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Can cryptocurrencies be a safe haven: a tail risk perspective analysis

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ABST... Cryptoc... decade... the cryp... auto-cor... meas... Using... of seven... find that... boundar... commod... correlati... and tail... systematic extreme risks. we also find that cryptocurrencies to be both left tail

independent, and cross tail independent with four selected stock indices, which implies part of the safe-haven function of the cryptocurrencies, indicating their ability to be a great diversifier for the stock market as gold, but not enough to be a tail hedging tool like gold.

KEYWORDS: Cryptocurrency tail risk tail correlation diversification hedge

JEL CLASSIFICATION: C13 C22 G10 G11 G15

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Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

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GARCH

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⁵ We use $\ln(T)$ (where T is the length of the time series) as the lag of Ljung-Box tests, which is suggested by Tsay ([2005](#)) and followed by other papers (For example, Fang and Miller [2007](#)). We use $\text{lag} = 1$ and $\text{lag} = 6$ for Engle tests of ARCH effect. In the literature, researchers usually choose 2 or 3 different (low order) lags to see if ARCH effect exists (for example, Engle [1982](#)).

⁶ A further test suggests that this autocorrelation cannot be removed by purely using ARMA, and we have to divide the sample into two or more sub-periods and then use ARMA to remove this autocorrelation for extreme value analysis to be applied. For all the cryptocurrencies, we use 03/01/2017 as a breakpoint; for Ripple, we use 05/01/2017 as another breakpoint, to fit the ARMA-GARCH model and get the pseudo return.

⁷ We can prove that when $Z > z_q$, and under the assumption of GPD, we have $E[Z|Z > z_q] = z_q + \sigma - \xi u^{1-\xi}$.

⁸ The left tail distributions of the four stock indices (S&P 500, Euro Stoxx 50, Nikkei 225, CSI 300) are estimated to be Fréchet type (long tails) during the sample period, and the two commodities (Gold PM Fixing and WTI Crude oil Indices) are estimated to be Weibull type tails (truncated tail distribution), so conditional extremal boundaries only apply to the two commodities.



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