



Aarhus School of Business
University of Aarhus

Handelshøjskolen
Aarhus Universitet



D-CAF Danish Center for Accounting and Finance

Workshop
Recent Advances in Interest Rate Modeling
Thursday 28 August 2008



Jesper Andreasen
DANSKE MARKETS, COPENHAGEN

Practical Interest Rate Modeling: Recent Developments and Future Challenges

We survey the development of interest rate models over the past 3 decades from short rate models, over Libor market models to Markov HJM models. The focus is on application to derivatives pricing and practical issues of calibration and numerical implementation will be discussed.



Christian Rønde Sørensen
JYSKE BANK

Implementations of LIBOR market Models

Taking a practical viewpoint, the presentation will concern the issues encountered during the implementation of a LIBOR Market Model in Jyske Bank. Topics being: Model choice, calibration, evaluation and computation time.



Ernst Eberlein
Professor of Stochastics and Mathematical Finance
UNIVERSITY OF FREIBURG

Lévy Driven Interest Rate Theory

We give an overview on recently developed interest rate term structure models which are driven by time-homogeneous and time-inhomogeneous Lévy processes. Three basic approaches are introduced: The forward rate model (Lévy HJM), the forward process model, and the LIBOR or market model. As an application pricing formulae for caps and floors are derived. Efficient algorithms to evaluate these formulae numerically are given. The LIBOR model can be extended to a multi-currency setting. Closed form pricing formulae for cross-currency derivatives such as foreign caps and floors and cross-currency swaps are studied in detail. The LIBOR model can also be extended to include defaultable instruments.



David Skovmand

Assistant Professor of Finance

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Alternative Specifications for the Lévy LIBOR Market Model: An Empirical Investigation

This paper introduces and analyzes specifications of the Lévy Market Model originally proposed by Eberlein and Özkan (2005). An investigation of the term structure of option implied moments shows that the Brownian motion and homogeneous Lévy processes are not suitable as modeling devices, and consequently a variety of more appropriate models is proposed. Besides a diffusive component the models have jump structures with low or high frequency combined with constant or stochastic volatility. The models are subjected to an empirical analysis using a time series of data for Euribor caps. The results of the estimation show that pricing performances are improved when a high frequency jump component is incorporated. Specifically, excellent results are achieved with the 4 parameter Self-Similar Variance Gamma model, which is able to fit an entire surface of caps with an average absolute percentage pricing error of less than 3%.



Antoon Pelsser

Professor of Actuarial Science

UNIVERSITY OF AMSTERDAM

Analytical Approximations for Prices of Swap Rate Dependent Embedded Options in Insurance Products

Life insurance products have profit sharing features in combination with guarantees. These so-called embedded options are often dependent on or approximated by forward swap rates. In practice, these kinds of options are mostly valued by Monte Carlo simulations. However, for risk management calculations and reporting processes, lots of valuations are needed. Therefore a more efficient method to value these options would be helpful. In this paper analytical approximations are derived for these kinds of options, based on an underlying multi-factor Gaussian interest rate model. The analytical approximation for options with direct payment is almost exact while the approximation for compounding options is also satisfactory. In addition, the proposed analytical approximation can be used as a control variate in Monte Carlo valuation of options for which no analytical approximation is available, such as similar options with management actions. Furthermore, it's also possible to construct analytical approximations when returns on additional assets (such as equities) are part of the profit sharing rate.
