Actuarial Science and Finance 1

Chair: Paul Marriott (University of Waterloo)

MATHIEU BOUDREAULT, Université du Québec à Montréal
Estimation of Asset Correlations with Transient Shocks in a Multi-name Credit Risk Model

It is well documented (Aït-Sahalia (2004), Duan and Fulop (2009), Johannes et al. (2009)) that asset prices are contaminated by trading noise which make it difficult to distinguish permanent from transient shocks. In this presentation, we will show how transient shocks impact the estimation of asset correlations in a general multi-name credit risk model. An estimation technique is presented and the statistical properties of this estimator are compared with other approaches. We conclude with an empirical example where we find that ignoring trading noise can seriously underestimate asset correlations and consequently, credit risk measures used for risk management.

MARIE-PIER CÔTÉ, McGill University
Copula-based Model for Risk Aggregation

A flexible approach is proposed for risk aggregation. The model consists of a tree structure, bivariate copulas, and marginal distributions. The construction relies on a conditional independence assumption whose implications are studied. A procedure for selecting the tree structure is developed using hierarchical clustering techniques, along with a distance metric based on Kendall's tau. Estimation, simulation, and model validation are also discussed. The approach is illustrated using data from a Canadian property and casualty insurance company.

HASSAN OMIDI FIROUZI, University of Montreal
Optimal Portfolio Problem for Entropic Value at Risk: When the Underlying Distribution is Non Elliptical

In modern portfolio theory, we typically find asset returns that are modeled by a random variable with an elliptical distribution and the notion of portfolio risk is described by an appropriate risk measure. In this joint work, we propose a new stochastic model for the asset returns that are based on Jumps-Diffusion (J-D) distributions. On the other hand, we also propose to use a new coherent risk measure, so-called, Entropic Value at Risk (EVaR), in the optimization problem. For certain models, including a jump-diffusion distribution, this risk measure yields an explicit formula for the objective function so that the optimization problem can be solved without resorting to numerical approximations.

ETIENNE MARCEAU, Université Laval
Infinite-time Ruin Measures for Compound Renewal Risk Models with Dependence

We study infinite-time ruin measures within risk models assuming dependence between interclaim times and claim amounts. We use change of measure techniques to obtain exact expressions for both the infinite-time ruin probability and the Gerber-Shiu discounted penalty function. Two different approaches are considered in the application of these techniques. Based on the expressions for the infinite-time ruin probability and the Gerber-Shiu function, we also derive Lundberg-type inequalities and asymptotic expressions for these two quantities. We investigate an important sampling method based on change of measure techniques. For specific bivariate distributions for the interclaim time and the claim amount, we derive their corresponding bivariate distributions resulting from the change of measure.

SHANOJA NAIK, University of Regina
Calibration of Wishart Stochastic Correlation Model for Sovereign Default Risk

In the context of structural credit risk modeling, we consider a stochastic correlation model with Wishart process for sovereign credit risk. Different from corporate counterparties, there is no reliable proxy for the market value of a sovereign credit asset,

which makes the model estimation problem challenging. We apply the extended Kalman Filter to calibrate the model, based on the term structure of survival probabilities which are implied by the market values of sovereign credit default swaps.

CHENGGUO WENG, University of Waterloo
CPPI under Regime Switching and Transaction Cost

Portfolio insurance has been extensively applied in the financial industry, typically designed to protect portfolio value from dropping below certain predetermined floor. It allows participation in risky investments for potential upside profits and meanwhile control downside risk. As one of the main portfolio insurance strategies, the CPPI adopts a simplified self-financing strategy to dynamically rebalance portfolio between a risky asset and a reserve asset. In this talk, I will introduce some results I recently obtained on CPPI in a discrete-time regime switching setting with transaction cost. Explicit formulas are derived for a variety of portfolio performance measures and can be easily implemented for sensitivity analysis. A numerical example with a real dataset will be given to demonstrate those obtained results.