

Integrated Variance Estimation for Assets Traded in Multiple Venues

Dr. Karsten Schweikert

Abstract

We identify a novel form of multiplicative market microstructure noise, referred to as fragmentation noise, which arises when the same asset is traded across multiple venues and information about the efficient price is dispersed across markets. We demonstrate that conventional estimators, such as realized variance and other well-established noise-robust methods, yield inconsistent estimates in the presence of fragmentation noise. To address this estimation issue, we propose a two-step estimator. In the first step, we use estimates of the drift to remove the fragmentation noise. In the second step, we apply the realized variance, bipower variation, or pre-averaging estimators, depending on the presence of jumps or additive market microstructure noise, to consistently estimate the integrated variance. We derive the asymptotic distribution of the two-step estimator under each specification and evaluate its performance through extensive simulations. An application to the constituents of the DJIA reveals that our two-step estimator outperforms the alternative univariate estimators under consideration.