The Skewed-T Distribution with Generalized Autoregressive Score Processes in Modelling the Stock Return Dynamics

Kuang-Liang Chang
Department of Political Economy, National Sun Yat-sen University, Kaohsiung, Taiwan

Abstract

It is well known the dynamic of stock returns is notoriously volatile and influenced by various internal and external factors, making accurate forecasting extreme challenging. The characteristics of stock returns include autocorrelation in stock returns, time-varying volatility in stock returns, and time-varying skewed shape in stock return distribution, making the dynamic process time-dependent. In order to take these characteristics into account, this paper extends the specification of Gao and Zhou (2016), which combines the dynamic conditional score model and the skewed-student distribution of Fernandez and Steel (1998), by allowing that the time-varying dynamics are present not only in the variation but also in the asymmetry. It has been documented the well-known GARCH model is a specifical case of the generalized autoregressive score process (GAS), which is constructed based on the score of likelihood function. It is now common to employ the GAS process to update the time-varying coefficients. In this paper, the conditional volatility and the asymmetry of the skewed-t distribution are governed by GAS processes. The empirical result shows that the GAS processes for volatility and asymmetry of aggregate stock return for developed countries vary depending on whether the daisy or weekly data is used.

Keywords

GARCH, Skewed-T, GAS, stock returns.