Realized Matrix-Exponential Stochastic Volatility with General Asymmetry, Long Memory and Spillovers

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Abstract

The paper develops a novel realized matrix-exponential stochastic volatility model of multivariate returns and realized covariances that incorporates asymmetry and long memory (hereafter the RMESV-ALM model). The matrix exponential transformation guarantees the positive definiteness of the dynamic covariance matrix. Efficient importance sampling is used to maximize the likelihood function of RMESV-ALM, and the finite sample properties of the quasi-maximum likelihood estimator of the parameters are analysed. Using high frequency data for three US financial assets, the new model is estimated and evaluated. The forecasting performance of the new model is compared with a novel dynamic realized matrix-exponential conditional covariance model. The volatility and co-volatility spillovers are examined via the news impact curves and the impulse response functions from returns to volatility and co-volatility.