

Efficient Estimation of the Continuous Time Stochastic Volatility Model Via the Empirical Characteristic Function

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This paper proposes an efficient estimation procedure of the continuous-time asset return process with stochastic volatility via the empirical characteristic function. With the squared-root specification of the conditional volatility process, we show that while the likelihood function of the asset return process does not have closed form, the characteristic function can be derived analytically. Thus the model can be estimated by matching the analytical characteristic function derived from the model to the empirical characteristic function calculated from the sampling observations. Since there is an exact one-to-one relationship between the characteristic function and the distribution function, with optimally chosen weighting function the empirical characteristic function method has the same asymptotic efficiency as the maximum likelihood estimation method. An application of the method is undertaken for the stochastic volatility model of the S&P 500 index returns.

JEL Classification: C13, C22, C52, G10

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