

RMI Research Workshop Series

	Session 1	Session 2
Speaker:	Prof Ser-Huang Poon University of Manchester	Prof Chen Nan Chinese University of Hong Kong
Title:	Consistent Pricing Model for Volatility	Credit Spreads, Optimal Capital Structure, and Implied Volatility with Endogenous Default and Jump Risk
Date / Time:	4th September 2009, 3.00pm – 4.10pm	4th September 2009, 4.30pm – 5.40pm
Venue:	RMI Seminar Room Level 1 21 Heng Mui Keng Terrace, I³ Building (Formerly known as I²R)	
Chair-person:	Prof Sun Defeng, National University of Singapore	

Light refreshments will be served during the break (4.10pm – 4.30pm)

Session 1: Abstract

Consistent Pricing Model for Volatility. Volatility is now widely recognised as a new asset class. The range of traded volatility products and the importance of risk management of volatility risk call for a model that can maintain some consistency across prices of derivatives written on the underlying as well as its volatility.

VIX, the S&P500 volatility index launched by the CBOE (Chicago Board of Exchange), is pioneering in this regards. Futures and options written on VIX are now traded in CBOE. In this paper, we show one approach to calibrate the prices of VIX futures and options, and how this calibrated information can be used to capture the dynamics of S&P 500 vol surface constructed from S&P 500 vanilla options. We conclude by drawing implications for risk management in investment banks who have major exposure in vega risk. This research is a joint collaboration with Xue Fei He at RMI and Simon Acomb at MBS.

About the speaker

Ser-Huang Poon graduated from the National University of Singapore with a degree in Accountancy. She obtained her Masters degree in Accounting and Finance and PhD degree in Finance from Lancaster University, UK. She is now a Professor of Finance at Manchester Business School, UK. Professor Poon has written three books on “Volatility Modelling and Forecasting”, “Asset Pricing” and “Financial Modelling under Non-Gaussian Distributions”, and is currently writing two other books; one on “Modelling and Hedging Interest Rate Derivatives” and “Volatility Derivatives”. Professor Poon has published widely in both academic and practitioner journals. Her ability to reach both sets of audience is evidenced by her volatility review article published in the Journal of Economic Literature, which was cited on the Nobel web site as the reference reading in volatility. A companion paper was published in the Financial Analysts Journal and won the best paper prize in 2003. She has also won the FMA (taxes, 2008) best paper prize in Fixed Income Research for her work on Pricing GDP-linked Bonds. Professor Poon is currently the head of postgraduate research in Accounting and Finance at Manchester Business School, and she teaches volatility forecasting and trading to practitioners in London and in Singapore. She is a Board Member of the Numerical Algorithms Group (NAG). In 2008, she successfully led a consortia of 19 university and industry partners on an 3.7 million euro bid for research training in the theme of Risk Management and Risk Reporting.

Session 2: Abstract

We propose a two-sided jump model for credit risk by extending the Leland–Toft endogenous default model based on the geometric Brownian motion. The model shows that jump risk and endogenous default can have significant impacts on credit spreads, optimal capital structure, and implied volatility of equity options: (1) Jumps and endogenous default can produce a variety of non-zero credit spreads, including upward, humped, and downward shapes; interesting enough, the model can even produce, consistent with empirical findings, upward credit spreads for speculative grade bonds. (2) The jump risk leads to much lower optimal debt/equity ratio; in fact, with jump risk, highly risky firms tend to have very little debt. (3) The two-sided jumps lead to a variety of shapes for the implied volatility of equity options, even for long maturity options; although in general credit spreads and implied volatility tend to move in the same direction under exogenous default models, this may not be true in presence of endogenous default and jumps. Pricing formulae of credit default swaps and equity default swaps are also given. In terms of mathematical contribution, we give a proof of a version of the “smooth fitting” principle under the jump model, justifying a conjecture first suggested by Leland and Toft under the Brownian model.

This is a joint work with Steve Kou at Columbia University.

About the speaker

Professor Chen Nan graduated from the Department of Probability and Statistics at Peking University in 1998, and he received his Master of Science degree in Probability and Statistics in 2001 at Peking University, his Master of Philosophy and Ph.D degrees in 2006 at Columbia University, USA. He joined the Department of System Engineering and Engineering Management at the Chinese University of Hong Kong in 2006.