

## FULL BAYESIAN INFERENCE FOR ASYMMETRIC GARCH MODELS WITH STUDENT-T INNOVATIONS

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This paper was motivated by the intrinsic difficulties which arise in the estimation of Student-t model parameters. In particular, these difficulties may lead to poor predictions in time series analysis. The Student-t model is well known for its robust properties. However, estimations have not been correctly done in many settings, including time series analysis.

In this work we consider modeling the past volatilities through an asymmetric generalized autoregressive conditional heteroskedasticity (Garch) model with heavy tailed sampling distributions. In particular, we consider the Student-t model with unknown degrees of freedom and indicate how it may be used adequately from a Bayesian point of view in the context of smooth transition models for the variance. We adopt the full Bayesian approach for inference, prediction and hypothesis testing. We discuss problems related to the estimation of degrees of freedom in the Student-t model and propose a solution based on independent Jeffreys priors which correct problems in the likelihood function. A simulated study is presented to investigate how estimation of model parameters in the Student-t Garch model are affected by small sample sizes, prior distributions and misspecification regarding the sampling distribution. An application to the Dow Jones stock market data illustrates the usefulness of the asymmetric GARCH model with Student-t errors. In this context, the Student-t model is preferable for prediction in the case of high volatility regimes.

## EXECUTIVE SUMMARY