



UNIVERSITÄT  
HEIDELBERG  
ZUKUNFT  
SEIT 1386



# HeiKaMEtrics-Seminar

Joint Heidelberg, Karlsruhe and Mannheim research seminar in Econometrics

---

## Factor State-Space Models for High-Dimensional Realized Covariance Matrices of Asset Returns

**Roman Liesenfeld**  
Universität zu Köln

Monday, December 18, 2017  
13:30 – 14:30  
AWI Room 00.010

### **Abstract:**

We propose a flexible matrix-variate state-space model for the prediction of high-dimensional covariance matrices of asset returns based on observable common factors such as the three Fama-French factors. In this model the latent joint covariance matrix of the assets and the common factors is observed through the corresponding realized covariance matrix with a measurement density which is assumed to be a central Wishart. By imposing a factor structure the covariance matrix of the assets is decomposed into a low-rank component driven by the covariance matrix of the factors and a diagonal residual covariance matrix. In this decomposition we allow for dynamic variation in the factor and residual covariance as well as in the factor loadings. This decomposition translates into a convenient factorization of the Wishart measurement density which greatly simplifies statistical inference in high-dimensional applications. The proposed model can be analyzed using Bayesian MCMC procedures and exploiting computational parallelization techniques enables a fast, scalable and numerically precise statistical inference. An empirical application to realized covariance matrices for 60 NYSE traded stocks shows that the model performs very well in- and out of sample.

(Bastian Gribisch, Jan Patrick Hartkopf, and Roman Liesenfeld)