

Modeling Asymmetric Volatility Clusters using Copulas and High Frequency Data

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Abstract

Volatility clustering is a well-known stylized feature of financial asset returns. In this paper, we investigate the asymmetric pattern of volatility clustering on both the stock and foreign exchange rate markets. To this end, we employ copula-based semi-parametric univariate time-series models that accommodate the clusters of both large and small volatilities in the analysis. Using daily realized volatilities of the individual company stocks, stock indices and foreign exchange rates constructed from high frequency data, we find that volatility clustering is strongly asymmetric in the sense that clusters of large volatilities tend to be much stronger than those of small volatilities. In addition, the asymmetric pattern of volatility clusters continues to be visible even when the clusters are allowed to be changing over time, and the volatility clusters themselves remain persistent even after forty days.

Keywords: Volatility Clustering, Copulas, Realized Volatility, High-frequency Data.

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