Interest Rate Modelling for the New Era

London: 15th & 16th April 2010

This workshop provides TWO booking options

Register to ANY ONE day of the workshop

Register to BOTH days of the workshop and receive £200 discount

Topics:

Day 1: Interest Rate Modelling for the New Era

- **Curve stripping, bucket deltas, and managing IR risks**
- **Smiles, local volatility models, and equivalent volatilities**
- **Using the SABR model to manage volatility smiles, hedging stability**
- **Ref rates & basis spreads**
- **Leverage, cost of funds, and the credit crisis**
- **Three elements to modern pricing: model, calibration, and evaluation**
- **Choosing a model and the five main interest rate risks**
- **HJM models – strengths, weaknesses, usage**
- **Calibration strategies and the selection of calibration instruments**
- **Connection between calibration instruments and vega risks**
- **Predicted vs. actual vol matrices for different calibrations**
- **Mis-hedging, mis-pricing, and the need for risk migrators**

Presenter:

Pat Hagan: Head of Quantitative Analytics, Chief Investment Office, JP Morgan

Day 2: Interest Rate Modelling: Back to Basics

- **Interest rate theory: past, present, and future**
- **Calibration of the interest rate term structure**
- **Term-structure density approach**
- **Revisiting CMS Spread Options (Cap, Floor, Digital, Range Accrual)**
- **Fast computation of CMS Range accrual**
- **Real time calibration of SABR model**
- **Post-Credit Crunch Multiple-Curve Framework**
- **Foreign-Currency Analogy, No Arbitrage and Quanto Adjustment**
- **No Arbitrage and Counterparty Risk**

Presenters:

Eric Benhamou: CEO, Pricing Partners
Marco Bianchetti: Risk Management – Market Risk – Pricing & Financial Modelling, Intesa SanPaolo Bank
Dr Dorje C Brody: Reader in Mathematical Finance, Imperial College London
Professor Lane P Hughston: Professor of Mathematical Finance, Imperial College London
Jochen Theis: Director, Markit

Day 1: Interest Rate Modelling for the New Era: Pat Hagan

09:00 – 10:30 / Managing Smile Risks

- **Basics: discount factors, FRAs, swaps, and other delta products**
- **Curve stripping, bucket deltas, and managing IR risks**
- **Martingales & the fundamental theorem**
- **Vanilla options (caps, floors, and swaptions) & martinga**
- **Vol matrices, bucket vegas, and managing vol risks**
- **Smiles, local volatility models, and equivalent volatilities**
- **Mishedging, and the development of the stochastic vol model**
- **Using the SABR model to manage volatility smiles, hedging stability**
- **Levy based models for managing volatility surfaces**

10:30 – 10:45 Break

10:45 – 12:30 / Intermission: Market Technicals

- **Money vs. scrip**
- **Holiday calendars, business day rules, and schedule generation**
- **Day count fractions**
- **Ref rates & basis spreads**
- **Leverage, cost of funds, and the credit crisis**

Managing Exotic Risks

- **Three elements to modern pricing: model, calibration, and evaluation**
- **Choosing a model and the five main interest rate risks**
- **HJM models – strengths, weaknesses, usage**
- **BGM/LMM models – strengths, weaknesses, usage**
- **Short rate models – strengths, weaknesses, usage**
- **Markovian models – strengths, weaknesses, usage**
- **Summary**

12:30 – 13:30 Lunch

13:30 – 15:15 / Practical Pricing of Exotics

- **LGM model**
- **Callable swaps (Bermudans)**
- **Calibration strategies and the selection of calibration instruments**
- **Connection between calibration instruments and vega risks**
- **Explicit calibrations for Bermudan**
- **Predicted vs. actual vol matrices for different calibrations**
- **Dependence of Bermudan price on choice of calibration instruments**
- **Dependence of hedges on calibration choices**

- **Conclusions**

15:15 – 15:30 Break

15:30 – 17:15 / Adjusters and Risk Migration

- **Mis-hedging, mis-pricing, and the need for risk migrators**
- **Price sharpening via adjusters**
- **Example: Correcting a Bermudan calibrated to ATM swaptions**
- **Example: Correcting a Bermudan calibrated to caplets**

Pricing/hedging callable range notes & accrual swaps

- **Definition of the deal**

Day 2: Interest Rate Modelling: Back to Basics

09:00 – 11:00 / Theory of Interest Rate Modelling: From Basics to / New Interest Rate Models: / Dr Dorje C Brody & Professor Lane P Hughston, / Imperial College London

1. Interest rate theory: past, present, and future

- **Overview of interest rate theory**
- **Dynamic models for the short rate**
- **The Heath-Jarrow-Morton framework**
- **Pricing kernel methodology**
- **Dynamical models for risky assets**
- **The dynamics of discount bonds**
- **The volatility structure approach: pros and cons**
- **Pricing formulae for discount-bonds**
- **Asymptotic conditions on long-dated discount bonds**

2. Calibration of the interest rate term structure

- **Conditional variance representation for the pricing kernel**
- **Parametrisation and calibration of interest rate dynamics**
- **The role of the Wiener chaos expansion in interest-rate term-structure calibration**
- **Bond option pricing in Wiener-chaos models**

3. Term-structure density approach

- **Dynamics of the term-structure density**
- **Construction of admissible term-structure models**
- **New Levy-based interest-rate models**
- **Brownian, Gamma, and Variance-Gamma models**
- **Bond-option pricing in rational Levy models**

11:00 – 11:15 Break

11:15 – 12:45 / Revisiting CMS Spread Options (Cap, Floor, Digital, / Range Accrual): / Eric Benhamou, Pricing Partners

- **Product description**
- **CMS Replication**
- **Presentation of the various approaches: Normal, Bi Lognormal, Bi-SABR with copula, Bi Heston with copula, and Hagan adjuster method**
- **Comparisons and price differences**
- **Fast computation of CMS Range accrual**
- **Real time calibration of SABR model**
- **Impact of the copula assumption**
- **Impact of multi curve construction**

12:45 – 13:45 Lunch

13:45 – 15:15 / Bases between Rates and Implications on Curve / Construction and Pricing: / Jochen Theis, Markit

Bullets to follow

15:15 – 15:30 Break

15:30 – 17:00 / Multiple Curves, One Price: New Approaches / for Pricing & Hedging Interest Rate Derivatives / Decoupling Forwarding and Discounting Yield / Curves: / Marco Bianchetti, Intesa SanPaolo Bank

Market Context and Practices:
• Pre-Credit Crunch Single-Curve Framework
• Post-Credit Crunch Multiple-Curve Framework
• No Arbitrage and Forward Basis

Foreign-Currency Analogy, No Arbitrage and Quanto Adjustment:
• Single Currency Spot and Forward Exchange Rates
• Quanto Adjustment
• Pricing & Hedging FRAs, Swaps, Caps/Floors/Swaptions

No Arbitrage and Counterparty Risk

Other Approaches:
• Multi-Curve Market Model Approach
• Axiomatic Approach
• Counterparty Risk Approach

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Workshop Fee:

☐ Any One day: £1099 + UK VAT

☐ Both days: £1998 + UK VAT
(Including £200 Discount)

30% discount Academic delegates

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