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Title: Market efficiency and Shannon entropy: Applications to stock markets and ETFs

Abstract:

When prices reflect all available information, the market is said to be efficient, and the price dynamics are assumed to be a martingale. However, empirical evidence suggests the existence of periods of inefficiency, especially at high-frequency timescales. Shannon entropy can capture such inefficiency patterns in financial time series. However, one must be cautious. Many regularities in financial data may induce some misleading signals of price predictability, for example, seasonality, volatility clustering, price staleness, microstructure effects, etc. Thus, we propose a computational methodology for a genuine estimation of the Shannon entropy applied to financial time series, filtering out the known sources of regularities and testing rigorously the drop in the entropy value, which signals a period of market inefficiency. We use the methodology for an extensive empirical analysis of market efficiency for stocks and ETFs.