

STATISTICS COLLOQUIUM

THURSDAY, May 9, 2013

TALK: 4:15 PM — SCIENCE CENTER RM. 705

RECEPTION: 3:50 PM — SCIENCE CENTER, 7TH FLOOR

“A Time Dynamic Pair Copula Construction”

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ABSTRACT

A recent technology in the statistics and econometrics literature is the Pair Copula Construction (PCC), an extremely flexible modeling technique for capturing complex, but static, multivariate dependency. There are several available tools for time varying bivariate copulas, but none for time varying multivariate copulas in more than two dimensions. We use a Bayesian framework to extend the PCC to account for time dynamic dependence structures, introducing time dynamics to the multivariate copula through its PCC decomposition. In particular, we model the time series of a transformation of select parameters of the PCC as an autoregressive time series model and conduct inference using a Markov Chain Monte Carlo (MCMC) algorithm. The Bayesian approach proves to be a powerful tool for estimating parameters, despite some additional computational effort. We use financial data to illustrate empirical evidence for the existence of time dynamic dependence structures, to show improved out-of-sample forecasts for our time dynamic PCC relative to the current time static PCC models, and to compare the relative performance of dynamic and static PCC models for Value at Risk (VaR) measures.