FLUCTUATION OF AUTOCORRELATION IN CRUDE OIL PRICE

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Overview

There is autocorrelation in crude oil price due to price inertia, cobweb theorem, error of models or other reasons (Panas, 2000; Adrangia, 2001; Alvarez-Ramirez, 2002). Lots of scholars have studied the fluctuation of crude oil price (Pindyck, 1999; Yang, 2002; Abosedra, 2004; Knetsch, 2007; Lee， 2010), but few focus on the fluctuation of autocorrelation in crude oil price. If we find the fluctuating rules of autocorrelation, we can get a better understanding of the fluctuating mechanism of crude oil price.

Methods

In order to study the role of fluctuating modes of autocorrelation in crude oil price which has time series characters, this paper selected international crude oil spot price as sample data to do a research, using the method of statistical physics. The fluctuating modes of autocorrelation were defined by autocorrelation coefficient, symbolization and coarse-graining process. We set modes as nodes and the transformation between modes as edges, and then the fluctuating modes network of autocorrelation was built. Thus the study of fluctuation of autocorrelation was transformed to network research.

Results

Then some problems, such as statistical properties, behavior of "small world" and transmission medium in the network could be analyzed by complex network theory and analytical method. The periodicity of fluctuation was calculated by spectral analysis method in discussion. A few of fluctuating modes were major forms of autocorrelation fluctuation. The average transition distance was 3.5 and the transformation probability can be calculated according to shortest path analysis. The role of transmission medium was caught by hierarchy of structural holes.

Conclusions

An advantage of this method is in describing the fluctuation of time series more exact because we have divided the time series by sliding windows of data in a microscopic perspective. This research not only describes the fluctuation of time series more exact but also provides idea for research method of fluctuation of univariate autocorrelation.

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