Inference about Realized Volatility using Infill Subsampling

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Abstract

We investigate the use of subsampling for conducting inference about quadratic variation of a discretely observed diffusion process under an infill asymptotic scheme. The subsampling method of Politis and Romano (1994) has been shown to be useful in many situations as a way of conducting inference under weak assumptions and without utilizing knowledge of limiting distributions. We show that this method of is inconsistent in our case. Recently, the word subsampling has been used in connection with the estimation of quadratic variation of a semimartingale subject to market microstructure noise, see Zhang, Mykland, and Aït-Sahalia (2005) and Barndorff-Nielsen and Shephard (2007). We show that this method does not deliver consistent inference for quadratic variation, due to high correlation between estimators on different subsamples. We discuss an alternative along this line that does not have this correlation problem, however, it has a vanishing bias only under smoothness assumptions on the volatility path. Finally, we propose a subsampling scheme that delivers consistent inference for the volatility process without any smoothness assumptions. This is a general method, and one could potentially apply it to conduct inference for quadratic variation in the presence of jumps (by subsampling tri-power quarticity). Also, one could include microstructure noise that is not neccessarity i.i.d. and independent from the latent price (by subsampling appropriate consistent estimator of QV). One could also include both componenets, jumps and noise (see work of Mark Podolskij).