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Title	Employing Bayesian Forecasting of Value-at-Risk to Determine an Appropriate Model for Risk Management
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Abstract	To allow for a higher degree of flexibility in model parameters, we propose a general and time-varying nonlinear smooth transition (ST) heteroskedastic model with a second-order logistic function of varying speed in the mean and variance. This paper evaluates the performance of Value-at-Risk (VaR) measures in a class of risk models, specially focusing on three distinct ST functions with GARCH structures: first- and second-order logistic functions, and the exponential function. The likelihood function is non-differentiable in terms of the threshold values and delay parameter. We employ Bayesian Markov chain Monte Carlo sampling methods to update the estimates and quantile forecasts. The proposed methods are illustrated using simulated data and an empirical study. We estimate VaR forecasts for the proposed models alongside some competing asymmetric models with skew and fat-tailed error probability distributions, including realized volatility models. To evaluate the accuracy of VaR estimates, we implement two loss functions and three backtests. The results show that the ST model with a second-order logistic function and skew Student's t error is a worthy choice at the 1% level, when compared to a range of existing alternatives.
Keywords	Second-order logistic transition function; Backtesting; Markov chain Monte Carlo methods; Value-at-Risk; Volatility forecasting; Realized volatility models
JEL	C22, C58, G17