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Skewness in the conditional distribution of daily equity returns

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Abstract

The conditional distribution of asset returns is important for a number of applications in finance, including financial risk management, asset pricing and option valuation. In the GARCH framework, it is typically assumed that returns are drawn from a symmetric conditional distribution such as the normal, Student-t or power exponential. However, the use of a symmetric distribution is inappropriate if the true conditional distribution of returns is skewed. This study models the conditional distribution of daily returns in five international equity market indices and a world equity index using the skewed generalised-t (SGT) distribution, a distribution that allows for a very wide range of skewness and kurtosis, and which nests the three most commonly used distributions as special cases. It is shown that the use of a conditional SGT distribution offers a substantial improvement in the fit of both GARCH and EGARCH models. Moreover, for both models, the study strongly rejects the restrictions on the SGT that are implied by

the normal, Student-t and power exponential distributions. With the GARCH specification, the conditional distribution is negatively skewed for all six series. However, for three of these series – namely the US, Japan and the World index – this skewness can be explained by leverage effects, which are captured by the EGARCH model. For the remaining three series – the UK, Canada and Germany – the skewness in the conditional distribution of returns remains even after allowing for leverage effects.

Notes

[1] See also Liu and Brorsen (1995), Mittnik et al. (1997, 1998a,b) and Mittnik and Rachev (2000).

[2] The focus of Hansen (1994) is modelling time variation in the kurtosis and skewness of returns, but he also estimates models that have constant skewness and kurtosis.

[3] To facilitate statistical inference, the table reports the transformed skewness parameter and its standard error. The true skewness parameter can be retrieved by inverting Equation 10.

The Message in Daily Exchange Rates

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