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Modelling volatility recurrence intervals in the Chinese commodity futures market

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Abstract

The law of extreme event occurrence attracts much research. The volatility recurrence intervals of Chinese commodity futures market prices are studied: the results show that the probability distributions of the scaled volatility recurrence intervals have a uniform scaling curve for different thresholds q . So we can deduce the probability distribution of extreme events from normal events. The tail of a scaling curve can be well fitted by a Weibull form, which is significance-tested by KS measures. Both short-term, and long-term, memories are present in the recurrence intervals with different thresholds q , which denotes that the recurrence intervals can be predicted. In addition, similar to volatility, volatility recurrence intervals also have clustering features. Through Monte Carlo simulation, we artificially synthesise ARMA, GARCH-class sequences similar to the original data, and find out the reason behind the clustering. The larger parameter d of the FIGARCH model is, the stronger the clustering effect. Finally, we use the Fractionally Integrated Autoregressive Conditional Duration model (FIACD) to analyse the recurrence interval characteristics. The results indicated that the FIACD model may provide a method with which to analyse volatility recurrence intervals.

Keywords:

Recurrence interval; Weibull function; Memory; Clustering; Monte Carlo simulation.

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