Realized stochastic volatility with leverage and long memory

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Abstract

The daily return and the realized volatility are simultaneously modeled in the stochastic volatility model with leverage and long memory. In addition to the stochastic volatility model with leverage for the daily returns, ARFIMA process is jointly considered for the realized volatilities. Using a state space representation of the model, we estimate parameters by Markov chain Monte Carlo methods. Model comparison with similar realized stochastic volatility models with short memory is conducted by computing marginal likelihood.

Main results using SP500 daily returns, realized volatilities are: (1) ARFIMA(1,d,1), ARFIMA(1,d,0), and ARFIMA(0,d,1) with lag 40, 50 outperform short memory. (2) ARFIMA(1,d,1), ARFIMA(1,d,0), and ARFIMA(0,d,1) with the same lags are found to be similar with respect to marginal likelihood.

Key word: ARFIMA; bias adjustment; leverage effect; long memory; marginal likelihood; Markov chain monte carlo; mixture sampler; realized volatility; realized kernel; realized stochastic volatility model; state space model;

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