

For favour of posting

DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE  
THE UNIVERSITY OF HONG KONG

Seminar

**Professor Valentin PATILEA**

CREST - ENSAI, France

will give a talk

entitled

## **TIME SERIES MODELS WITH TIME VARYING VARIANCE**

Abstract

In the first part of the talk we consider linear vector autoregressive (VAR) models where the innovations could be unconditionally heteroscedastic. The volatility structure is deterministic and quite general, including breaks or trending variances as special cases. In this framework we study the ordinary least squares (OLS), the generalized least squares (GLS) and adaptive least squares (ALS) procedures. The GLS estimator requires the knowledge of the time varying variance structure, while in the ALS approach the unknown variance is estimated by kernel smoothing with the outer product of the OLS residual vectors. We derive the asymptotic distribution of the proposed estimators for the VAR model coefficients and compare their properties. In particular we show that the ALS estimator is asymptotically equivalent to the infeasible GLS estimator. Using these results we build Wald tests for the linear Granger causality in mean which are adapted to VAR processes driven by errors with a nonstationary volatility. It is also shown that the commonly used standard Wald test for the linear Granger causality in mean is potentially unreliable in our framework.

In the second part of the talk we consider the problem of testing second order dynamics for univariate autoregressive processes in presence of time-varying variance. A benchmark approach is the stationary ARCH model of Engle (1982). Motivated by real data evidence, processes with non constant unconditional variance and ARCH effects have been recently introduced. We take into account such possible non stationarity and propose simple testing procedures for ARCH effects. Adaptive McLeod and Li's portmanteau and ARCH-LM tests for checking for second order dynamics are provided. The standard versions of these tests, commonly used by practitioners, suppose constant unconditional variance. We prove the failure of these standard tests with time-varying unconditional variance. The theoretical results are illustrated by mean of simulated and real data. The talk is based on joint work with Hamdi Raissi.

on

**Wednesday, July 6, 2016**

*(Refreshments will be served from 10:45 a.m. outside Room 301 Run Run Shaw Building)*

**11:00 a.m. – 12:00 noon**

at

**Room 301, Run Run Shaw Building**

**Visitors Please Note that the University has limited parking space. If you are driving please call the Department at 3917 2466 for parking arrangement.**

All interested are welcome