The Xva Of Financial Derivatives Cva Dva And Fva Explained Financial Engineering Explained

Weather derivatives provide a tool for weather risk management, and the markets for these exotic financial products are gradually emerging in size and importance. This unique monograph presents a unified approach to the modeling and analysis of such weather derivatives, including financial contracts on temperature, wind and rain. Based on a deep statistical analysis of weather factors, sophisticated stochastic processes are introduced modeling the time and space dynamics. Applying ideas from the modern theory of mathematical finance, weather derivatives are priced, and questions of hedging analyzed. The treatise contains an in-depth analysis of typical weather contracts traded at the Chicago Mercantile Exchange (CME), including so-called CDD and HDD futures. The statistical analysis of weather variables are based on a large data set from Lithuania. The monograph includes the research done by the authors over the last decade on weather markets. Their work has gained considerable attention, and has been applied in many contexts.

This book provides a comprehensive guide for modern derivatives pricing and credit analysis. Written to provide sound theoretical detail but practical implication, it provides readers with everything they need to know to price modern financial derivatives and analyze the credit exposure of a financial instrument in today's markets.

"The three volumes of Interest rate modeling are aimed primarily at practitioners working in the area of interest rate derivatives, but much of the material is quite general and, we believe, will also hold significant appeal to researchers working in other asset classes. Students and academics interested in financial engineering and applied work will find the material particularly useful for its description of real-life model usage and for its expansive discussion of model calibration, approximation theory, and numerical methods."--Preface.

A detailed, expert-driven guide to today's major financial point of interest The xVA Challenge: Counterparty Credit Risk, Funding, Collateral, and Capital is a practical guide from one of the leading and most influential credit practitioners, Jon Gregory. Focusing on practical methods, this informative guide includes discussion around the latest regulatory requirements, market practice, and academic thinking. Beginning with a look at the emergence of counterparty risk during the recent global financial crisis, the discussion delves into the quantification of firm-wide credit exposure and risk mitigation methods, such as netting and collateral. It also discusses thoroughly the xVA terms, notably CVA, DVA, FVA, ColVA, and KVA and their interactions and overlaps. The discussion of other aspects such as wrong-way risks, hedging, stress testing, and xVA management within a financial institution are covered. The extensive coverage and detailed treatment of what has become an urgent topic makes this book an invaluable reference for any practitioner, policy maker, or student. Counterparty credit risk and related aspects such as funding, collateral, and capital have become key issues in recent years, now generally characterized by the term 'xVA'. This book provides practical, in-depth guidance toward all aspects of xVA management. Market practice around counterparty credit risk and credit and debit value adjustment (CVA and DVA) The latest regulatory developments including Basel III capital requirements, central clearing, and mandatory collateral requirements The impact of accounting requirements such as IFRS 13 Recent thinking on the applications of funding, collateral, and capital adjustments (FVA, ColVA and KVA) The sudden realization of extensive counterparty risks has severely compromised the health of global financial markets. It's now a major point of action for all

financial institutions, which have realized the growing importance of consistent treatment of collateral, funding, and capital alongside counterparty risk. The xVA Challenge: Counterparty Credit Risk, Funding, Collateral, and Capital provides expert perspective and real-world guidance for today's institutions.

XVA Desks - A New Era for Risk Management

Derivatives Analytics with Python

Practical Approach To Xva, A: The Evolution Of Derivatives Valuation After The Financial Crisis

Second Edition

A Student Introduction

Advanced Hedging under IFRS 9

Solve the DVA/FVA Overlap Issue and Effectively Manage Portfolio Credit Risk Counterparty Risk and Funding: A Tale of Two Puzzles explains how to study risk embedded in financial transactions between the bank and its counterparty. The authors provide an analytical basis for the quantitative methodology of dynamic valuation, mitigation, and hedging of bilateral counterparty risk on over-the-counter (OTC) derivative contracts under funding constraints. They explore credit, debt, funding, liquidity, and rating valuation adjustment (CVA, DVA, FVA, LVA, and RVA) as well as replacement cost (RC), wrong-way risk, multiple funding curves, and collateral. The first part of the book assesses today's financial landscape, including the current multi-curve reality of financial markets. In mathematical but model-free terms, the second part describes all the basic elements of the pricing and hedging framework. Taking a more practical slant, the third part introduces a reduced-form modeling approach in which the risk of default of the two parties only shows up through their default intensities. The fourth part addresses counterparty risk on credit derivatives through dynamic copula models. In the fifth part, the authors present a credit migrations model that allows you to account for rating-dependent credit support annex (CSA) clauses. They also touch on nonlinear FVA computations in credit portfolio models. The final part covers classical tools from stochastic analysis and gives a brief introduction to the theory of Markov copulas. The credit crisis and ongoing European sovereign debt crisis have shown the importance of the proper assessment and management of counterparty risk. This book focuses on the interaction and possible overlap between DVA and FVA terms. It also explores the particularly challenging issue of counterparty risk in portfolio credit modeling. Primarily for researchers and graduate students in financial mathematics, the book is also suitable for financial quants, managers in banks, CVA desks, and members of supervisory bodies.

The 2008 financial crisis shook the financial derivatives market to its core, revealing a failure to fully price the cost of doing business then. As a response to this, and to cope with regulatory demands for massively increased capital and other measures with funding cost, the pre-2008 concept of Credit Valuation Adjustment (CVA) has evolved into the far more complex hybrid Cross Valuation Adjustment (XVA).This book presents a clear and concise framework and provides key considerations for the computation of myriad adjustments to the price of financial derivatives, to fully reflect costs. XVA has been of great interest recently due to heavy funding costs (FVA), initial margin (MVA) and capital requirements (KVA) required to sustain a

derivatives business since 2008, in addition to the traditional concepts of cost from counterparty default or credit deterioration (CVA), and its mirror image — the cost of one own's default (DVA).The book takes a practitioner's perspective on the above concepts, and then provides a framework to implement such adjustments in practice. Models are presented too, taking note of what is computationally feasible in light of portfolios typical of investment banks, and the different instruments associated with these portfolios.

Basic option theory - Numerical methods - Further option theory - Interest rate derivative products.

Explore the deadly elegance of finance's hidden powerhouse The Money Formula takes you inside the engine room of the global economy to explore the little-understood world of quantitative finance, and show how the future of our economy rests on the backs of this all-but-impenetrable industry. Written not from a post-crisis perspective – but from a preventative point of view – this book traces the development of financial derivatives from bonds to credit default swaps, and shows how mathematical formulas went beyond pricing to expand their use to the point where they dwarfed the real economy. You'll learn how the deadly allure of their ice-cold beauty has misled generations of economists and investors, and how continued reliance on these formulas can either assist future economic development, or send the global economy into the financial equivalent of a cardiac arrest. Rather than rehash tales of post-crisis fallout, this book focuses on preventing the next one. By exploring the heart of the shadow economy, you'll be better prepared to ride the rough waves of finance into the turbulent future. Delve into one of the world's least-understood but highest-impact industries Understand the key principles of quantitative finance and the evolution of the field Learn what quantitative finance has become, and how it affects us all Discover how the industry's next steps dictate the economy's future How do you create a quadrillion dollars out of nothing, blow it away and leave a hole so large that even years of "quantitative easing" can't fill it – and then go back to doing the same thing? Even amidst global recovery, the financial system still has the potential to seize up at any moment. The Money Formula explores the how and why of financial disaster, what must happen to prevent the next one.

XVA

Scripting for Derivatives and xVA

Theory and Practice of CSA and XVA Pricing, Exposure Simulation and Backtesting

Machine Learning for Risk Calculations

The Mathematics of Financial Derivatives

A Forward Equation for Computing Derivatives Exposure

From the late 1990s, the spectacular growth of a secondary market for credit through derivatives has been matched by the emergence of mathematical modelling analysing the credit risk embedded in these contracts. This book aims to provide a broad and deep overview of this modelling, covering statistical analysis and techniques, modelling of default of both single and multiple entities, counterparty risk, Gaussian and non-Gaussian modelling, and securitisation. Both reduced-form and firm-value models for the default of single entities are considered in detail, with extensive

discussion of both their theoretical underpinnings and practical usage in pricing and risk. For multiple entity modelling, the now notorious Gaussian copula is discussed with analysis of its shortcomings, as well as a wide range of alternative approaches including multivariate extensions to both firm-value and reduced form models, and continuous-time Markov chains. One important case of multiple entities modelling - counterparty risk in credit derivatives - is further explored in two dedicated chapters. Alternative non-Gaussian approaches to modelling are also discussed, including extreme-value theory and saddle-point approximations to deal with tail risk. Finally, the recent growth in securitisation is covered, including house price modelling and pricing models for asset-backed CDOs. The current credit crisis has brought modelling of the previously arcane credit markets into the public arena. Lipton and Rennie with their excellent team of contributors, provide a timely discussion of the mathematical modelling that underpins both credit derivatives and securitisation. Though technical in nature, the pros and cons of various approaches attempt to provide a balanced view of the role that mathematical modelling plays in the modern credit markets. This book will appeal to students and researchers in statistics, economics, and finance, as well as practitioners, credit traders, and quantitative analysts

Valuation and hedging of financial derivatives are intrinsically linked concepts. Choosing appropriate hedging techniques depends on both the type of derivative and assumptions placed on the underlying stochastic process. This volume provides a systematic treatment of hedging in incomplete markets. Mean-variance hedging under the risk-neutral measure is applied in the framework of exponential L(r)vy processes and for derivatives written on defaultable assets. It is discussed how to complete markets based upon stochastic volatility models via trading in both stocks and vanilla options. Exponential utility indifference pricing is explored via a duality with entropy minimization. Backward stochastic differential equations offer an alternative approach and are moreover applied to study markets with trading constraints including basis risk. A range of optimal martingale measures are discussed including the entropy, Esscher and minimal martingale measures. Quasi-symmetry properties of stochastic processes are deployed in the semi-static hedging of barrier options. This book is directed towards both graduate students and researchers in mathematical finance, and will also provide an orientation to applied mathematicians, financial economists and practitioners wishing to explore recent progress in this field."

It was the end of 2005 when our employer, a major European Investment Bank, gave our team the mandate to compute in an accurate way the counterparty credit exposure arising from exotic derivatives traded by the ?rm. As often happens, - posure of products such as, for example, exotic interest-rate, or credit derivatives were modelled under conservative assumptions and credit of?cers were struggling to assess the real risk. We started with a few models written on spreadsheets, t- lored to very speci?c instruments, and soon it

became clear that a more systematic approach was needed. So we wrote some tools that could be used for some classes of relatively simple products. A couple of years later we are now in the process of building a system that will be used to trade and hedge counterparty credit ex- sure in an accurate way, for all types of derivative products in all asset classes. We had to overcome problems ranging from modelling in a consistent manner different products booked in different systems and building the appropriate architecture that would allow the computation and pricing of credit exposure for all types of pr- ucts, to ?nding the appropriate management structure across Business, Risk, and IT divisions of the ?rm. In this book we describe some of our experience in modelling counterparty credit exposure, computing credit valuation adjustments, determining appropriate hedges, and building a reliable system.

Arguably the strongest addition to numerical finance of the past decade, Algorithmic Adjoint Differentiation (AAD) is the technology implemented in modern financial software to produce thousands of accurate risk sensitivities, within seconds, on light hardware. AAD recently became a centerpiece of modern financial systems and a key skill for all quantitative analysts, developers, risk professionals or anyone involved with derivatives. It is increasingly taught in Masters and PhD programs in finance. Danske Bank's wide scale implementation of AAD in its production and regulatory systems won the In-House System of the Year 2015 Risk award. The Modern Computational Finance books, written by three of the very people who designed Danske Bank's systems, offer a unique insight into the modern implementation of financial models. The volumes combine financial modelling, mathematics and programming to resolve real life financial problems and produce effective derivatives software. This volume is a complete, self-contained learning reference for AAD, and its application in finance. AAD is explained in deep detail throughout chapters that gently lead readers from the theoretical foundations to the most delicate areas of an efficient implementation, such as memory management, parallel implementation and acceleration with expression templates. The book comes with professional source code in C++, including an efficient, up to date implementation of AAD and a generic parallel simulation library. Modern C++, high performance parallel programming and interfacing C++ with Excel are also covered. The book builds the code step-by-step, while the code illustrates the concepts and notions developed in the book.

Theory and Practice, Second Edition

Interest Rate Risk in the Banking Book

AAD and Parallel Simulations

An Introduction to Derivative Pricing

Counterparty Credit Risk, Collateral and Funding

A Technical Guide

This latest addition to the Financial Engineering Explained series focuses on the new standards for derivatives valuation, namely, pricing and risk

management taking into account counterparty risk, and the XVA's Credit, Funding and Debt value adjustments.

The 2008 financial crisis shook the financial derivatives market to its core, revealing a failure to fully price the cost of doing business then. As a response to this, and to cope with regulatory demands for massively increased capital and other measures with funding cost, the pre-2008 concept of Credit Valuation Adjustment (CVA) has evolved into the far more complex hybrid Cross Valuation Adjustment (XVA). This book presents a clear and concise framework and provides key considerations for the computation of myriad adjustments to the price of financial derivatives, to fully reflect costs. XVA has been of great interest recently due to heavy funding costs (FVA), initial margin (MVA) and capital requirements (KVA) required to sustain a derivatives business since 2008, in addition to the traditional concepts of cost from counterparty default or credit deterioration (CVA), and its mirror image -- the cost of one own's default (DVA). The book takes a practitioner's perspective on the above concepts, and then provides a framework to implement such adjustments in practice. Models are presented too, taking note of what is computationally feasible in light of portfolios typical of investment banks, and the different instruments associated with these portfolios.

Leverage Python for expert-level volatility and variance derivative trading Listed Volatility and Variance Derivatives is a comprehensive treatment of all aspects of these increasingly popular derivatives products, and has the distinction of being both the first to cover European volatility and variance products provided by Eurex and the first to offer Python code for implementing comprehensive quantitative analyses of these financial products. For those who want to get started right away, the book is accompanied by a dedicated Web page and a Github repository that includes all the code from the book for easy replication and use, as well as a hosted version of all the code for immediate execution. Python is fast making inroads into financial modelling and derivatives analytics, and recent developments allow Python to be as fast as pure C++ or C while consisting generally of only 10% of the code lines associated with the compiled languages. This complete guide offers rare insight into the use of Python to undertake complex quantitative analyses of listed volatility and variance derivatives. Learn how to use Python for data and financial analysis, and reproduce stylised facts on volatility and variance markets Gain an understanding of the fundamental techniques of modelling volatility and variance and the model-free replication of variance Familiarise yourself with micro structure elements of the markets for listed volatility and variance derivatives Reproduce all results and graphics with IPython/Jupyter Notebooks and Python codes that accompany the book Listed Volatility and Variance Derivatives is the complete guide to Python-

based quantitative analysis of these Eurex derivatives products. Structured products are sold to a wide range of retail, high net worth and institutional investors, with over £15bn of structured investments sold in the UK in 2009. Based on a non-specialist graduate lecture course given at University College London (UCL), this book provides an invaluable introduction to the fast growing world of derivative investments and the technology used in their design, pricing and structuring. The book gives a comprehensive overview of structuring and trading products based on the author's extensive international experience in structuring investment products across a range of underlying asset classes, including equities, interest rates, credit and hybrids. The product coverage ranges from equity investments such as reverse convertibles and basket correlation products, to credit products such as first-to-default notes and the notorious "CDO2".Written in a simple and accessible manner, this book will be of interest to students, bankers, investors and other finance professionals./a

Counterparty Risk and Funding

With Pricing Cases For All Asset Classes

Valuation In A World Of Cva, Dva, And Fva : A Tutorial On Debt Securities And Interest Rate Derivatives

Pricing Derivative Securities

The XVA of Financial Derivatives: CVA, DVA and FVA Explained

International Convergence of Capital Measurement and Capital Standards

Differential machine learning combines automatic adjoint differentiation (AAD) with modern machine learning (ML) in the context of risk management of financial Derivatives. We introduce novel algorithms for training fast, accurate pricing and risk approximations, online, in real-time, with convergence guarantees. Our machinery is applicable to arbitrary Derivatives instruments or trading books, under arbitrary stochastic models of the underlying market variables. It effectively resolves computational bottlenecks of Derivatives risk reports and capital calculations.Differential ML is a general extension of supervised learning, where ML models are trained on examples of not only inputs and labels but also differentials of labels wrt inputs. It is also applicable in many situations outside finance, where high-quality first-order derivatives wrt training inputs are available. Applications in Physics, for example, may leverage differentials known from first principles to learn function approximations more effectively. In finance, AAD computes pathwise differentials with remarkable efficacy so differential ML algorithms provide extremely effective

pricing and risk approximations. We can produce fast analytics in models too complex for closed-form solutions, extract the risk factors of complex transactions and trading books, and effectively compute risk management metrics like reports across a large number of scenarios, backtesting and simulation of hedge strategies, or regulations like XVA, CCR, FRTB or SIMM-MVA. TensorFlow implementation is available on https://github.com/differential-machine-learning.

The derivative practitioner's expert guide to IFRS 9 application Accounting for Derivatives explains the likely accounting implications of a proposed transaction on derivatives strategy, in alignment with the IFRS 9 standards. Written by a Big Four advisor, this book shares the author's insights from working with companies to minimise the earnings volatility impact of hedging with derivatives. This second edition includes new chapters on hedging inflation risk and stock options, with new cases on special hedging situations including hedging components of commodity risk. This new edition also covers the accounting treatment of special derivatives situations, such as raising financing through commodity-linked loans, derivatives on own shares and convertible bonds. Cases are used extensively throughout the book, simulating a specific hedging strategy from its inception to maturity following a common pattern. Coverage includes instruments such as forwards, swaps, cross-currency swaps, and combinations of standard options, plus more complex derivatives like knock-in forwards, KIKO forwards, range accruals, and swaps in arrears. Under IFRS, derivatives that do not qualify for hedge accounting may significantly increase earnings volatility. Compliant application of hedge accounting requires expertise across both the standards and markets, with an appropriate balance between derivatives expertise and accounting knowledge. This book helps bridge the divide, providing comprehensive IFRS coverage from a practical perspective. Become familiar with the most common hedging instruments from an IFRS 9 perspective Examine FX risk and hedging of dividends, earnings, and net assets of foreign subsidies Learn new standards surrounding the hedge of commodities, equity, inflation, and foreign and domestic liabilities Challenge the qualification for hedge accounting as the ultimate objective IFRS 9 is set to

replace IAS 39, and many practitioners will need to adjust their accounting policies and hedging strategies to conform to the new standard. Accounting for Derivatives is the only book to cover IFRS 9 specifically for the derivatives practitioner, with expert guidance and practical advice.
This book presents techniques for valuing derivative securities at a level suitable for practitioners, students in doctoral programs in economics and finance, and those in masters-level programs in financial mathematics and computational finance. It provides the necessary mathematical tools from analysis, probability theory, the theory of stochastic processes, and stochastic calculus, making extensive use of examples. It also covers pricing theory, with emphasis on martingale methods. The chapters are organized around the assumptions made about the dynamics of underlying price processes. Readers begin with simple, discrete-time models that require little mathematical sophistication, proceed to the basic Black-Scholes theory, and then advance to continuous-time models with multiple risk sources. The second edition takes account of the major developments in the field since 2000. New topics include the use of simulation to price American-style derivatives, a new one-step approach to pricing options by inverting characteristic functions, and models that allow jumps in volatility and Markov-driven changes in regime. The new chapter on interest-rate derivatives includes extensive coverage of the LIBOR market model and an introduction to the modeling of credit risk. As a supplement to the text, the book contains an accompanying CD-ROM with user-friendly FORTRAN, C++, and VBA program components.
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.

Financial Calculus

A Tale of Two Puzzles

Data Analysis, Models, Simulation, Calibration and Hedging

Counterparty Risk, Funding, Collateral, Capital and Initial Margin

Credit, Funding and Capital Valuation Adjustments

Modeling and Pricing in Financial Markets for Weather Derivatives

The 2008 financial crisis shook the financial derivatives market to its core, revealing a failure to fully price the cost of doing business then. As a response to this, and to cope with regulatory demands for massively increased capital and other measures with funding cost, the pre-2008 concept of Credit Valuation Adjustment (CVA) has evolved into the far more complex hybrid Cross Valuation Adjustment (XVA). This book presents a clear and concise framework and provides key considerations for the computation of myriad adjustments to the price of financial derivatives, to fully reflect costs. XVA has

been of great interest recently due to heavy funding costs (FVA), initial margin (MVA) and capital requirements (KVA) required to sustain a derivatives business since 2008, in addition to the traditional concepts of cost from counterparty default or credit deterioration (CVA), and its mirror image; the cost of one own's default (DVA). The book takes a practitioner's perspective on the above concepts, and then provides a framework to implement such adjustments in practice. Models are presented too, taking note of what is computationally feasible in light of portfolios typical of investment banks, and the different instruments associated with these portfolios.
CVA, DVA, and FVA, which are the acronyms for credit, debit, and funding valuation adjustments, have become widely used by major banks since the financial crisis. This book aims to bridge the gap between the highly complex and mathematical models used by these banks to adjust the value of debt securities and interest rate derivatives, and the end users of the valuations, for example, accountants, auditors, and analysts. The book, which is essentially a tutorial, demonstrates the types of models that are used using binomial trees that are featured in the CFA® fixed income curriculum and allows readers to replicate the examples using a spreadsheet.
In this paper, we derive a forward analytical formula for computing the expected exposure of financial derivatives. Under general assumptions about the underlying diffusion process, we give a convenient decomposition of the exposure into two terms: The first term is an intrinsic value part which is directly deduced from the term structure of the forward mark-to-market. The second term expresses the variability of the future mark-to-market and represents the time value part.Abstract In the spirit of Dupire's equation for local volatility, our representation establishes a differential equation for the evolution of the expected exposure with respect to the observation dates. Our results are twofold: First, we derive analytically an integral formula for the exposure's expectation and we highlight straightforward links with local times and the co-area formula. Second, we show that from a numerical perspective, our solution can be significantly efficient when compared to standard numerical methods. The accuracy and time-efficiency of the forward representation are of special interest in benchmarking XVA valuation adjustments at the trade level.
Reverse stress testing was introduced in risk management as a

regulatory tool for financial institutions more than a decade ago. The recent Covid-19 crisis illustrates its relevance and highlights the need for a systematic re-thinking of tail risks in the banking sector. This book addresses the need for practical guidance describing the entire reverse stress testing process. Reverse Stress Testing in Banking features contributions from a diverse range of established practitioners and academics. Organized in six parts, the book presents a series of contributions providing an in-depth understanding of: Regulatory requirements and ways to address them Quantitative and qualitative approaches to apply reverse stress testing at different levels – from investment portfolios and individual banks to the entire banking system The use of artificial intelligence, machine learning and quantum computing to gain insights into and address banks' structural weaknesses Opportunities to co-integrate reverse stress testing with recovery and resolution planning Governance and processes for board members and C-suite executives Readers will benefit from the case studies, use cases from practitioners, discussion questions, recommendations and innovative practices provided in this insightful and pioneering book.

Modern Computational Finance

Hedging Derivatives

The xVA Challenge

Modern Derivatives Pricing and Credit Exposure Analysis

The Money Formula

Understanding, Building and Managing Counterparty, Funding and Capital Risk

Written by a practitioner with years working in CVA, FVA and DVA this is a thorough, practical guide to a topic at the very core of the derivatives industry. It takes readers through all aspects of counterparty credit risk management and the business cycle of CVA, DVA and FVA, focusing on risk management, pricing considerations and implementation.

Thorough, accessible coverage of the key issues in XVA XVA - Credit, Funding and Capital Valuation Adjustments provides specialists and non-specialists alike with an up-to-date and comprehensive treatment of Credit, Debit, Funding, Capital and Margin Valuation Adjustment (CVA, DVA, FVA, KVA and MVA), including modelling frameworks as well as broader IT engineering challenges. Written by an industry expert, this book navigates you through the complexities of XVA, discussing in detail the very latest developments in valuation adjustments including the impact of regulatory capital and margin requirements arising from CCPs and bilateral initial margin. The book presents a unified approach to modelling valuation adjustments including credit risk,

funding and regulatory effects. The practical implementation of XVA models using Monte Carlo techniques is also central to the book. You'll also find thorough coverage of how XVA sensitivities can be accurately measured, the technological challenges presented by XVA, the use of grid computing on CPU and GPU platforms, the management of data, and how the regulatory framework introduced under Basel III presents massive implications for the finance industry. Explores how XVA models have developed in the aftermath of the credit crisis The only text to focus on the XVA adjustments rather than the broader topic of counterparty risk. Covers regulatory change since the credit crisis including Basel III and the impact regulation has had on the pricing of derivatives. Covers the very latest valuation adjustments, KVA and MVA. The author is a regular speaker and trainer at industry events, including WBS training, Marcus Evans, ICBI, Infoline and RISK If you're a quantitative analyst, trader, banking manager, risk manager, finance and audit professional, academic or student looking to expand your knowledge of XVA, this book has you covered.

The rewards and dangers of speculating in the modern financial markets have come to the fore in recent times with the collapse of banks and bankruptcies of public corporations as a direct result of ill-judged investment. At the same time, individuals are paid huge sums to use their mathematical skills to make well-judged investment decisions. Here now is the first rigorous and accessible account of the mathematics behind the pricing, construction and hedging of derivative securities. Key concepts such as martingales, change of measure, and the Heath-Jarrow-Morton model are described with mathematical precision in a style tailored for market practitioners. Starting from discrete-time hedging on binary trees, continuous-time stock models (including Black-Scholes) are developed. Practicalities are stressed, including examples from stock, currency and interest rate markets, all accompanied by graphical illustrations with realistic data. A full glossary of probabilistic and financial terms is provided. This unique book will be an essential purchase for market practitioners, quantitative analysts, and derivatives traders.

A thoroughly updated and expanded edition of the xVA challenge The period since the global financial crisis has seen a major re-appraisal of derivatives valuation, generally expressed in the form of valuation adjustments ('xVAs'). The quantification of xVA is now seen as fundamental to derivatives pricing and valuation. The xVA topic has been complicated and further broadened by accounting standards and regulation. All users of derivatives need to have a good understanding of the implications of xVA. The pricing and valuation of the different xVA terms has become a much studied topic and many aspects are in constant debate both in industry and academia. Discussing counterparty credit risk in detail, including the many risk mitigants, and how this leads to the different xVA terms Explains why banks have undertaken a dramatic reappraisal of the assumptions they make when pricing, valuing and managing derivatives Covers what the industry generally means by xVA and how it is used by banks, financial institutions and end-users of derivatives Explains all of the underlying regulatory

capital (e.g. SA-CCR, SA-CVA) and liquidity requirements (NSFR and LCR) and their impact on xVA Underscores why banks have realised the significant impact that funding costs, collateral effects and capital charges have on valuation Explains how the evolution of accounting standards to cover CVA, DVA, FVA and potentially other valuation adjustments Explains all of the valuation adjustments - CVA, DVA, FVA, ColVA, MVA and KVA - in detail and how they fit together Covers quantification of xVA terms by discussing modelling and implementation aspects. Taking into account the nature of the underlying market dynamics and new regulatory environment, this book brings readers up to speed on the latest developments on the topic.

A Revised Framework

A Practitioner's View

A Comprehensive Guide

The Oxford Handbook of Credit Derivatives

Reverse Stress Testing in Banking

The Evolution of Derivatives Valuation After the Financial Crisis

The book's content is focused on rigorous and advanced quantitative methods for the pricing and hedging of counterparty credit and funding risk. The new general theory that is required for this methodology is developed from scratch, leading to a consistent and comprehensive framework for counterparty credit and funding risk, inclusive of collateral, netting rules, possible debit valuation adjustments, re-hypothecation and closeout rules. The book however also looks at quite practical problems, linking particular models to particular 'concrete' financial situations across asset classes, including interest rates, FX, commodities, equity, credit itself, and the emerging asset class of longevity. The authors also aim to help quantitative analysts, traders, and anyone else needing to frame and price counterparty credit and funding risk, to develop a 'feel' for applying sophisticated mathematics and stochastic calculus to solve practical problems. The main models are illustrated from theoretical formulation to final implementation with calibration to market data, always keeping in mind the concrete questions being dealt with. The authors stress that each model is suited to different situations and products, pointing out that there does not exist a single model which is uniformly better than all the others, although the problems originated by counterparty credit and funding risk point in the direction of global valuation. Finally, proposals for restructuring counterparty credit risk, ranging from contingent credit default swaps to margin lending, are considered.

The first decade of the 21st Century has been disastrous for

financial institutions, derivatives and risk management. Counterparty credit risk has become the key element of financial risk management, highlighted by the bankruptcy of the investment bank Lehman Brothers and failure of other high profile institutions such as Bear Sterns, AIG, Fannie Mae and Freddie Mac. The sudden realisation of extensive counterparty risks has severely compromised the health of global financial markets. Counterparty risk is now a key problem for all financial institutions. This book explains the emergence of counterparty risk during the recent credit crisis. The quantification of firm-wide credit exposure for trading desks and businesses is discussed alongside risk mitigation methods such as netting and collateral management (margining). Banks and other financial institutions have been recently developing their capabilities for pricing counterparty risk and these elements are considered in detail via a characterisation of credit value adjustment (CVA). The implications of an institution valuing their own default via debt value adjustment (DVA) are also considered at length. Hedging aspects, together with the associated instruments such as credit defaults swaps (CDSs) and contingent CDS (CCDS) are described in full. A key feature of the credit crisis has been the realisation of wrong-way risks illustrated by the failure of monoline insurance companies. Wrong-way counterparty risks are addressed in detail in relation to interest rate, foreign exchange, commodity and, in particular, credit derivative products. Portfolio counterparty risk is covered, together with the regulatory aspects as defined by the Basel II capital requirements. The management of counterparty risk within an institution is also discussed in detail. Finally, the design and benefits of central clearing, a recent development to attempt to control the rapid growth of counterparty risk, is considered. This book is unique in being practically focused but also covering the more technical aspects. It is an invaluable complete reference guide for any market practitioner with any responsibility or interest within the area of counterparty credit risk.

Containing many results that are new, or which exist only in recent research articles, Interest Rate Modeling: Theory and Practice, 2nd Edition portrays the theory of interest rate modeling as a three-dimensional object of finance, mathematics, and computation. It introduces all models with financial-economical justifications, develops options along the martingale approach, and handles option evaluations with

precise numerical methods. Features Presents a complete cycle of model construction and applications, showing readers how to build and use models Provides a systematic treatment of intriguing industrial issues, such as volatility and correlation adjustments Contains exercise sets and a number of examples, with many based on real market data Includes comments on cutting-edge research, such as volatility-smile, positive interest-rate models, and convexity adjustment New to the 2nd edition: volatility smile modeling; a new paradigm for inflation derivatives modeling; an extended market model for credit derivatives; a dual-curved model for the post-crisis interest-rate derivatives markets; and an elegant framework for the xVA.

The XVA of Financial Derivatives: CVA, DVA and FVA ExplainedSpringer

A Python-based Guide

A Practical Approach to XVA

Advances in Credit Risk Modeling and Management

Interest Rate Modeling

Differential Machine Learning

Modelling, Pricing, and Hedging Counterparty Credit Exposure

Credit risk remains one of the major risks faced by most financial and credit institutions. It is deeply connected to the real economy due to the systemic nature of some banks, but also because well-managed lending facilities are key for wealth creation and technological innovation. This book is a collection of innovative papers in the field of credit risk management. Besides the probability of default (PD), the major driver of credit risk is the loss given default (LGD). In spite of its central importance, LGD modeling remains largely unexplored in the academic literature. This book proposes three contributions in the field. Ye & Bellotti exploit a large private dataset featuring non-performing loans to design a beta mixture model. Their model can be used to improve recovery rate forecasts and, therefore, to enhance capital requirement mechanisms. François uses instead the price of defaultable instruments to infer the determinants of market-implied recovery rates and finds that macroeconomic and long-term issuer specific factors are the main determinants of market-implied LGDs. Cheng & Cirillo address the problem of modeling the dependency between PD and LGD using an original, urn-based statistical model. Fadina & Schmidt propose an improvement of intensity-based default models by accounting for ambiguity around both the intensity process and the recovery rate. Another topic deserving more attention is trade credit,

which consists of the supplier providing credit facilities to his customers. Whereas this is likely to stimulate exchanges in general, it also magnifies credit risk. This is a difficult problem that remains largely unexplored. Kanapickiene & Spicas propose a simple but yet practical model to assess trade credit risk associated with SMEs and microenterprises operating in Lithuania. Another topical area in credit risk is counterparty risk and all other adjustments (such as liquidity and capital adjustments), known as XVA. Chataignier & Crépey propose a genetic algorithm to compress CVA and to obtain affordable incremental figures. Anagnostou & Kandhai introduce a hidden Markov model to simulate exchange rate scenarios for counterparty risk. Eventually, Boursicot et al. analyzes CoCo bonds, and find that they reduce the total cost of debt, which is positive for shareholders. In a nutshell, all the featured papers contribute to shedding light on various aspects of credit risk management that have, so far, largely remained unexplored. A practical guide to counterparty risk management and credit value adjustment from a leading credit practitioner Please note that this second edition of Counterparty Credit Risk and Credit Value Adjustment has now been superseded by an updated version entitled The XVA Challenge: Counterparty Credit Risk, Funding, Collateral and Capital. Since the collapse of Lehman Brothers and the resultant realization of extensive counterparty risk across the global financial markets, the subject of counterparty risk has become an unavoidable issue for every financial institution. This book explains the emergence of counterparty risk and how financial institutions are developing capabilities for valuing it. It also covers portfolio management and hedging of credit value adjustment, debit value adjustment, and wrong-way counterparty risks. In addition, the book addresses the design and benefits of central clearing, a recent development in attempts to control the rapid growth of counterparty risk. This uniquely practical resource serves as an invaluable guide for market practitioners, policy makers, academics, and students. An incisive and essential guide to building a complete system for derivative scripting In Volume 2 of Modern Computational Finance Scripting for Derivatives and xVA, quantitative finance experts and practitioners Drs. Antoine Savine and Jesper Andreasen deliver an indispensable and insightful roadmap to the interrogation, aggregation, and manipulation of cash-flows in a variety of ways. The book demonstrates how to facilitate portfolio-wide risk assessment and regulatory calculations (like xVA). Complete with a professional scripting library written in modern C++, this stand-alone volume walks readers through the construction of a comprehensive risk and valuation tool. This

essential book also offers: Effective strategies for improving scripting libraries, from basic examples—like support for dates and vectors—to advanced improvements, including American Monte Carlo techniques Exploration of the concepts of fuzzy logic and risk sensitivities, including support for smoothing and condition domains Discussion of the application of scripting to xVA, complete with a full treatment of branching Perfect for quantitative analysts, risk professionals, system developers, derivatives traders, and financial analysts, Modern Computational Finance Scripting for Derivatives and xVA: Volume 2 is also a must-read resource for students and teachers in master's and PhD finance programs.

State-of-the-art algorithmic deep learning and tensoring techniques for financial institutions The computational demand of risk calculations in financial institutions has ballooned and shows no sign of stopping. It is no longer viable to simply add more computing power to deal with this increased demand. The solution? Algorithmic solutions based on deep learning and Chebyshev tensors represent a practical way to reduce costs while simultaneously increasing risk calculation capabilities. Machine Learning for Risk Calculations: A Practitioner's View provides an in-depth review of a number of algorithmic solutions and demonstrates how they can be used to overcome the massive computational burden of risk calculations in financial institutions. This book will get you started by reviewing fundamental techniques, including deep learning and Chebyshev tensors. You'll then discover algorithmic tools that, in combination with the fundamentals, deliver actual solutions to the real problems financial institutions encounter on a regular basis. Numerical tests and examples demonstrate how these solutions can be applied to practical problems, including XVA and Counterparty Credit Risk, IMM capital, PFE, VaR, FRTB, Dynamic Initial Margin, pricing function calibration, volatility surface parametrisation, portfolio optimisation and others. Finally, you'll uncover the benefits these techniques provide, the practicalities of implementing them, and the software which can be used. Review the fundamentals of deep learning and Chebyshev tensors Discover pioneering algorithmic techniques that can create new opportunities in complex risk calculation Learn how to apply the solutions to a wide range of real-life risk calculations. Download sample code used in the book, so you can follow along and experiment with your own calculations Realize improved risk management whilst overcoming the burden of limited computational power Quants, IT professionals, and financial risk managers will benefit from this practitioner-oriented approach to state-of-the-art risk calculation.

A Continuing Challenge for Global Financial Markets
Counterparty Credit Risk

Financial Derivative Investments: An Introduction To Structured Products
The new challenge for global financial markets
Counterparty Credit Risk and Credit Value Adjustment