Ann. Inst. Statist. Math.
Vol. 57, No. 1, 83–103 (2005)

JOINT MODELING OF COINTEGRATION AND CONDITIONAL HETEROSCEDASTICITY WITH APPLICATIONS

HEUNG WONG[1], W. K. LI[2] AND SHIQING LING[3]

[1]*Department of Applied Mathematics, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China*
[2]*Department of Statistics and Actuarial Science, The University of Hong Kong, Pokfulam Road, Hong Kong, China*
[3]*Department of Mathematics, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, China*

(Received August 15, 2003; revised March 30, 2004)

Abstract. A cointegrated vector AR-GARCH time series model is introduced. Least squares estimator, full rank maximum likelihood estimator (MLE), and reduced rank MLE of the model are presented. Monte Carlo experiments are conducted to illustrate the finite sample properties of the estimators. Its applicability is then demonstrated with the modeling of international stock indices and exchange rates. The model leads to reasonable financial interpretations.

Key words and phrases: Cointegration, full rank maximum likelihood estimator, least squares estimator, partially nonstationary, reduced rank MLE, vector AR-GARCH model.