



The 6th Fixed Income Conference

InterContinental Madrid

22nd / 23rd / 24th September 2010

Due to the great success of the previous five Fixed Income conferences, WBS Training are pleased to announce that we will be heading to the wonderful city of Madrid in 2010.

The popular three streamed format will be retained as in previous years, along with presenting 3 workshops on Wednesday 22nd September.

At our conference, delegates are not restricted to attend single streams. You have the opportunity to hop around the different streams and attend the presentations that benefit you the most. All stream presentation times run concurrently with each other.

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The 6th Fixed Income Conference Presenter List:

Jesper Andreasen

Global Head of Quantitative Research, Danske Bank

Alexandre Antonov

Senior Quantitative Analyst, NumeriX

Peter Austing

Quantitative Analyst, Barclays Capital

Dominique Bang

Quantitative Analyst, Bank of America Merrill Lynch

Martin Baxter

Analyst, Fixed Income Quant Group, Nomura International, plc

Eric Benhamou

CEO, Pricing Partners

Damiano Brigo

Managing Director, Fitch Solutions and Visiting Professor, Mathematics, Imperial College London

Giovanni Cesari

Managing Director, UBS

Vladimir Chorniy

Head of Market and Counterparty Risk Analytics, BNP Paribas

Gangadhar Darbha

Head of Algorithmic Trading Strategies, Global Markets, Nomura Structured Finance

Luis Manuel Garcia

Head of Credit Quantitative Analysis, BBVA

Dariusz Gatarek

National Bank of Poland

Andrei Greenberg

Quantitative Analyst

Jon Gregory

Independent Credit Consultant

Patrick Hagan

Head, Quantitative Analytics, Chief Investment Office, JP Morgan

John Hull

Maple Financial Professor of Derivatives & Risk Management, University of Toronto

Peter Jaeckel

OTC Analytics

Dharminder Kainth

Head of QuaRC, Royal Bank Of Scotland

María Teresa Martínez

Senior Interest Rate and Hybrids Quant, Santander

Fabio Mercurio

Senior Researcher, Bloomberg LP New York

Massimo Morini

Head of Credit Models, IntesaSan Paolo Bank

The 6th Fixed Income Conference Presenter List:

Andrea Pallavicini

Head of Financial Engineering, Banca Leonardo

Vladimir Piterbarg

Head of Quantitative Analytics, Barclays Capital

Henrik Rasmussen

Global Head of Rates Quantitative Research, Bank of America Merrill Lynch

John Ryan

European Head of FX Quants, Santander

David Shelton

Director, Co-Head Of Credit Derivatives Research, Bank of America Merrill Lynch

Manuel Torrealba

Head of Interest Rates Quantitative Analysis, BBVA

Julian Turc

Head of Cross-Asset Quantitative Research, Société Générale

Wednesday 22nd September

Pre-Conference Workshop Day:

Vladimir Piterbarg: Global Head Of Quantitative Analytics Group,
Barclays Capital

- **Interest Rate Modelling: From Solid Foundations To Advanced Models**

John Hull: Maple Financial Professor of Derivatives & Risk
Management, University of Toronto

- **Fundamentals of Credit Risk**

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

- **Interest Rate Modelling for the New Era.**

Wednesday 22nd September

Pre-Conference Workshop Day:

Interest Rate Modelling: From Solid Foundations To Advanced Models by Vladimir Piterbarg

Building Yield Curves

- Cubic Splines
- Non-parametric methods
- Tension splines
- Basis and Multiple Projection Curves

Vanilla models for single and multi-rate derivatives

- Basics of CMS models
- Copula calculus
- Old and new copulas and fitting smiles of CMS spreads

Short rate models -- what works and what does not

- Quasi-Gaussian Models with Local and Stochastic Volatility
- Quadratic Gaussian Models
- Multi-factor short rate models

Industrial-strength Libor market models

- Classical developments
- Advanced calibration techniques
- Interpolation of rates

Interest rate exotics in Monte Carlo

- Lower and upper bounds
- Advanced regression techniques
- Greeks

Lessons from crisis: Introducing deterministic and stochastic bases in interest rate models

- Multiple discounting curves
- Multiple projection curves
- Stochastic basis in interest rate models
- Impact on derivatives valuation

All delegates will receive a complimentary copy of the 2010 publication: Interest Rate Modeling (Volume I. Foundations and Vanilla Models) by Leif B.G. Andersen and Vladimir V. Piterbarg.

Day schedule:	09:00 – 17:00
Break:	10:30 – 10:45
Lunch:	12:30 – 13:30
Break:	15:15 – 15:30

Wednesday 22nd September

Pre-Conference Workshop Day:

Fundamentals of Credit Risk by John Hull

Background

- The products: CDSs, cash CDOs, synthetic CDOs, etc
- The credit crisis: how it happened, what we can learn from it
- Default probabilities and recovery rates
- Real world vs risk-neutral probability measures

The Standard Market model

- The nature of copulas
- Factor-based copulas
- Gaussian copula model of time to default
- Relation to structural models
- Implementation of model
- Other Factor-Based Correlations

Base Correlation and Alternative Measures

- Compound correlation and base correlation
- The loss distribution
- The hazard rate distribution
- The expected loss function

The Implied Copula Approach

- A parametrization of the model
- Step-by-implementation
- Valuation of bespokes
- Homogeneous vs heterogeneous model
- One factor vs two factors

John Hull is the Maple Financial Professor of Derivatives and Risk Management at the Joseph L. Rotman School of Management, University of Toronto. He is well known for his books and for his research covering many areas, including credit derivatives. He has won many teaching awards, including University of Toronto's prestigious Northrop Frye award.

Day schedule:	09:00 – 17:00
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Wednesday 22nd September

Pre-Conference Workshop Day:

Interest Rate Modelling for the New Era by 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

Break: 10:30 – 10:45

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**

Lunch: 12:30 – 13:30

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**

Break: 15:15 – 15:30

- **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**
- **Mismatched payoffs & convexity corrections**
- **Using replication to price non-callable range notes**
- **LGM model and potential calibration strategies**
- **Potential mishedging of swaption or caplet risks**
- **Using internal adjusters to correct prices and hedges**

Conference:

Thursday 23rd September
Day 1: Interest Rate Modelling Stream

08:00 – 08:50 / Registration

08:50 – 10:40 / Solving The Puzzles In Interest Rates, Funding and
/ CVA:
/ Massimo Morini, Banca IMI

- Multiple Curves in an Interest Rate Market with collateral, liquidity and CVA
- Explaining and Modelling Basis Swap Spreads as credit and liquidity options
- Bridging the gap between standard theory and real FRAs and Swaps
- Mathematical modelling of EONIA collateralized derivatives tied to risky Libor
- Charging Funding Liquidity without double counting with counterparty risk
- Funding Spread and Bond Basis for the measurement of the real Cost of Funding

Break: 10:40 – 11:00

11:00 – 12:30 / LIBOR Market Model with Stochastic Basis:
/ Fabio Mercurio, Bloomberg LP

- Stylized facts of the interest rate market
- Using distinct curves for generating future LIBOR rates and for discounting
- Pricing of linear and plain-vanilla interest rate derivatives
- Extending the LMM to the multi-curve case
- Modeling stochastic basis
- Deriving closed-form formulas for caps and swaptions
- An example of calibration to market data

Lunch: 12:30 – 13:50

13:50 – 15:10 / Modelling CMS & Spread Options:
/ Dherminder Kainth, Royal Bank of Scotland

- Issues with SABR for extrapolation and resolutions
- Introduction to Spread options:

Survey of market pricing approaches
Insights from copula based pricing models - disconnect between markets?

- Pricing within cheyette

Break: 15:10 – 15:30

**15:30 – 16:50 / Construction of an Arbitrage Free Smile, with
/ Particular Application to CMS and Range Accrual
/ Based Products:
/ María Teresa Martínez, Santander**

1. The importance of a safe smile: due to the post-crisis market conditions, there is great interest in not so complex “exotic” products such as digital payoffs (e.g. range accruals) or CMS products, with exposure to the smile shape and high dependence of the absence of arbitrage of the vol curve. Also, the use of Markov functional type models requires of well defined smiles for all strikes, with no arbitrage. Our aim is to present a way of generating the smile without arbitrages for all strikes.
2. The classic smile definition: SABR. The standard for smile generation is the celebrated formula by Hagan et. al, that presents two main drawbacks regarding our objective: one can easily find arbitrages in the smile, especially in the left hand wing, and the extrapolated volatilities for high strikes are usually far from the market implied volatilities.
3. Some proposals: SABR near the forward, and prime extrapolation in far away strikes (Benaim, Dogson, Kainth), strike dependent SABR parameters, mixture of CEV processes (Rebonato). With the first two, the problem of the arbitrageability of the vol curve still can exist. The third one is safer in this sense, and our proposal is in the line of this result.
4. Our proposal: we propose to approximate SABR vol curve with a mixture of two CEV processes, with appropriate parameter choice so that the new vol curve approximates SABR one near the forward, and has a handy way of controlling the wings of the distribution, by means of the weighting parameter.
5. Applications: the extra degree of freedom given by this weighting parameter (that affects mainly to the right extreme of the smile) can be used to match CMS swaps market. This allows us to combine quoted swaption volatilities and CMS swap prices to construct an arbitrage free smile for a full range of strikes.

16:50 – 18:00 / Open Floor Q&A Session

- **Interest Rate Modelling Panel: Interest Rate Models and the Crisis**

Moderator: Fabio Mercurio

Panelists:

- **Jesper Andreasen**
- **Eric Benhamou**
- **Massimo Morini**
- **Manuel Torrealba**

Panel Topics:

- **Eonia, Repo or Libor? The effects of funding and collateral on interest rate derivatives.**
- **Basis Spreads. Are we in a new rate-credit-liquidity hybrid market?**
- **BGM and Hull&White. Updating our models to post-crisis reality.**
- **How to improve the implied volatility asymptotic approximations.**
- **Local/Stochastic Volatility Models: alternatives to SABR? Cheyette models: alternatives to BGM?**
- **CMS and CMS Spread Option Pricing. Changes in the market and model advances**

Gala Dinner 20:00, Posada de la Villa Restaurant

Friday 24th September
Day 2: Interest Rate Modelling Stream

**09:00 – 10:30 / Time Dependent Heston Model and Fast Calibration
/ of Stochastic Volatility Models:
/ Eric Benhamou, Pricing Partners**

- **Introduction to the Malliavin small noise expansion**
- **Fast analytics for Time dependent Heston model**
- **Fast analytics for Piterbarg model with non zero correlation**
- **Deriving a fast and robust calibration for Heston and SABR**

Break: 10:30 – 11:00

**11:00 – 11:45 / Implied Volatility Asymptotics: A Twist On The Non-
/ Linear PDE Approach:
/ Henrik Rasmussen, Bank of America Merrill Lynch**

- **In this talk, I will discuss short-time asymptotics for the implied volatility, starting from the non-linear PDE for the implied volatility**
- **This non-linear PDE is transformed into a non-linear integral equation that is more amenable to treatment**
- **Using formal short-time asymptotics, we obtain approximations for various models that have previously been considered in the literature**

**11:45 – 12:30 / Quasi-Periodic and Periodic Decompositions:
/ Alternatives to Transform Methods for Option
/ Pricing:
/ Dominique Bang, Bank of America Merrill Lynch**

- **We present novel formulations for a call option as a periodic and quasi-periodic series**
- **These can be efficiently used for option pricing, as long as the characteristic function of the log-spot is known in closed form**
- **Bounds and error analysis are provided**
- **Eventually we apply the technique to Heston dynamics**

Lunch: 12:30 – 13:30

**13:30 – 15:00 / Using Changes of Measure to Estimate Arbitrage-
/ Free Models of the Rates Curve:
/ Julien Turc, Société Générale**

- We present a multi-factor affine model of the interest rate curve. The model leads to a specification of the curve that is similar to the Nelson-Siegel formula.
- The model involves three latent factors (level, slope and curvature), and considers risk premia between the historical and risk-neutral measures.
- We present an efficient way to estimate the model, using Kalman filtering and maximum quasi-likelihood.

This framework can be used to spot: relative value opportunities within the nominal curve, within the real curve, or between both curves. The model also leads to useful estimates of risk premia, and strips expected inflation out of market prices of inflation linked products. We also consider credit risk, and present credit-adjusted estimates for nominal risk premia.

Break: 15:00 – 15:15

**15:15 – 16:30 / Modelling the Spread and Applications to Callable
/ Spread Options:
/ Manuel Torrealba, BBVA**

- CMS Swaps and Spread Options
- Models for CMS Swaps
- Direct models for the spread
- Copula models for the spread
- Pricing CMS swaps and spread options with the LMM
- Adding Stochastic Volatility to the LMM
- Calibration of the LMM
- Application to the pricing of callable spread options
- Greeks analysis

End of Conference

Thursday 23rd September
Day 1: Credit Stream

08:00 – 08:50 / Registration

08:50 – 10:40 / A Dynamic Credit Basket Model with an Explicit
/ Stochastic Modeling of Default Correlation using
/ Chained Copulas:
/ Luis Manuel García, BBVA

- Introduction to basket dynamic models
- Chaining with the Gaussian Copula.
- Brief Introduction to Archimedean Copulas
- The Clayton Copula
- The Gamma process
- Spot and forward Copulas
- Correlation modeling: CIR and Lognormal processes
- Default intensities modeling
- Correlation smile implied by the model

Break: 10:40 – 11:00

11:00 – 12:30 / CVA Pricing, Integrated with Funding and
/ Own Credit:
/ Martin Baxter, Nomura International

- CVA portfolio pricing fundamentals
- Consistent integration with funding and own credit benefit
- Quanto CDS and cross-currency CVA
- Impact on callable trades

Lunch: 12:30 – 13:50

13:50 – 15:10 / Credit Models and the Crisis or: How I learned to
/ stop worrying and love the CVA and CDOs:
/ Damiano Brigo, Fitch Solutions & Imperial College,
/ London

- Base correlation warnings pre-crisis
- Alternative CDO models pre-crisis
- Base correlation and Dynamic models in crisis
- The neglected role of Credit volatility for CVA
- Poor wrong way risk representation with copula models
- Bilateral Counterparty Risk and seemingly paradoxical results
- Impact of singular numeraires in index options pricing in-crisis

Break: 15:10 – 15:30

**15:30 – 16:50 / Modelling, Pricing, and Hedging Counterparty
/ Credit Exposure:
/ Giovanni Cesari, UBS**

- Computing CVA and counterparty risk for both vanilla and exotic products
- A generic mathematical and computational framework
- Practical examples of exposure computations across all asset classes
- Inclusion of right way / wrong way risk
- Impact of collateral

16:50 – 18:00 / Open Floor Q&A Session

- **Credit Stream Panel: Credit Models and the Crisis: CVA, CDOs, FX Effects, Liquidity and Hybrid Models**

Moderator: Damiano Brigo

Panelists:

- Martin Baxter
- Giovanni Cesari
- Dariusz Gatarek
- David Shelton

Panel Topics:

- Hybrid modeling features: the FX effect on CDS on multiple currencies. (Can CDS be considered pure credit indicators any more?)
- CVA: hybrid models features and consistency, model risk.
- CVA: netting, collateralization, bilateral features.
- Liquidity modeling and interaction with credit
- Future of the CDO market

Gala Dinner 20:00, Posada de la Villa Restaurant

Friday 24th September
Day 2: Credit Stream

09:00 – 10:30 / Comprehensive Risk Measure for Correlation
/ Trading Books: Modelling and Challenges:
/ Vladimir Chorniy & Andrei Greenberg,
/ BNP Paribas

- Overview of new capital charges on trading books
- IRC vs CRM: major limitations
- Capturing dependence of risk factors for correlation products
- Parametric vs statistical approach to modelling risk factors
- Combining marginal extreme events using EVT and copula functions
- Joint tail realisations and extreme P&L
- CRM and advanced risk management

Break: 10:30 – 11:00

11:00 – 12:30 / Gaining from your own Default – The Strange Case
/ of DVA:
/ Jon Gregory, Independent Credit Consultant

- Background, accounting rules and examples
- CVA and DVA
- DVA with correlation and systemic risk
- How to realise DVA
- DVA and funding

Lunch: 12:30 – 13:30

13:30 – 15:00 / Recent Developments in Correlation Modelling
/ David Shelton, Bank of America Merrill Lynch

- Impact of Revisions to Basel II on Correlation Books
- Modelling the Dynamics of the Correlation Skew
- Stochastic Recovery Modelling and the Empirical Recovery Distribution
- Counterparty Risk: CVA and DVA for Correlation Products

Break: 15:00 – 15:15

15:15 – 16:30 / Modelling Wrong-Way Risk for Interest-Rate
/ Products:
/ Andrea Pallavicini, Banca Leonardo

- Risk-neutral evaluation of counterparty risk
- Credit spread dynamics, wrong-way risk and bilateral CVA
- Collateralized contracts
- Modelling risk factors and correlations
- Pricing examples for interest-rate derivatives

Thursday 23rd September
Day 1: Exotic Products Stream

08:00 – 08:50 / Registration

**08:50 – 10:40 / Future Landscape of Market Microstructure and
/ Algorithmic Trading in FX and Fixed Income:
/ Gangadhar Darbha, Nomura Structured Finance**

- **New Regulatory proposals and future microstructure of FI and FX markets**
- **Opportunities and challenges**
- **Look at trends and highlight the scope and opportunities**
- **Discuss the challenges for algorithmic trading in fixed income from both modelling and system development perspectives**
- **Examples from Auto-hedging in FX and real-time Inventory management in Rates**

Break: 10:40 – 11:00

**11:00 – 12:30 / Stochastic Local Volatility Models:
/ Jesper Andreasen, Danske Bank**

- **SV expansion in a local volatility model**
- **Full stochastic local volatility models**
- **Forward and backward finite difference solution**
- **The multi asset case and Monte Carlo**

Lunch: 12:30 – 13:50

**13:50 – 15:10 / A Study of Quanto Approximations in the Presence
/ of Local and Stochastic Volatility:
/ Peter Jaeckel, OTC Analytics**

- **Common approximations**
- **Consistent modelling of Quanto options**
- **A simple approximation for a simple local volatility model**
- **The implications of stochastic volatility**
- **Numerical examples**
- **Conclusion: do Quanto options warrant modelling them as exotic products?**

Break: 15:10 – 15:30

15:30 – 16:50 / CDO Pricing Suitable for Hybrid Products: / Dariusz Gatarek, National Bank of Poland

The subject of the talk is a new top-down approach to CDO tranche pricing i.e. a model:

- **Admitting a natural interpretation of model parameters in terms of individual spreads**
- **Fitting to all potential default distributions**
- **Suitable for individual names via top-down approach**
- **Consistent with equity, currency and interest rate models, hence suitable for hybrid products**
- **Having a natural extension to dynamic modelling and credit options**
- **Numerically tractable**

16:50 – 18:00 / Open Floor Q&A Session

- **View Interest Rate Modelling & Credit Streams.**

Gala Dinner 20:00, Posada de la Villa Restaurant

Friday 24th September
Day 2: Exotic Products Stream

**09:00 – 10:30 / Analytical Approximation for the Shifted Multi-
/ Factor HW Model:
/ Alexandre Antonov, NumeriX**

- **Model definition**
- **Properties:**

A. Rates decorrelation
B. Skew control
C. Numerical effectiveness

- **Approximation:**

A. Zero bonds
B. Arrow-Debreu price
C. Swaption price

Break: 10:30 – 11:00

**11:00 – 12:30 / Pricing and Hedging Barrier Options in the
/ Presence of Jumps:
/ John Ryan, Santander**

- **The standard risk neutral hedging arguments are examined in the presence of jump dynamics to demonstrate how the hedge, risk neutral transition density and the concept of market completeness are affected.**
- **The pricing equation is formulated in a pure integral form to better illustrate the correspondence between the risk neutral hedge and standard replication strategies for barrier options.**
- **A simplified example of a one-dimensional homogeneous model is examined using the Weiner-Hopf technique to obtain closed form solutions for the price and the hedge portfolio.**
- **A final simplification to a double-exponential jump probability is presented to demonstrate features of the hedge and make connections to previously known results.**

Lunch: 12:30 – 13:30

**13:30 – 15:00 / Practical Implementation of Fast Greeks in your
/ Analytics Library:
/ Martin Baxter, Nomura International**

- **Advantages of calculating Greeks internally in a fast semi-analytic way**
- **Chain rule re-imagined – forwards and backwards Greeks**
- **Block architecture for Greeks – calculators and allocators**
- **Greeks of a single routine – local use of the allocator architecture**
- **Taking Greeks of root-finding and optimisation routines**
- **Fast Greeks on trees and lattices**

Break: 15:00 – 15:15

**15:15 – 16:30 / Repricing the CMS smile with Methods from
/ Foreign Exchange:
/ Peter Austing, Barclays Capital**

- **Constructing a model consistent with cms smiles and a cms spread smile is related to the problem of a model for driving assets and cross in FX**
- **Introduction to the FX problem and how to relate it to the CMS problem**
- **Best-of contracts have some special properties**
- **They allow us to construct a joint probability density repricing the triangle of smiles analytically**
- **Then we can value more general european contracts**
- **And address the question of whether there is arbitrage in the triangle of smiles**

End of Conference

Event Fee:

- ☐ Workshop: £899.00 + ES VAT
(No Workshop Discount)
- ☐ Main Conference: £1699.00 + ES VAT

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