THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF APPLIED MATHEMATICS
應 用 數 學 系

Academy of Mathematics
and Systems Science

AMSS-PolyU Joint Research Institute
Distinguished Lecture on

Stochastic Change-point ARX-GARCH Models and Their Applications to Econometric Time Series

By Professor T.L.LAI

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Abstract

A long-standing problem in modeling volatilities of econometric time series is the separation of steady-state (long-run) and short-term volatilities. To address this problem, we consider two time scales and use the "short" time-scale to define GARCH dynamics and the "long" time-scale to incorporate parameter jumps. This leads to a Bayesian change-point ARX-GARCH model, whose unknown parameters may undergo occasional changes at unspecified times and can be estimated by explicit recursive formulas when the hyperparameters of the Bayesian model are specified. Efficient estimation of the hyperparameters is discussed and yields empirical Bayes estimates of the piecewise constant parameters in the stochastic change-point model. The empirical Bayes approach can be applied to the frequentist problem of partitioning the time series into segments under sparsity assumptions on the change-points. Simulation and empirical studies are presented to illustrate the advantages of the proposed model and methods over considerably more complicated stochastic volatility models with contemporaneous jumps in prices and their volatilities in the finance literature.

Biography

Tze Leung Lai is Professor of Statistics in the School of Humanities and Sciences, and by courtesy, of Health Research and Policy in the School of Medicine and of the Institute of Computational and Mathematical Engineering in the Engineering School of Stanford University. He is also Director of Financial Mathematics Program and the Financial and Risk Modeling Institute at Stanford, and Co-director of the Biostatistics Core of the Cancer Institute and the Center of Innovative Design at the School of Medicine. He received his B.A. (First Class Honours) in Mathematics from The University of Hong Kong in 1967 and his Ph.D. in Mathematical Statistics in 1971 from Columbia University, where he stayed on the faculty until he moved to Stanford University in 1987. He won the Committee of Presidents of Statistical Societies Award in 1983 and the Abraham Wald Prize in Sequential Analysis in 2005. He is an elected member of Academia Sinica, where he has been an Advisory Committee member of the Institute of Statistical Science since 1992.

He is also an Advisory Committee member of the Department of Statistics and Actuarial Science and of the Institute for Mathematical Research at HKU, and of the Statistics Center at Peking University and the Mathematical Sciences Center at Tsinghua University. He has published 9 books, 275 papers, and has supervised 64 Ph.D. students.

Date : 19 April 2013 (Friday)
Time : 3:00pm - 4:00pm (Tea reception at 4:15pm)
Venue : AG710, Chung Sze Yuen Building, PolyU

ALL ARE WELCOME !

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