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Evidence of long range dependence in Asian equity markets: the role of liquidity and market restrictions

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Abstract

In this paper, the efficient market hypothesis is tested for China, Hong Kong and Singapore by means of the long memory dependence approach. We find evidence suggesting that Hong Kong is the most efficient market followed by Chinese A type shares and Singapore and finally by Chinese B type shares, which suggests that liquidity and capital restrictions may play a role in explaining results of market efficiency tests.

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1. Introduction

The literature on market efficiency is vast as the theme is of interest for both practitioner and academics. Since it is a very intriguing issue, a big part of this literature focuses on seeking long memory dependence in asset returns. Actually, if the stock returns present long range dependence, the random walk hypothesis is not valid anymore and neither does the market efficiency hypothesis [1]. Moreover, the presence of long range dependence in asset returns contradicts the weak form of market efficiency

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which states that, under the information contained on the set formed by past returns, future returns are unpredictable [2].

This paper tests long-range dependence for three different countries: China, Hong Kong and Singapore. While the Chinese equity market is an emergent market which has two types of shares—one that is restricted to local investors (Class A shares) and other that is available only for foreign investors (Class B shares)—Hong Kong and Singapore are two developed economies. Thus, we have here a unique opportunity to test the effect of these differences of these two types of Chinese shares on the formation of the long-range dependence phenomena.

In this paper, our measure of long-range dependence is the Hurst's exponent. Additionally, since market efficiency (predictability) seems to evolve over time [3], we measure this exponent statically (as the usual approach) and also dynamically.

The rest of the paper is divided as follows. Our measure of long-range dependence considered here are introduced in Section 2. In Section 3, the data used in this work is presented. In Section 4, the methodology employed in this paper is presented. In Section 5, the empirical results of this work are exposed. Finally, Section 6 presents some conclusions of this work.

2. Measures of long-range dependence

In this paper, the Hurst's exponent calculated by the classical R/S analysis [4,5] is our measure of long range dependence.

The R/S analysis [4,5] due to its simplicity is the most popular way to detect long-range dependence. Let $X(t)$ be the price of a stock on a time t and $r(t)$ be the logarithmic return denoted by $r(t) = \ln(X(t+1)/X(t))$.

The R/S statistic is the range of partial sums of deviations of times series from its mean, rescaled by its standard deviation. So, consider a sample of continuously compounded asset returns $\{r(1), r(2), \ldots, r(\tau)\}$ and let $\bar{r}_\tau$ denote the sample mean $1/\tau \sum_\tau r(\tau)$ where τ is the time span considered. Then the R/S statistic is given by

$$(R/S)_\tau \equiv \frac{1}{s_\tau}\left[\max_{1\leqslant t\leqslant\tau}\sum_{t=1}^{\tau}(r(t)-\bar{r}_\tau) - \min_{1\leqslant t\leqslant\tau}\sum_{t=1}^{\tau}(r(t)-\bar{r}_\tau)\right] , \tag{1}$$

where s_τ is the usual standard deviation estimator

$$s_\tau \equiv \left[\frac{1}{\tau}\sum_t (r(t)-\bar{r}_\tau)^2\right]^{1/2} . \tag{2}$$

Hurst [4] found that the rescaled range, R/S, for many records in time is very well described by the following empirical relation:

$$(R/S)_\tau = (\tau/2)^H . \tag{3}$$