

Stochastic Modelling of Volatility and Inter-relationships in the Australian Electricity Markets

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Abstract

To model the price and price volatilities of the Australian wholesale spot electricity markets, the univariate generalised autoregressive conditional heteroskedasticity (GARCH) models have been applied and the inter-relationships in these markets are modelled using multivariate GARCH models. Stochastic volatility (SV) models, as flexible alternatives to GARCH models, have demonstrated their superiority in many financial applications. However, the use of SV models in the modelling of electricity markets is still quite limited. This paper investigates existing multivariate SV models and proposes new SV models with skew error distributions, to model the price and price volatilities of three pairs of markets, selected from four regional electricity markets in Australia, which are shown to be highly correlated in a previous study (Higgs, 2009). Bayesian approach using Markov chain Monte Carlo (MCMC) method is adopted and model implementation is done using the software WinBUGS. Empirical results show that the price and volatilities of selected markets are strongly correlated across different pairs of regional markets. Based on Deviance Information Criterion, the models with skew error distributions perform better than those with symmetric distribution.

Keywords: Australian electricity price markets; Bivariate SV models; Skew t distribution.