

PREFACE

I am pleased to introduce this third volume of lectures presented at the Courant Institute Mathematical Finance Seminar. The audience consisted of academics from NYU and other universities and practitioners from investment banks, hedge funds and asset-management firms. I am particularly grateful to the authors for their very interesting and innovative contributions.

The talks covered a wide range of topics in Quantitative Finance. For editorial clarity, we grouped the papers in four categories: “Finance Theory and Asset-Allocation”, “Arbitrage Pricing and Derivatives”, “Term-Structure Models” and “Algorithms for Pricing and Hedging”.

The section on *Finance Theory and Asset-Allocation* opens with a contribution by Sanjiv Das and K. Sundaram on the regulations of fees for mutual funds. Les Gulko proposes a quantitative “portfolio-based” approach to studying the balance sheet of a firm and its assess its creditworthiness. John Mulvey discusses a stochastic optimization algorithm for asset-liability management for long-term investors.

The papers on *Arbitrage Pricing and Derivatives* include a second contribution of Das and Sundaram on credit derivatives. After that, Peter Carr, Alex Lipton and Dilip Madan study the dynamic/synthetic replication of derivatives. Elyes Jouini studies the pricing of derivative securities in incomplete markets and gives an equilibrium argument for obtaining bounds on fair values. Padilla and Blat model “regime shifts” in volatility as a discrete-state Markov process and apply this idea to the pricing of options under volatility uncertainty. Jong-Shi Pang and Jacqueline Huang consider the pricing of American-style options using numerical methods for variational inequalities.

In the section *Term Structure Models*, Alex Levin describes a linearization approach for pricing swaptions (options on swaps) and other interest-rate sensitive derivatives in the context of multi-factor models. Jacques Carriere proposes a methodology for pricing interest rate derivatives in which bond yields are modeled as state-variables. T. Yasuoka discusses the calibration of the Brace–Gatarek–Musielka LIBOR market model.

The last section *Algorithms for Pricing and Hedging* contains an article by Vijay Pant and Tom Little on numerical methods for pricing variance swaps and a contribution by Steven Figlewski on barrier options. Also, Raphael Douady discusses the Least Squares Monte Carlo method for pricing American Options and some modifications of the algorithm. Juan Cardenas discusses accelerated Monte Carlo methods for calculating Value-at-Risk and Roberta Gamba and myself develop a method for estimating the “greeks” in Monte Carlo simulation using regressions.

I hope that you find the papers intellectually stimulating and enjoyable.

Marco Avellaneda
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