

# Testing second order dynamics for autoregressive processes in presence of time-varying variance

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(Joint work with Valentin Patilea.)

The problem of the volatility specification for stable autoregressive processes is investigated. A benchmark approach is the stationary ARCH model introduced by Engle (1982). Motivated by empirical evidence from time series applications, processes which exhibit non constant unconditional variance and ARCH effects have been recently introduced. In this paper we consider such non stationary specifications and we propose simple procedures for testing for the presence of ARCH effects. Noting that the squared residuals are uncorrelated when a deterministic function is used to describe the unconditional volatility, adaptive McLeod and Li's portmanteau and ARCH-LM tests for checking for second order dynamics are provided. Moreover, the failure of the standard versions of these two tests for checking the presence of second order dynamics in series with time-varying unconditional variance is underlined. The theoretical results are illustrated by mean of Monte Carlo experiments and considering real US economic and financial data sets.