



The University of Chicago

Department of Statistics

Seminar Series

JIANQING FAN

Department of Statistics

Princeton University

**“Nonparametric specification tests for
diffusion models in financial econometrics”**

MONDAY October 31, 2005 at 4:00 PM
133 Eckhart Hall, 5734 S. University Avenue

Refreshments following the seminar in Eckhart 110.

ABSTRACT

We develop a specification test for the transition density of a discretely-sampled continuous-time diffusion process, based on a comparison of a nonparametric estimate of the transition density or distribution function to their corresponding parametric counterparts assumed by the null hypothesis. Using the closed form expansions for the transition density, we are able to consider a direct comparison of the two densities for an arbitrary specification of the null parametric model. Using three different discrepancy measures between the null and alternative transition density and distribution functions, we simultaneously test the model's assumptions on the drift and diffusion functions. Our approach does not impose the assumption that the alternative model is a one-factor diffusion model and allows multi-factor stochastic volatility models or any stationary Markovian processes. In the case of many financial time series, such as interest rates or currencies, we avoid the near non-stationarity that can affect tests based on the marginal density of the process. We establish the asymptotic null distributions of proposed test statistics and compute their power functions. The finite sample properties are critically investigated via simulation studies and are compared with the test statistic of Hong and Li (2005). Our approaches are illustrated by applications to treasury bill data and implied volatility data.

(Based on the joint work with Yacine Ait-Sahahlia and Heng Peng)

Please send email to Mathias Drton (drton@galton.uchicago.edu) for further information. Information about building access for persons with disabilities may be obtained in advance by calling the department office at (773) 702-8333.