Review of: "Unpacking the Complexities of Bitcoin Volatility: A Time Series Data with Long-term Memory or Long-range Dependence"

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Potential competing interests: No potential competing interests to declare.

The article analyzes Bitcoin's price fluctuations during the Covid pandemic and the Russia-Ukraine war

Bitcoin's price movement is divided into 4 stages.

Sub-periods	Events type
Pre-Covid-19 Crisis	17/09/2014 - 30/12/2019
High Covid-19 situation	31/12/2019 - 31/12/2020
Between the Covid-19 Crisis and the Russo-Ukrainian War	01/01/2021 - 23/02/2022
Russo-Ukrainian War	24/02/2022 - 15/09/2022

Use models:

- GARCH
- FIGARCH-BBM
- FIGARCH-CHUNG
- FIEGARCH
- FIAPARCH-BBM
- HYGARCH

Use conditional volatility models to estimate the parameters of periods. Then compare these parameters with specific fluctuations of Bitcoin. Finally, the author performs the tests (the normality test, the Q-Statistics on Standardized Residuals Test, the ARCH Test, and the graphic analysis)

- The result: Covid and the war have had a significant effect on the price of bitcoin and investor sentiment plays an important role in the price movement.
- The parameters of the defined conditions volatility models suggest that a war will make cryptocurrencies more

important in the market, and more important than during the pandemic.

Part 1: The author gives previous studies that used models to assess the volatility of cryptocurrencies.

Part 2: The author gives descriptive statistics on bitcoin price movement data from 2014 to 2022

Part 3: The author gives the theory and formula of the models.

Part 4: Results:

- 4.1 => The results show that historical price movements will affect the price of bitcoin, and historical downward movements will have a stronger impact than historical positive price movements.
- 4.2 The author thoroughly examines the problem of autocorrelation in models. In summary, the GARCH model used in this analysis captures the full range of ARCH effects in the data, and there is no solid evidence of the effects of resipdual ARCH.
- 4.3 The author evaluates the volatility of Bitcoin price through a Conditional Volatility pattern and chart. The author compares Bitcoin's volatility to events and sees the impact of events.

Part 5: The author makes a conclusion

- Negative events often lead to greater volatility than positive events across all cryptocurrencies. The volatility of Bitcoin data during political or economic events affects the choice of the corresponding value and coefficient movement model.
- The use of GARCH models can provide a better understanding of Bitcoin price movements.
- Investors need to be cautious when investing in Bitcoin as negative price movements have the potential to cause greater volatility, potentially causing significant losses. Policy makers need to pay attention to this issue, as it implies that regulatory measures that cause a negative sentiment situation in the market can lead to significant volatility in the market.

About limitations: author considers adding more

The author needs to clarify why investor psychology only studies Covid factors and the Russia-Ukraine war when there are many other factors affecting bitcoin, such as the manipulation of investment funds, bitcoin whales, blockchain technical information, etc Information about Bitcoin halving, information about cash flow...

The study needs to add more trading volume and liquidity of bitcoin. Special consideration should be given to including the trading volume factor in the model for analysis because volume is a factor that shows the psychological volatility of investors when there are factors that affect