期貨的最佳預測模型與交易策略

-結合時間序列與Lévy模型

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摘要

我們針對期貨價格的報酬率來找尋最佳的預測模型和交易策略，透過 (1) 結合
ARMA-GARCH和創新的Lévy模型(the Jump Diffusion (JD), Generalized Hyperbolic
(GH), Hyperbolic, Normal Inverse Gaussian (NIG), Variance Gamma (VG), GH Skewed
T, Student t, Classical Tempered Stable (CTS), CGMY 和 Hansen's Skewed T) (2) 使
用樣本內的資料來估計模型的參數然後對樣本外的資料進行預測，並且同時把焦點
放在模型殘差的偏態、峰態、厚尾還有波動度聚集的現象 (3) 以道瓊股價指數期貨
1999年12月16日到2010年8月17和台灣股價指數期貨1999年12月16日到2010年9月13
日的日資料進行實證分析和績效的比較 。

實證的結果顯示，結合ARMA-GARCH和殘差為Lévy的模型會比結合
ARMA-GARCH和殘差為常態分配的模型有更好的交易績效和更高的勝率。另外，
為了使模型更加穩健，我們除了使用5天的移動式窗以外，也使用30天的移動式窗進
行實證分析，而實證的結果大部分都顯示Lévy-ARMA-GARCH模型的預測能力和交
易績效會比Normal-ARMA-GARCH模型還要更好。

關鍵詞：時間序列模型、標準化的 Lévy 過程、交易法則、道瓊股價指數期貨、台灣
股價指數期貨。

Optimal Forecasting Models and Trading Strategies of the Futures -Time Series Models with Standard Lévy Process

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Abstract

We address forecasting and trading strategy by (1) considering a ARMA-GARCH model with standard Lévy process innovations: the Jump Diffusion (JD), Generalized Hyperbolic (GH), Hyperbolic, Normal Inverse Gaussian (NIG), Variance Gamma (VG), GH Skewed T, Student"s t, Classical Tempered Stable (CTS), CGMY as well as Hansen's Skewed T, (2) estimating the model with a sample including 10 years of daily data (including in sample and out of sample), principally focused on the innovation"s skewness, leptokurtosis, fat tails as well as the time varying volatility, and (3) testing empirically the performance of these models for the Dow Jones Industrial average (DJIA) Index Futures during December 16, 1999 to August 17, 2010 and Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX) Futures during December 16, 1999 to September 13, 2010 with moving windows. Moreover, we do the futures price forecasting and building a trading rule to make positive profits.

The empirical results show that using the ARMA-GARCH model with standard Lévy process innovations for forecasting and trading strategy generates significantly higher profits and greater directional accuracy than those based on normal innovations. To robust the ARMA-GARCH models with various distributions, by moving windows method, we consider 5 days moving window and 30 days moving window, and make the similar results. Therefore, Lévy-ARMA-GARCH models seem to be better in both the forecasting ability and strategy performance than Normal-ARMA-GARCH model.

Keywords: ARMA-GARCH model, standard Lévy process, trading rule, Dow Jones Industrial average Index Futures, Taiwan Stock Exchange Capitalization Weighted Stock Index Futures

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