

RECENT ADVANCES IN MATHEMATICAL FINANCE: CONFERENCE IN HONOR OF STAN PLISKA



University of Illinois at Chicago
December 7-8, 2007
UIC Student Center East
750 S. Halsted Street, Room 605
Chicago, IL

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UIC International Center for
UNIVERSITY OF ILLINOIS AT CHICAGO Futures and Derivatives
COLLEGE OF BUSINESS ADMINISTRATION



Merrill Lynch

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12:45 p.m. Check-in

1:15 p.m. Welcome by Gib Bassett and Tomasz Bielecki

1:30 p.m. Robert Jarrow

S.C. Johnson Graduate School of Management, Cornell University, Ithaca, NY, USA

“Asset Price Bubbles in Incomplete Markets”

Abstract: Jarrow studies asset price bubbles in a continuous time model using the local martingale framework. Jarrow and his colleagues characterize all possible price bubbles in an incomplete market satisfying the “no free lunch with vanishing risk” and “no dominance” assumptions. They propose a new theory for bubble birth that involves a nontrivial modification of the classical martingale pricing framework. This modification involves the market exhibiting different local martingale measures across time—a possibility not previously explored within the classical theory. Finally, they investigate the pricing of derivative securities in the presence of asset price bubbles. Many of the pricing results obtained stand in contrast to those of the classical theory. They propose, but do not implement, some new tests for the existence of asset price bubbles using derivative securities. Joint work with Kazuhiro Shimbo and Philip Protter.

2:15 p.m. Masaaki Kijima

Graduate School of Economics, Kyoto University, Yoshida-Honmachi, Sakyo-ku, Kyoto, Japan

“The Optimal Capital Structure and Endogenous Bankruptcy for a Fixed Term Debt Issued at Par”

Abstract: Kijima analyzes optimal leverage and debt capacity for a coupon debt issued at par with fixed maturity under the balancing theory. The two cases are considered; when the debt is protected by covenants and when the debt is unprotected, i.e. equity holders can endogenously bankrupt the firm. The optimal capital structure is examined using analytical and numerical solutions. Their results are consistent with empirical findings. Joint work with Teruyoshi Suzuki.

3:00 p.m. Break

3:30 p.m. Phelim Boyle

School of Business and Economics, Wilfrid Laurier University, Waterloo, Ontario, Canada

“Robust Pricing in an Incomplete Market”

Abstract: In an incomplete market there will be a multiplicity of stochastic discount factors. We discuss an approach for the selection of a stochastic discount factor for pricing a new derivative security. The basic idea is that the price of a derivative security should not vary too much when the payoff of the primitive security is slightly perturbed. Two metrics of robustness are developed. The first is based on robustness in expectation. The second is based on robustness in probability and draws on results from the theory of large deviations. We illustrate the approaches in a stochastic volatility model and we compute the sensitivity of the price of a call option to model misspecification. This talk is based on joint work with Shui Feng, Weidong Tian and Tan Wang.

4:15 p.m. Takeaki Kariya

Graduate School of Global Business, Meiji University, Institute of Economic Research, Kyoto University, Japan

“A Model for Corporate Bonds with Multiple Industry Factors and Derivation of the Implied Term Structure of Default Probabilities and Recovery Rates for Each Pair of Industry and Rating Category Via Corporate Bond Data”

Abstract: In general, the issuers of corporate bonds run multiple businesses. Taking this into account, Kariya proposes a statistical pricing model for corporate bonds that enables him to derive the implied term structure of default probabilities and recovery rates for each pair of industry and rating category via corporate bond data. The model is compared to other models in the treatment of credit risk.

6:00 p.m. Cocktails at Costa’s

Costa’s Greek Dining & Bar

340 S. Halsted

Chicago, IL 60661

Phone 312-263-9700

Restaurant is walking distance from the conference.

7:00 p.m. Dinner

Choice of leg of lamb or chicken breast with pastichio, spinach cheese pie, dolmades, potato and vegetables. Vegetarian meals will be ordered as needed.

7:45 a.m. Breakfast in Room 605, UIC Student Center East

8:45 a.m. Jin-Chuan Duan

Risk Management Institute and Department of Finance, National University of Singapore and Rotman School of Management, University of Toronto

“Co-integration in Crude Oil Components and the Pricing of Crack Spread”

Abstract: The crack spread options traded at the New York Mercantile Exchange are American style futures spread options on the one-to-one by volume difference between the futures prices of a refined petroleum products and light sweet crude oil. Duan and his colleagues investigate the importance of co-integration and future maturity effects for pricing the two most common of these options, namely the New York Harbor no. 2 heating oil and New York Harbor gasoline crack spread options. They compare the performance of four models, a simple bivariate GARCH model and a co-integrated bivariate GARCH model, both as proposed in Duan and Pliska (2004) as well as similar models where the volatility processes are augmented with maturity effects. The model parameters are estimated using the future prices, and the option prices are computed with the primal simulation technique. They find evidence in support of the co-integration pricing model, particularly the one incorporating maturity effects.

9:30 a.m. Yevgeny Goncharov

Department of Mathematics, Florida State University, Tallahassee, FL, USA

“Prepayment and Mortgage Rate Modeling”

Abstract: The mortgage rate is one of the most potent refinancing predictors. Many prepayment models state it explicitly; however, only very few use an endogenous mortgage rate process. Usually, a 10-year Treasury heuristic is used for this purpose, thus, effectively making such models merely variants of an empirical approach popular on Wall Street. Currently, the literature on endogenous mortgage rate modeling is very limited. The endogenous mortgage rate process was first defined by Goncharov in his PhD thesis. Pliska studied the problem in a discrete setting. Recently, Citigroup published its MOATS model which has some endogenous features. The computational complexity was likely one of the reasons why this important topic has been mostly absent in the mortgage literature. In the talk, Goncharov discussed existing mortgage rate models and describes a new algorithm which makes the complexity of the problem equivalent to the problem of MBS valuation, thus making endogenous mortgage rate modeling accessible for real-life applications.

10:15 a.m. Break

10:30 a.m. Chris Rogers

Statistical Laboratory Centre for Mathematical Sciences, Cambridge University, UK

“Pathwise Stochastic Optimal Control”

Abstract: This paper approaches optimal control problems for discrete-time controlled Markov processes by representing the value of the problem in a dual Lagrangian form. This approach is a completely novel way to look any stochastic optimal control problem, independent of (but complementing) the classical dynamic-programming/value-function approach. The representation obtained opens up the possibility of numerical methods based on Monte Carlo simulation which may be advantageous in high-dimensional problems or in problems with complicated constraints.

11:15 a.m. Dilip Madan

Robert H. Smith School of Business, University of Maryland, College Park, MD, USA

“Sato Processes and the Valuation of Structured Products”

Madan and colleagues report on the adequacy of using Sato processes to value equity structured products. In models used to price options on realized variance, the latter must be a random variable with a positive variance. An analysis of this variance of realized variance for Sato processes shows that these processes may be suited to option contracts on realized volatility. Nonlinear pricing principles based on hedging to acceptability are outlined for the purpose of pricing structured transactions. It is shown that typically different products should be priced using different models. Pricing comparisons of Sato process prices with other standard models like Heston stochastic volatility, with and without jumps, VGSA, local volatility and local CGMY are also provided. Sato processes tend to overprice cliquets relative to other models. They also maintain the value of long dated out-of-the-money realized variance options.