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STUDYING FRACTAL STRUCTURE IN PORTUGUESE FUTURES MARKET

Amílcar Serrão
Associate Professor at Management Department in Evora University.
Current address: Evora University, Management Department, Largo dos Colegiais
7000-554 Evora, Portugal E-mail: aserrao@uevora.pt

ABSTRACT

This paper is concerned with the random walk generated by the Brownian motion and its objective is to determine if Portuguese Futures prices satisfy the Brownian motion assumption. In alternative, this study is interested in determining if Brownian motion is fractal.

An approach is developed to test specifically for random walk using a times series stationarity test in addition to a variance test or a conventional R-S analysis. This study takes the position that a true test for a random walk is a joint test of stationarity and fractal structure.

The results show that the null hypotheses of stationary increments and the Hurst coefficient (H = 0.5) can not generally be rejected. These two hypotheses are sufficient to show that Portuguese Futures prices follow a random walk process as well the unadjusted Hurst-Mandelbrot R-S test. These results indicate that Portuguese Futures prices are consistent with Brownian motion.

The more prudent conclusion of this study, in order to avoid the possibility of Type II error, is that the results are consistent with the statistical requirement of non-fractal Brownian motion, rather than the more definitive conclusion that the data are a Brownian motion.

Key words: Random Walk, Brownian Motion, Fractal, Futures prices, Oporto Futures Exchange.