

DEPARTMENT OF STATISTICS COLLOQUIUM SERIES

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**MODEL SELECTION TESTING FOR DIFFUSION PROCESSES
WITH APPLICATIONS TO INTEREST RATE AND
EXCHANGE RATE MODELS**

ABSTRACT:

A model selection test for nonnested misspecified diffusion models is developed by using a criterion based on the Kullback-Leibler information criterion in a new asymptotic framework that accounts for the relative significance of diffusion functions for high frequency data. The test examines the hypothesis that two competing models are equivalent in the criterion. Our approach differentiates the roles of diffusion and drift functions and shows the equivalence of models must be understood differently depending on the sampling frequencies; it is of primary importance for a model to have a diffusion function close to the true diffusion function for superiority when the sampling frequency is high, and we compare drift functions if the models cannot be distinguished by the diffusion functions. As the sampling frequencies become higher, the diffusion functions are more important, and the informative signal for ranking the drift functions is weaker. The drift functions are useful only when we sample data for long enough. Our new asymptotics deals with the different rates of information in the diffusion and drift functions by considering both the sampling interval Δ and the sampling span T , and we show the sampling span must increase at a relative speed faster than Δ^{-2} (or $\Delta^2 T \rightarrow \infty$) to ensure sufficient information to be collected for distinguishing two models by their drift functions. The limiting distribution of the test statistic is normal, and we compare different asymptotic approximations to the sampling distribution of the test statistic using the subsampling, and the nonparametric block bootstrap methods, as well as the standard normal approximation for the test statistics standardized by the heteroskedasticity autocorrelation consistent variance estimators. We apply our test to the model selection problems for spot interest rate models and exchange rate models. We find that many popular models are observationally equivalent.

Joint work with Jeong (Indiana U) and Joon Y. Park (Indiana U).

DATE: Thursday, November 5, 2009

TIME: 11:10 a.m. – 12:10 p.m.

PLACE: Room 150, Blocker

Refreshments will be served in the Statistics Conference Room at 10:30 am for those attending the seminar.