Zero Theorem Literature Review

"Price Clustering in Bitcoin, A. Urquhart, 2017"

By: SoReZ

Highlights

- Examine BitCoin's price clustering as well as the potential trading benefits of BitCoin.

- Understanding the hypothesis along with clustering kurtosis test to evaluate the trading implications for price clustering in Bitcoin.

Background

Due to advancements in technology and increasing popularity of cryptocurrency, BitCoin has received a substantial attention. Hence, it is evident that Bitcoin has garnered a lot of attention. However, there are still significant concerns about the behaviour of BitCoin values. Therefore, there is a need to examine any potential price clustering in BitCoin.

Introduction

To address all the behavioral issues, there is a need to examine Bitcoin prices for clustering as well as the potential trading benefits such as determinants of the clustering. In this context, Urquhart (2017) find significant evidence of clustering at round numbers, with over 10% of prices ending with 00 decimals compared to other variations but there is no significant pattern of returns after the round number. Furthermore, Urquhart (2017) support the negotiation hypothesis suggested by Harris (1991) which shows that price and volume have a significant positive relationship with price clustering at whole numbers.

Proposed Methodology

For this purpose, Urquhart (2017) applied a clustering test which is represented as $f(M) = \alpha + \beta D^i + \varepsilon$ to find price clustering around whole numbers where

$f(M)$ is the absolute frequency of digits to the right of the decimal place while $D^{(}i)$ is a dummy variable taking the value of 1 for whole numbers and zero otherwise. Under the null hypothesis, β will be zero. Moreover, a clustering kurtosis test was also considered to determine whether there is a different frequency distribution shape around whole numbers which is represented as $f(M) = \mu + \delta_1 M + \delta_2 M^2 + \varepsilon$.

Details of Proposed Methodology

In order to evaluate the trading implications for price clustering in Bitcoin, Urquhart (2017) examined a cluster that is reached through prices falling or prices rising. In this regard, data was collected from Bitcoincharts which provides a complete history of various bitcoin exchanges. Moreover, the data consists of daily closing prices of Bitstamp from 1st May 2012 to 30th April 2017 that captures 5 years of Bitcoin prices. Once data is collected, then different days before and after a cluster at round numbers were considered to study the pre- and post- behaviour of prices. To analyze this behavior four dummies were created such as $BDZ^{(}n)$, $BUZ^{(}n)$, $ADZ^{(}n)$ and $AUZ^{(}n)$. In each case, n is set to 1, 2, 3, 4, and 5 days to enable the identification of the duration of any price impact. Therefore, the regression model is introduced which is as follow $R_t = \beta_0 + \beta_1 R_{t-1} + \beta_2 BDB_t^n + \beta_3 BUB_t^n + \beta_4 ADB_t^n + \beta_5 AUB_t^n + \varepsilon_t$. Once, the regression model is considered then the potential determinants of price clustering were analyzed which estimates a standard probit model.

Results and Discussion

According to Urquhart (2017), the results show evidence of clustering at the 00 digit indicating clustering at round numbers which depicts that 00 digits are the most popular in the distribution of clustering, with 10.81% of the prices ending in 00 digits. Moreover, 50 and 99 digits are the next two popular digits while the least popular digits only occur between 4 and 7 times in the whole series. In order to evaluate the price clustering, the clustering test and clustering kurtosis test is applied which shows positive and significant evidence of clustering at round numbers, while the clustering kurtosis test shows a significant positive coefficient indicating significant clustering at round numbers.From this it is clear that as price and trading volume of Bitcoin increases, the number of clustering at round numbers also increases.

Conclusion

This led to the conclusion that there is significant evidence of price clustering around whole numbers. However, prices after a round number show no predictable pattern and therefore cannot be taken advantage of in the form of an investment strategy.

References

Urquhart, A. (2017). Price clustering in bitcoin. *Economics letters*, 159:145–148.