

Asymmetry in Stochastic Volatility Models: Threshold or Correlation?*

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Abstract

We compare the ability of correlation and threshold effects in a stochastic volatility model to capture the asymmetric relationship between stock returns and volatility. The parameters are estimated using maximum likelihood based on the extended Kalman filter and uses numerical integration over the latent volatility process. The stochastic volatility model with only correlation does a better job of capturing asymmetry than a threshold stochastic volatility model even though it has fewer parameters. We develop a stochastic volatility model that includes both threshold effects and correlated innovations. We find that the general model with both threshold effects and correlated innovations dominates purely threshold and correlated models. In this augmented model volatility and returns are negatively correlated, and volatility is more persistent, less volatile and higher following negative returns even after counting for the negative correlation.

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