This is an intensive three-day programme focusing on the application of practical techniques for the implementation and use of BGM Libor and Swap Market Models.

**Presented by Massimo Morini**

**THE COURSE**
The BGM Libor and Swap Market Models are the last generation of financial models for interest rate derivatives, with an importance in pricing and hedging financial products that has grown in the recent market turmoil.

Discover new developments and cutting edge techniques in Libor and Swap Market Models. This in-depth course reviews foundations and illustrates the latest advances, including lessons learnt from the financial crisis. This will give participants the opportunity to apply new methodologies in a practical context for the current needs of the market.

The course analyses techniques and structures for crucial points such as volatility and correlation modelling. It further investigates calibration techniques on market data, presents problematic scenarios and identifies appropriate solutions. The various pricing problems with real-world payoffs are examined and practical solutions are described. Volatility smile and skew are explored and captured with tractable dynamics and the introduction of stochastic volatility, analysing in practice the most recent stochastic volatility term structure models. Finally, how to deal with credit and liquidity risk in this framework is explained.

**PRIOR KNOWLEDGE**
The Black-Scholes Model and Formula and the foundations of derivatives pricing. Basic statistics and numerical methods (Monte Carlo). Matlab.

**WHO SHOULD ATTEND?**
- Exotic Products Managers (pricing strategy development), Quantitative Analysts, QA Managers
- Fixed Income and Interest Rate Derivatives Managers & teams
- Financial Engineering Managers
- Portfolio Managers
- Traders
- Risk Managers or Directors

About LFS

London Financial Studies is a specialist teaching resource that concentrates exclusively on capital markets. We offer individuals, teams and companies a unique and expert teaching resource that combines theoretical understanding with practical experience. LFS is well known for its personal approach and the economic value that it delivers to clients.

This program is accredited by the CFA and Institute members are eligible for 24 Continuing Education credit hours.
DAY I

- Practical advantages and shortcomings of different approaches for pricing and hedging interest rate derivatives/Short rate modelling, HJM, Market Models (BGM). The capability to fit current market data
- Understanding Market Models: from market Black formulas to the Libor Market Model
- The Libor and Swap Market Models. Theoretically inconsistent but practically compatible
- Parameterising the model: the choice of the Volatility Structure. Future evolution and implications on exotics pricing and stability. The evolution of the term structure of volatility during the financial crisis
- Calibrating different volatility structures to cap quotes. Examples
- Correlation Modelling:
  - Desirable properties
  - Historical Correlations
  - Parametric Forms for Correlation
  - Controlling Model Dimension. The number of factors
  - Parameterising the Decorrelation seen from summer 2008
- Accurate approximations for efficient calibrating to swaptions. Testing the approximations on stressed data
- Monte Carlo Pricing in the LMM
  - Euler scheme
  - Log Euler
  - Milstein scheme
  - Predictor-Corrector scheme
  - Efficiency and Variance Reduction
  - Control Variates
- Calibrating exactly and instantaneously to swaptions. Analysis of calibration market cases
- Establishing a one-to-one relationship between parameters and market quotations for precise volatility bucketing
- Diagnostics of Calibration: controlling realism, stability and consistency of the results
- Joint Calibration. Possible inconsistencies between cap and swaption markets

Workshop: Volatility and correlation structures
DAY II

- Modelling smile and skew in interest-rate derivatives markets
- Deciding the backbone by models for the skew (ingredients for stochastic volatility models): CEV and shifted lognormal Libor Model. Pricing formulas
- Local volatility Libor Market Models. Choosing a model with well-defined dynamics
- Uncertain volatility models. Simplest choice for embedding smiles in the Libor Market Model. Limitations
- SABR model. Dynamic behaviour of smile and hedging issues
- Indetermination problems and effect on pricing exotics. How to solve the calibration problem
- Convexity adjustments and freezing drifts in Libor Market Model. Application to CMS derivatives. Analysis and comparison in different market situations. The problems of standard approximations with an anomalous shape of the term structure and the changes in volatility and correlation
- Convexity adjustments with smile for CMS products
- Stochastic Libor Market Models
- Heston stochastic volatility Libor Model. Approximations for efficient pricing. Different choices for parameterisations
- Practical problems in implementing stochastic volatility Libor Models. Modelling correlation of rates with stochastic volatility
- Cutting edge: an arbitrage-free term structure market model for Libor exotics with SABR dynamics. Calibration, approximations, empirical testing on market prices
- Comparing Heston volatility vs SABR volatility in Libor Market Model

**Workshop:** Pricing spread options with stochastic volatility

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**BGM Market Models:**

**Calibration, Smile, Pricing and Advances with lessons from the Crisis**

Our work is built on four complementary key values

**Practical application**
What we teach is soundly based in current best practice. Our teachers have extensive practical experience in relevant capital markets.

**Intellectual clarity**
Our teachers are first class communicators and acknowledged experts in their fields. They combine extensive practical experience with profound theoretical understanding. As skilled communicators, they get the message across quickly and effectively. Course exercises deliver effective practical learning that participants remember long after leaving the classroom.

**Personal approach**
We try to understand the needs of each person and structure courses and packages of real benefit to them. All our teaching groups are small enough to enable individual needs to be assessed and met continually.

**Economic value**
We understand the commercial environment in which our clients operate. What we teach them delivers tangible benefits to their personal performance and the bottom line of their companies.

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**London Financial Studies**

*capital markets learning*

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Butlers Wharf
London SE1 2ND
DAY III

- Implementing a Libor Market Model that can automatically price derivatives based on nonstandard rates. Interpolating realisations, interpolating dynamics, stochastic interpolation. Using LMM rates to rebuild a future general term structure. Testing interpolations. Practical pricing of path-dependant derivatives

- Efficient sensitivities in the Libor Market Model. Pathwise greeks. Computing global and bucketed delta and vega

- Simulation issues. Simulation of stochastic volatility. Controlling negative values. Predictor-corrector and other tricks

- Bermudan-style products:  
  - Dealing with exotic callable interest rate products. Calibration and model adjustments. Efficiency issues and sensitivities  
  - Comparing the pricing of Bermudans with different products. The role of correlations

Workshop: Pricing Bermudan derivatives

- Making the model robust to cope with the new market after the credit crunch. Explaining and modelling the anomalies in interest rate products that aroused from the subprime crisis

- A new foundation to interest rate models to account for counterparty and liquidity risk

- Decoupling discounting from forwarding when there is collateralisation. Libor and OIS Market Model. Modelling basis swap spreads

- A Libor Market Model for a plurality of curves

Global markets are fast moving, complex and evolving continuously. High-quality professional education is vital to maintain performance.

Tight Focus
Our expertise is in capital markets. That is what we concentrate on. We offer courses and packages on a wide range of topics in this important and complex area. This tight focus enables us to deliver teaching that is uniquely effective and useful.

Theory and practice
The professional and personal qualities of our course leaders are crucial; effective learning can only be delivered by exceptional teachers. At London Financial Studies we are able to attract prominent practitioners and academics all of whom have a clear and thorough grasp of their subjects and wide, practical experience. They are all expert communicators with the ability to impart their knowledge in a clear and engaging way.
**Booking Form**

The course fee is £1145 plus VAT per day and includes lunch, refreshments, full documentation, all relevant Excel macros and spreadsheets and access to our on-line Library.

An early booking discount of 10% is available for bookings made more than 20 working days before the start of the course. Multiple booking discounts are also available.

Invoices will be sent out with payment instructions and are payable by the earlier of 14 days from receipt or the first day of the course.

**BGM Market Models** (Please fill in 1 form for each booking)

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I have read and accept the booking conditions on this page

Signed: 

Date:

**Registration**

To confirm your place, please return this booking form by fax to:

+44 (0)20 7378 1062