

Fitting dynamic factor models to nonstationary time series

Abstract Michael Eichler:

We review current approaches for fitting dynamic factor models to nonstationary time series. These approaches are based on dynamic principal components analysis in the frequency domain. They are fully nonparametric and depend strongly on the chosen bandwidths for smoothing over frequency and time. As an alternative, we propose a semiparametric approach in which only parts of the model are allowed to be time-varying. More precisely, we consider two specifications: first, the latent factors admit a dynamic representation with time-varying autoregressive coefficients while the loadings are constant over time. Second, the factor model is stationary while the loadings are time-varying.

Estimation of the model parameters is accomplished by application of the EM algorithm and the Kalman filter. The time-varying parameters are modelled locally by polynomials and estimated by maximizing the likelihood locally. Simulation results show that compared to estimation of the factors by principal components our approach produces superior results in particular for small cross-sectional dimension. We illustrate our approach also applications to real data.