

Statistics and Data Science Seminar

Econometric analysis of multivariate realised QML: estimation of the covariation of equity prices under asynchronous trading

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Abstract: Estimating the covariance between assets using high frequency data is challenging due to market microstructure effects and asynchronous trading. In this paper we develop a multivariate realised quasi-likelihood (QML) approach, carrying out inference as if the observations arise from an asynchronously observed vector scaled Brownian model observed with error. Under stochastic volatility the resulting realised QML estimator is positive semi-definite, uses all available data, is consistent and asymptotically mixed normal. The quasi-likelihood is computed using a Kalman filter and optimised using a relatively simple EM algorithm which scales well with the number of assets. We derive the theoretical properties of the estimator and prove that it achieves the efficient rate of convergence. The estimator is also analysed using Monte Carlo methods and applied to equity data with varying levels of liquidity.

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