Unit Root-type Processes: Integrated Threshold-GARCH(1, 1) and Near-unit Root AR(1)

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Abstract

Two unit root-type processes are discussed. First, an integrated process in threshold GARCH is presented. Contrasted with standard GARCH, threshold GARCH (TGARCH) models accommodate asymmetric volatilities accounting for leverage effects in financial time series. Similar to IGARCH, integrated threshold GARCH process is defined and is named as I-TGARCH in which current volatility remains in all future volatilities. Some statistical properties of I-TGARCH are reported. The Korea stock prices index (KOSPI) is analyzed for illustration. Second, we consider various near-unit root AR(1) processes where autoregressive parameter converges to one (at various rates) as the sample size tends to infinity. The convergence direction is either from stationarity to unit root or from explosive case to unit root. Asymptotic distribution for the least squares estimator of the autoregressive parameter is derived and it is shown that the asymptotic distribution produces a bias when errors are correlated.

Key words: Integrated Process; Threshold GARCH; Near-unit root AR(1).