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The isotropy of cryptocurrency volatility

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Abstract

We examine the fractal volatility and long-range dependence of Bitcoin, Ethereum, Tether and USD Coin by employing the continuous wavelet transform, maximal overlap discrete wavelet transform and rescaled range. Our dataset consists of daily prices spanning from January 2017 through to October 2022, encapsulating pre- and post-epidemic eras. Generally, our findings suggest that Tether presents the least overall volatility throughout the time-frequency spectrum. USD Coin demonstrates ephemeral turbulence, contrary to Tether's maturity in influencing market equilibrium through token issuance and trade responses. In the post-epidemic sample, both stablecoins indicate mean reversion, with USD Coin showing marginally better efficiency. Conversely, investment tokens display persistent clusters due to retail traders and long-term fundamental institutions. Although both tokens illustrate multifractal volatility, Ethereum unveils more essence of self-similarity than Bitcoin. Hence, there is no evidence that Ethereum truly duplicates Bitcoin since policy-related events differ between them, as both return series move incongruously. Conditional dynamics signify that all cryptocurrencies, except Tether, were affected by the pandemic transition of COVID-19 and subsequent macroeconomic news. The unconditional volatility of stablecoins evinces zero-mean errors, antithetical to investment tokens exhibiting annual cycles. The fractal geometry suggests that investment tokens simulate one-dimensional lines, whereas stablecoins mimic two-dimensional planes. © 2023 John Wiley & Sons Ltd.

Author Keywords

bitcoin; cryptocurrency; efficiency; Ethereum; Stablecoin; token; volatility; wavelet

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currency market, financial market, financial system, investment, macroeconomics, wavelet analysis

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