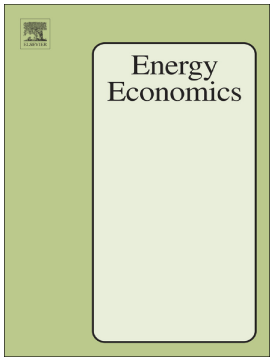

A Markov switching long memory model of crude oil price return volatility

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A Markov switching long memory model of crude oil price return volatility

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Abstract

I propose a time series model that simultaneously captures long memory and Markov switching dynamics to analyze and forecast oil price return volatility. I compare the fit and forecasting performance of the model to that of a range of linear and nonlinear GARCH models widely adopted in the literature. Complexity-penalized likelihood criteria show that the Markov switching long memory model improves the description of the data. The out-of-sample results at several time horizons show that the model produces superior forecasts over those obtained from the selected GARCH competitors. Results are obtained using Patton's robust loss functions and the Hansen's superior predictive ability test. I conclude that the proposed model provides a useful alternative to the usually employed GARCH models.

Key words: Crude oil volatility; Long memory; Markov switching; GARCH modelling; Volatility forecast.

JEL classification: Q47; C32; C52.

1 Introduction

Volatility forecasts are of paramount importance in risk management, derivative pricing and hedging, market making, market timing, portfolio selection and many other financial activities. Therefore in recent years a myriad of studies have devoted many efforts on modelling and forecasting the conditional variance. Many volatility models were developed starting with the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model introduced by Engle (1982) and Bollerslev (1986). This

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