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Keep in mind

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Whilst emphasis has been given to short-term dependence of financial returns, long-term dependence remains overlooked. Despite financial literature provides evidence of long-term´s memory existence, serial-independence assumption prevails.   This document´s long-term dependence assessment relies on rescaled range analysis (R/S), a popular and robust methodology designed for Geophysics but extensively used in financial literature. Results correspond to most of the previous evidence of significant long-term dependence, particularly for small and illiquid markets, where persistence is its most common

kind. Persistence conveys that the range of possible future values of the variable will be wider than the range of purely random and independent variables. Ahead of R/S financial literature, authors estimate an adjusted Hurst exponent in order to properly estimate the covariance matrix at higher investment horizons, avoiding the traditional independence reliant- square-root-of-time rule. Ignoring long-term dependence within the mean-variance portfolio optimization results in concealed risk taking; conversely, by adjusting for long-term dependence the weight of high (low) persistence risk factors decreases (increases) as the investment horizon widens. This alleviates some well-known shortcomings of conventional portfolio optimization for long-term investors (e.g. central banks, pension funds and sovereign wealth managers), such as excessive risk taking in long-term portfolios, extreme weights, home bias, and reluctance to hold foreign currency-denominated assets.