Persistence characteristics in financial prices:

Evidence from the Portuguese stock market returns

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Abstract

The objective of this article is to provide additional knowledge to the discussion of long-term memory, leaning over the behavior of the main Portuguese stock index. The first four moments are calculated using time windows of increasing size and sliding time windows of fixed size equal to 50 days and suggest that daily returns are non-ergodic and non-stationary. Seeming that the series is best described by a fractional Brownian motion approach, we use the rescaled-range analysis (R/S) and the detrended fluctuation analysis (DFA). The findings indicate evidence of long term memory in the form of persistence. This evidence of fractal structure suggests that the market is subject to greater predictability and contradicts the efficient market hypothesis in its weak form. This raises issues regarding theoretical modeling of asset pricing. In addition, we carried out a more localized (in time) study to identify the evolution of the degree of long-term dependency over time using windows 200-days and 400-days. The results show a switching feature in the index, from persistent to anti-persistent, quite evident from 2010.

Keywords: Long-term memory; Persistence; Hurst exponent; Rescaled-range analysis; Detrended fluctuation analysis; Econophysics.