Realized stochastic volatility with skew-t error*

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Abstract

Realized stochastic volatility (RSV) models with two types of skew-t distributions are introduced. The first one is the generalized hyperbolic skew-t distribution which includes normal and Student's t distributions as special cases. The other one is Azzalini's skewed distribution which includes a skew-normal distribution as well as the normal and Student's t as special cases. The RSV models with these distributions, along with the Bayesian estimation scheme via a Markov chain Monte Carlo method, allow flexible modeling of the skewness and heavy tail in the distribution of financial asset returns conditional on the latent volatility. The models are applied to US and Japanese stock indices: Dow Jones Industrial Average (DJIA) in 2000–2011 and Nikkei 225 in 1997–2010. The estimation results support the negative skewness in the conditional return distribution for DJIA but not for Nikkei 225 and do not support the heavy tail for both data. Moreover, the marginal likelihood comparison shows that the RSV model with Azzalini's skew-normal distribution performs well for both DJIA and Nikkei 225.

JEL classification: C11, C58.

Keywords: realized volatility, stochastic volatility, Markov chain Monte Carlo, skewed distributions.

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