Risk TRAINING

NEW YORK 1 & 2 December 2005
LONDON 5 & 6 December 2005

PRACTICAL CALIBRATION AND IMPLEMENTATION TECHNIQUES FOR INTEREST RATE MODELLING

Intermediate to advanced training course with practical examples

Course Highlights:

- **Discover** the practicalities of Libor market models
- **Gain** an insight into real world pricing and hedging of Bermudan swaptions and other callable Libor exotics
- **Examine** correlation and the pricing of hybrid derivatives
- **Learn** how to implement the Libor and swap market models
- **Understand** stochastic volatility models for fixed income derivatives and hybrids
- **Identify** jump processes for interest rate modelling: the example of Levy processes
- **Hear** about calibration of FX volatilities in a cross-currency Libor market

Course Tutors:

- **Matt Grayson**
  Global Head of Interest Rate and Currency Analytic Modelling, MORGAN STANLEY
- **Peter Jaeckel**
  Global Head of Credit, Hybrid, and Commodity Derivative Analytics, ABN AMRO
- **Christopher Hunter**
  Hybrid Exotic Trader, BNP PARIBAS
- **Marcello Minenna**
  Senior Officer and Adjunct Professor of QFinance, CONSOB & UNIVERSITY OF MILAN BICOCCA
- **Claudio Albanese**
  Professor, IMPERIAL COLLEGE LONDON

Who's it for?

This intensive two day training course will be of benefit to a wide array of practitioners:
■ Asset manager ■ Associate ■ Auditor ■ Financial analyst ■ Financial engineer ■ Interest rate exotic trader ■ Interest rate trader ■ Market risk manager ■ Portfolio manager ■ Principal analyst ■ Quantitative analyst ■ Quantitative developer ■ research analyst ■ System developer/programmer ■ Vice president of derivatives risk ■ Vice president of interest rates and Vice president of structured products

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An incisivemedia event

New York, 1 & 2 December 2005

Day one – Thursday, 1 December 2005

09.00 Registration and coffee

09.30 OVERVIEW OF INTEREST RATES DERIVATIVES PRICING FRAMEWORK

- Fundamentals of interest rates derivatives: FRAs, swaps, caps and swaptions
- The market model (Black) for caplets and the forward neutral measure
- General numeraire changes and invariance principles
- Avoiding vanishing numeraires
- The Libor forward measure and the pricing of swaptions
- Smile and skew in volatility
- Introducing stochastic volatility as a time change
- Choosing the time change to create volatility clustering and autocorrelation
- Jump processes for interest rates modelling: the example of Levy processes

Marcello Minenna
Senior Officer and Adjunct Professor of QFinance, **CONSOB & UNIVERSITY OF MILAN BICOCCA**

This session will include a 30 minute break

12.30 Lunch

13.30 STOCHASTIC VOLATILITY MODELS FOR FIXED INCOME DERIVATIVES AND HYBRIDS

- Stochastic volatility term structure models
- Regime switching
- Functional lattices
- Callable swaps
- Stochastic models for FX reversals
- Building correlation models for fixed income hybrids
- Case study I: callable constant maturity swaps
- Case study II: callable power reverse dual currency bonds
- Case study III: equity linked swaptions

Claudio Albanese
Professor, **IMPERIAL COLLEGE**

This session will include a 30 minute break

16.30 End of day one

Day two – Friday, 2 December 2005

09.00 Registration and coffee

09.30 REAL WORLD PRICING AND HEDGING OF BERMUDAN SWAPTIONS AND OTHER CALLABLE LIBOR EXOTICS

- Using Libor market models to price callable Libor exotics via Monte Carlo: why and how
- General framework for pricing american style options in Monte Carlo, and how to use it for callable Libor exotics
- Obtaining good risk numbers from a Monte Carlo based model: methods for deltas, gammas, vegas
- Analysing main sources of noise in computing Greeks
- Pathwise differentiation methods
- Projecting a Libor market model onto a low-dimensional Markov model for callable Libor exotics
- Smoothing techniques for callable Libor exotics
- Overview of the latest exotics: TARNS, callable ratchets

Matt Grayson
Global Head of Interest Rate and Currency Analytic Modelling, **MORGAN STANLEY**

This session will include a 30 minute break

12.30 Lunch

13.30 CORRELATION AND THE PRICING OF HYBRID DERIVATIVES

- Modelling correlation
  - linear correlation and concordance
  - tail dependency
  - asymmetry
- European pricing
  - introduction to copula
  - Gaussian student and Archimedean copula
  - implied correlation surfaces
- Term structure pricing
  - Gaussian modelling with implied correlation
  - local correlation
- Implementation and examples

Christopher Hunter
Hybrid Exotic Trader, **BNP PARIBAS**

This session will include a 30 minute break

16.30 End of course

London, 5 & 6 December 2005

Day one – Monday, 5 December 2005

09.00 Registration and coffee

09.30 OVERVIEW OF INTEREST RATES DERIVATIVES PRICING FRAMEWORK

- Fundamentals of interest rates derivatives: FRAs, swaps, caps and swaptions
- The market model (Black) for caplets and the forward neutral measure
- General numeraire changes and invariance principles
- Avoiding vanishing numeraires
- The Libor forward measure and the pricing of swaptions
- Smile and skew in volatility
- Introducing stochastic volatility as a time change
- Choosing the time change to create volatility clustering and autocorrelation
- Jump processes for interest rates modelling: the example of Levy processes

Marcello Minenna
Senior Officer and Adjunct Professor of QFinance, **CONSOB & UNIVERSITY OF MILAN BICOCCA**

This session will include a 30 minute break

12.30 Lunch

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- Stochastic volatility term structure models
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- Case study II: callable power reverse dual currency bonds
- Case study IIi: equity linked swaptions

Claudio Albanese
Professor, **IMPERIAL COLLEGE**

This session will include a 30 minute break

16.30 End of day one

Day two – Tuesday, 6 December 2005

09.00 Registration and coffee

09.30 STANDARD AND SKEWED LIBOR MARKET MODEL DYNAMICS

- Derivation of the indirectly stochastic drift
- Leaving the canon
- Futures convexity corrections in the Libor market model
- Speed is everything – the predictor-corrector scheme
- Parametrisation of correlation and volatility backbone
- Factor reduction – pros and cons
- Speed is everything – the drift term

12.30 Lunch

- Analytical calibration to coterminal swaptions
- Non-parametric volatility specification
- Global calibration to the full swaption matrix
- Bermudan Monte Carlo
- Cross-currency Libor market modelling
- Calibration of FX volatilities in a cross-currency Libor market

Peter Jaeckel
Global Head of Credit, Hybrid, and Commodity Derivative Analytics, **ABN AMRO**

This session will include breaks and lunch

16.30 End of course

Biographies:

Matt Grayson, MORGAN STANLEY
Matt Grayson received his Ph.D. in Mathematics from Princeton University in 1983. There followed a decade of theoretical research at MIT, Berkeley, Stanford, UCSD, and IBM. In 1993 he joined Citibank Securities in Fixed Income Research where he worked on Mortgage Prepayments, Callable Bonds, and FX exotics. In 1996 he joined Goldman Sachs Fixed Income Proprietary Trading where he modelled and traded interest rate volatility. In 1999 he joined Morgan Stanley focusing on complex interest rate models and derivatives. He is now Global Head of Interest Rate and Currency Analytic Modelling.

Peter Jaeckel, ABN AMRO
Peter Jäckel received his D. Phil. in Physics from Oxford University in 1995. After a short period in academic research, he moved into quantitative analysis and financial modelling in 1997, when he joined Nikko Securities. Following that he worked as a quant at NatWest, which later became part of the Royal Bank of Scotland group. In December 2000, he joined Commerzbank Securities as a Financial Engineer in their front office product development and derivatives modelling group, and jointly with his co-head ran the team from May 2003. Since September 2004, he has been with ABN AMRO as Global Head of Credit, Hybrid, and Commodity Derivative Analytics.

Marcello Minenna, CONSOB & UNIVERSITY OF MILAN BICOCCA
Marcello Minenna, acknowledged by Risk Magazine as the "quant enforcer" is senior officer at CONSOB (Commissione Nazionale per le Società e la Borsa, the Italian Securities and Exchange Commission), where he develops quantitative models for surveillance and supports the enforcement and regulatory units in their activities. Marcello teaches financial mathematics at the University of Milan Bicocca. He graduated in economics from Bocconi University and received his MA and PhD in mathematics for finance from Columbia University and State University of Brescia. He is the author of several publications including the Risk Book A Guide to Quantitative Finance.

Christopher Hunter, BNP PARIBAS
Christopher Hunter is an exotic hybrid trader on the Fixed Income trading desk at BNP Paribas in London. Prior to trading, he worked in the structuring and options research team (SORT), developing pricing models for exotic interest rate derivatives, first in London and, until recently, in New York. Dr. Hunter began his career as a theoretical physicist, receiving his PhD from Cambridge in 1998, before joining Bruno Dupire at Nikko Financial Products. From there he moved to Royal Bank of Scotland and worked for Riccardo Rebonato until his move to BNP Paribas in 2001. Dr Hunter is a visiting lecturer at King's College London, and, until his departure from New York, was a Fellow in the Financial Mathematics Program at the Courant Institute.

Claudio Albanese, IMPERIAL COLLEGE LONDON
Claudio Albanese is a chaired professor of Mathematical Finance at Imperial College London. Claudio has a Ph.D. in Physics from ETH-Zurich and taught at several other universities including NYU, Princeton and the University of Toronto. His industry experience includes a period at Morgan Stanley. Claudio's research focuses on credit derivatives and on stochastic volatility modelling for equity and interest rate derivatives. Claudio's personal homepage is under www.imperial.ac.uk/mathfin