but the focus is on

comprehension and the issues that matter most to practitioners—including the rights and obligations, terms and conventions, opportunities and exposures, trading, motivation, sensitivities, pricing, and valuation of each product. Coverage includes forwards, futures, options, swaps, and related products and trading strategies, with practical examples that demonstrate each concept in action. The companion website provides Excel files that illustrate pricing, valuation, sensitivities, and strategies discussed in the book, and practice and assessment questions for each chapter allow you to reinforce your learning and gauge the depth of your understanding. Derivative securities are a complex topic with many "moving parts," but practitioners must possess a full working knowledge of these products to use them effectively. This book promotes a truly internalized understanding rather than rote memorization or strict quantitation, with clear explanations and true-to-life examples. Understand the concepts behind derivative securities Delve into the nature, pricing, and offset of sensitivities Learn how different products are priced and valued Examine trading strategies and practical examples for each product Pricing and valuation is important, but understanding the fundamental nature of each product is critical—it gives you the power to wield them more effectively, and exploit their natural behaviors to achieve both short- and long-term market goals. Derivatives Essentials provides the clarity and practical perspective you need to master the effective use of derivative securities products.

Quantitative Energy Finance John Wiley & Sons

Quantitative Modeling of Derivative Securities demonstrates how to take the basic ideas of arbitrage theory and apply them - in a very concrete way - to the design and analysis of financial products. Based primarily (but not exclusively) on the analysis of derivatives, the book emphasizes relative-value and hedging ideas applied to different financial instruments. Using a ""financial engineering approach,"" the theory is developed progressively, focusing on specific aspects of pricing and hedging and with problems that the technical analyst or trader has to consider in practice. More than just an introductory text, the reader who has mastered the contents of this one book will have breached the gap separating the novice from the technical and research literature.

Applied Quantitative Methods for Trading and Investment Springer

"This book deals with some of the key derivatives products including equity derivatives, mainly used for creating investment products for retail and private investors, interest rates derivatives, used for creating investment and treasury products, real estate derivatives and hybrid derivatives products"--

A Factor Model Approach to Derivative Pricing John Wiley & Sons

An accessible introduction to quantitative finance by the numbers—for students, professionals, and personal investors The world of quantitative finance is complex, and sometimes even high-level financial experts have difficulty grasping it. Quantitative Finance For Dummies offers plain-English guidance on making sense of applying mathematics to investing decisions. With this complete guide, you'll gain a solid understanding of futures, options and risk, and become familiar with the most popular equations, methods, formulas, and models (such as the Black-Scholes model) that are applied in quantitative finance. Also known as mathematical finance, quantitative finance is about applying mathematics and probability to financial markets, and involves using mathematical models to help make investing decisions. It's a highly technical discipline—but almost all investment companies and hedge funds use quantitative methods. The book breaks down the subject of quantitative finance into easily digestible parts, making it approachable for personal investors, finance students, and professionals working in the financial sector –especially in banking or hedge funds who are interested in what their quant (quantitative finance professional) colleagues are up to. This user-friendly guide will help you even if you have no previous experience of quantitative finance or even of the world of finance itself. With the help of Quantitative Finance For Dummies, you'll learn the mathematical skills necessary for success with quantitative finance and tips for enhancing your career in quantitative finance. Get your own copy of this handy reference guide and discover: An easy-to-follow introduction to the complex world of quantitative finance The core models, formulas, and methods used in quantitative finance Exercises to help augment your understanding of QF How QF methods are used to define the current market value of a derivative security Real-world examples that relate quantitative finance to your day-to-day job Mathematics necessary for success in investment and quantitative finance Portfolio and risk management applications Basic derivatives pricing Whether you're an aspiring quant, a top-tier personal investor, or a student, Quantitative Finance For Dummies is your go-to guide for coming to grips with QF/risk management.

In the Presence of Counterparty Credit Risk for the Fixed-Income Market

Springer Science & Business Media

Derivatives Models on Models takes a theoretical and practical look at some of the latest and most important ideas behind derivatives pricing models. In each chapter the author highlights the latest thinking and trends in the area. A wide range of topics are covered, including valuation methods on stocks paying discrete dividend, Asian options, American barrier options, Complex barrier options, reset options, and electricity derivatives. The book also discusses the latest ideas surrounding finance like the robustness of dynamic delta hedging, option hedging, negative probabilities and space-time finance. The accompanying CD-ROM with additional Excel sheets includes the mathematical models covered in the book. The book also includes interviews with some of the world’s top names in the industry, and an insight into the history behind some of the greatest discoveries in quantitative finance. Interviewees include: Clive Granger, Nobel Prize winner in Economics 2003, on Cointegration Nassim Taleb on Black Swans Stephen Ross on Arbitrage Pricing Theory Emanuel Derman the Wall Street Quant Edward Thorp on Gambling and Trading Peter Carr the Wall Street Wizard of Option Symmetry and Volatility Aaron Brown on Gambling, Poker and Trading David Bates on Crash and Jumps Andrei Khrennikov on Negative Probabilities Elie Ayache on Option Trading and Modeling Peter Jaeckel on Monte Carlo Simulation Alan

Lewis on Stochastic Volatility and Jumps Paul Wilmott on Paul Wilmott Knut Aase on Catastrophes and Financial Economics Eduardo Schwartz the Yoga Master of Quantitative Finance Bruno Dupire on Local and Stochastic Volatility Models

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