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## 基于贝叶斯Wishart波动模型的原油市场与股市动态相依性研究

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### The Dynamic Dependence Between Crude Oil Market and Stock Market Based on Bayesian Wishart Multivariate Stochastic Volatility model

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摘要

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**摘要** 针对时变相关系数矩阵在多变量随机波动模型的估计问题, 构建了贝叶斯动态相关Wishart波动模型。在CC-MSV模型的基础上, 设置精度矩阵服从Wishart分布, 使得模型的相关系数矩阵具有时变特征。通过模型的统计结构分析, 选择参数先验分布, 设计相应的Gibbs-MTM-ARMS混合算法, 据此估计模型参数; 并利用上证综合指数、标普500指数与原油期货价格数据进行实证分析。研究结果表明: 模型能够有效地刻画原油市场与股票市场的动态相依性; 金融危机期间, 股票市场与原油市场的相关性较强, 并且难以判断正负方向; 金融危机后, 中国股票市场与原油市场呈现极微弱的相关性, 而美国股票市场与原油市场的正相关性较为明显。

**关键词:** 动态相依性 随机波动 贝叶斯分析 Wishart分布 Gibbs-MTM-ARMS混合算法

**Abstract:** Bayesian dynamic correlation Wishart volatility model is established in this paper to address estimation problem of time-varying coefficient matrix in multivariate stochastic volatility. In order to make the correlation coefficient matrix incorporated time-varying characteristics, the precision matrices in CC-MSV models are set to following the Wishart distribution. Based on the analysis of statistic structure of model and the selection of parameters prior, the Gibbs-MTM-ARMS sampling algorithm method is utilized to estimate model parameters. The empirical research applies the data of Shanghai Composite Index, S&P500 and crude oil future price. The research results show that the correlation between crude oil market and stock market is strong during the financial crisis, but it is difficult to identify the direction. Further, after the financial crisis, the U.S. stock market is obviously positive correlated with crude oil market, while the correlation between China stock market and crude oil market is very weak. All those indicate that models used in this paper can effectively depict the dynamic dependency between crude oil market and stock market.

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