Influence of deterministic trend on the estimated parameters of GARCH(1,1) model

CĂLIN VAMOŞ AND MARIA CRĂCIUN

ABSTRACT.

The log returns of financial time series are usually modeled by means of the stationary GARCH(1,1) stochastic process or its generalizations which can not properly describe the nonstationary deterministic components of the original series. We analyze the influence of deterministic trends on the GARCH(1,1) parameters using Monte Carlo simulations. The statistical ensembles contain numerically generated time series composed by GARCH(1,1) noise superposed on deterministic trends. The GARCH(1,1) parameters characteristic for financial time series longer than one year are not affected by the detrending errors. We also show that if the ARCH coefficient is greater than the GARCH coefficient, then the estimated GARCH(1,1) parameters depend on the number of monotonic parts of the trend and on the ratio between the trend and the noise amplitudes.

REFERENCES

[1] Bollereslev, T., *Generalized autoregressive conditional heteroskedasticity*, Journal of Econometrics, **31** (1986), 307-328
[2] Mantegna, R.N. and Stanley, H.E., *An Introduction to Econophysics, Correlations and Complexity in Finance*, Cambridge University Press, Cambridge, 2000
[3] Mikosch, Th. and Stărică, C., *Is it really long memory we see in financial returns?*, in Extremes and Integrated Management, (P. Embrechts et al. Eds.), Risk Books, UBS Warburg, 2000
[4] Stărică, C., *Is GARCH(1,1) as good a model as the Nobel prize accolades would imply?*, Preprint, Chalmers University of Technology, Gothenburg, 2003
[5] Stărică, C. and Granger, C., *Nonstationarities in Stock Returns*, The Review of Economics and Statistics **87** (2005), No. 3, 503-522

"T. POPOVICIU" INSTITUTE OF
NUMERICAL ANALYSIS
ROMANIAN ACADEMY
P.O. BOX 68-1
400110 CLUJ-NAPOCA, ROMANIA
E-mail address: cvamos@ictp.acad.ro
E-mail address: craciun@ictp.acad.ro