The Hong Kong Polytechnic University
Department of Applied Mathematics

Seminar
On

On the Estimation of Integrated Covariance Matrices of High Dimensional Diffusion Processes

by

Dr. Xinghua Zheng and Dr. Yingying Li
Hong Kong University of Science and Technology

Abstract

We consider the estimation of integrated covariance (ICV) matrices of high dimensional diffusion processes based on high frequency observations. We start by studying the most commonly used estimator, the realized covariance (RCV) matrix. We show that in the high dimensional case when the dimension p and the observation frequency n grow in the same rate, the limiting spectral distribution (LSD) of the RCV matrix depends on the covolatility process not only through the targeting ICV matrix, but also on how the covolatility process varies in time. We establish a Marcenko-Pastur type theorem for weighted sample covariance matrices, based on which we further establish a Marcenko-Pastur type theorem for RCV matrices for a class C of diffusion processes. The results explicitly demonstrate how the time-variability of the covolatility process affects the LSD of RCV matrix. We then propose an alternative estimator, the time-variation adjusted realized covariance (TVARCV) matrix. We show that for diffusion processes in class C, the TVARCV matrix possesses the desirable property that its LSD depends solely on that of the targeting ICV matrix through a Marcenko-Pastur equation.

Date : **22 July, 2011 (Friday)**

Time : **2:30 p.m. – 3:30 p.m.**

Venue : **Departmental Conference Room HJ610**
The Hong Kong Polytechnic University

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