

Review Report on

“Hedging Cryptos with Bitcoin Futures”

The authors investigated the hedge effectiveness of CME Bitcoin futures on a number of cryptos, such as Bitcoin, ETH, XRP and several crypto indices. The risk measures VaR, CVaR and SRM are used to evaluate the hedge performance.

Major Comments:

- **Hedge Instruments.** (1) The crypto markets open continuously 24/7, while the CME operates on weekdays, closed at 15:00 US Central Time as the author noticed. I suggest the authors include futures and perpetuals traded on dominant less regulated exchanges such as BitMEX, Binance and Bybit for instance. These exchanges have much larger trading volume than CME.

(2) Several CME Bitcoin futures are listed. Which contract does the authors use in the implementation?

(3) Crypto futures on ETH, ADA, LTC and XRP are listed on exchanges such as Binance. These instruments are more liquid with low bid-ask spread. I do not see any reason why traders use Bitcoin futures to hedge.

(4) Are these crypto indices tradable (CRIX, BITX for instance)? If not, would it be meaningful to consider them as the underlying asset of the portfolio?
- **Empirical Analysis.** (1) On pages 23 and 24, the authors state only 5 data points in the test data and choose a block window 250 to bootstrap the process. How does it relate to the 300 trading observations on page 5 (line 35). I did not quite understand how the authors run the process.

(2) The crypto prices are extremely volatile and change dramatically. Therefore, it is common to use high frequency data which is also easy to get from exchanges' open API such as BitMEX and Binance. I suggest the authors to re-run their analysis using high frequency data. It would allow them to get more reliable conclusions.

(3) In Figure 12 on page 24, how could an optimal hedge strategy lead to negative hedge effectiveness? The trader could simply hold the underlying and do not hedge.

Minor Comments:

- Line 10 of page 2, "... the CME futures is the only regulated cryptos ...". This is not true. Bakkt Holdings also has bitcoin futures which are physically settled.
- What is Z in Proposition 2?
- Most of Section 3 are standard results on Copulae and could be placed in Appendix.
- The authors missed a number of papers on bitcoin hedge such as [1], [2] and [3], to name a few.

References

- [1] Alexander, C., Choi, J., Park, H. and Sohn, S., 2020. BitMEX bitcoin derivatives: Price discovery, informational efficiency, and hedging effectiveness. *Journal of Futures Markets*, 40(1), pp.23-43.
- [2] Corbet, S., Lucey, B., Peat, M. and Vigne, S., 2018. Bitcoin Futures—What use are they?. *Economics Letters*, 172, pp.23-27.
- [3] Deng, J., Pan, H., Zhang, S. and Zou, B., 2020. Minimum-variance hedging of bitcoin inverse futures. *Applied Economics*, 52(58), pp.6320-6337.