

BIG DATA & ALGORITHMIC FINANCE



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Matthieu Garcin is a lecturer and a researcher in quantitative finance at ESILV. His research focuses on the application of nonlinear and nonparametric models and methods to finance, as well as on econophysics, signal processing, and statistics. Formerly, he has worked for a decade as a quantitative analyst in the financial industry, in particular in asset management. He graduated from the École Polytechnique and holds a PhD in mathematics from Université Paris 1 Panthéon-Sorbonne.

FRACTAL PROPERTIES, INFORMATION THEORY, AND MARKET EFFICIENCY

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Considering that both the entropy-based market information and the Hurst exponent are useful tools for determining whether the efficient market hypothesis holds for a given asset, we study the link between the two approaches. We thus provide a theoretical expression for the market information when log-prices follow either a fractional Brownian motion or its stationary extension using the Lamperti transform. In the latter model, we show that a Hurst exponent close to $1/2$ can lead to a very high informativeness of the time series, because of the stationarity mechanism. In addition, we introduce a multiscale method to get a deeper interpretation of the entropy and of the market information, depending on the size of the information set. Applications to Bitcoin, CAC 40 index, Nikkei 225 index, and EUR/USD FX rate, using daily or intraday data, illustrate the methodological content.

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