Fourier estimation of stochastic leverage using high frequency data

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Abstract

We consider a general stochastic volatility model driven by continuous Brownian semimartingales and we define a non-parametric estimator of the stochastic leverage process defined by means of the covariance between the price and the volatility process. Our estimation procedure is based only on a pre-estimation of the Fourier coefficients of the volatility process and on the use of the Bohr convolution product as in Malliavin and Mancino 2009. This approach constitutes a novelty in comparison with the non-parametric leverage estimators proposed in the literature generally based on a pre-estimation of the spot volatility. The estimator is proved to be consistent and in virtue of its definition it can be directly applied to estimate the leverage effect in the case of irregular trading observations of the price path and microstructure noise contaminations.

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Keywords: leverage, non-parametric estimation, semi-martingale, Fourier transform, high frequency data.

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