Preface

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1 Introduction

This special issue on Computational Finance is based on presentations at the fifth International Conference on Computational Management Science held at Imperial College London in March 2008 and the 11th Conference on Stochastic Programming held at the University of Vienna in August 2007. The topics covered highlight the role played by computational techniques to solve relevant real-world problems in finance.

In the first paper, *Leonard C. MacLean*, *Yonggan Zhao*, and *William T. Ziemba* extend Merton's continuous time mean-variance analysis and the mutual fund separation theorem to markets characterized through a Markovian state price density and compare the growth optimal portfolio with the mean-variance optimal portfolios on a finite investment horizon. *Kostas Triantafyllopoulos* and *Giovanni Montana* use a state-space framework for modeling mean-reverting spreads which enjoy a certain degree of predictability and can thus be exploited by statistical arbitrage strategies. They introduce a time-dependency in the model parameters and devise a computationally fast estimation algorithm. *Piergiacomo Sabino* investigates linear transformation-based variance reduction techniques for Quasi-Monte Carlo methods and applies them to two high-dimensional option pricing problems. *Eduardo Faria* and *Stein-Erik Fleten* propose an optimization model for a price-taking Nordic hydropower producer. They use stochastic programming techniques to determine an optimal bidding strategy and analyze the impact of the possibility to participate in the Elbas market. In order to estimate the parameters of models for financial data, *Peter Winker*, *Marianna Lyra*, and *Chris Sharpe* consider conditional forecasts based on the capital asset pricing model

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and a factor model. They compare the performance of two different optimization heuristics to obtain least median of squares estimators. *Marcellino Gaudenzi* and *Antonino Zanette* propose a tree method for the pricing of cliquet options which provide a guaranteed minimum annual return. The authors demonstrate the superiority of their method over the standard Cox–Ross–Rubinstein approach. *Willem K. Klein Haneveld*, *Matthijs H. Streutker*, and *Maarten H. van der Vlerk* discuss the collective adjustment of pension rights in asset liability management models. They compare two approaches in which the decisions are modelled at an aggregate and a detailed level of the liabilities and demonstrate that the aggregate approach leads to significant biases. *Thiemo Krink* and *Sandra Paterlini* investigate portfolio optimization models with non-convex objective and constraint functions. They propose a new multiobjective evolutionary algorithm for their solution and assess it against established algorithms for portfolio optimization. Finally, *Michal Kaut* and *Stein W. Wallace* introduce a novel scenario generation method for stochastic programming which yields scenarios that faithfully reflect any given multivariate structure. This approach is based on the theory of copulas and proves particularly useful when the target shape deviates significantly from the standard normal elliptic shape. The authors illustrate their approach with an example from portfolio management.

Both the quality and the quantity of submissions to this special issue illustrate the important role that computational techniques play in current finance research. Due to the high complexity and uncertainty surrounding quantitative financial models, research on computational finance is likely to be of increasing significance in the future.