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Multivariate Stochastic Volatility Models: a Probabilistic Principal Component Analysis Approach

Many financial time series exhibit changing variance and this can have important consequences in formulating economic or financial decisions. We propose a parsimonious multivariate stochastic volatility model to describe this time varying property. The model is formulated based on probabilistic principal component analysis. Non-zero correlations are permitted among innovations and between those of the asset returns and volatility dynamics. A Gibbs method is derived under a Bayesian framework to estimate the parameters and log volatilities. Simulation studies and application to real data illustrate how the model and proposed approach work.