

CRYPTOCURRENCIES AS A HEDGE AND SAFE HAVEN INSTRUMENTS DURING COVID-19 PANDEMIC

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Abstract

This study examines the potential of cryptocurrencies such as bitcoin, ethereum, ripple, tether, and bitcoin cash as hedging instruments and a safe haven for the Indonesian capital market, especially during the Covid-19 pandemic era. Now, Indonesia's capital market condition is in turbulence. The benefit of this research is to help the investors make decisions on which cryptocurrencies can be an instrument hedge and safe haven in this Covid-19 pandemic era for Indonesia Stock Exchange (IDX). The data used in this study are data on the closing price of the Composite Stock Price Index (CSPI), bitcoin (BTC), ethereum (ETH), ripple (XRP), tether (USDT), and bitcoin cash (BCH) from January 3 to June 16, 2020. Data analysis used Generalized Autoregressive Conditional Heteroscedasticity (GARCH) and Quantile Regression (QREG). This study found that bitcoin, ethereum, tether, and bitcoin cash can act as a hedge, but only the ripple cannot act as a hedge. Bitcoin, ethereum, ripple, tether, and bitcoin cash cannot act as a safe haven when the Indonesian capital market was getting extreme, like during the Covid-19 pandemic era. The roles of bitcoin, ethereum, ripple, tether, and bitcoin cash as safe havens will fade when conditions in the Indonesian capital market become more extreme. This research can be used as a reference for investors for their investments by looking top four cryptocurrencies as a hedging instrument. However, in severe conditions such as during the Covid-19 Pandemic, the top five cryptocurrencies cannot be used as a safe haven, as revealed in this study.

Keywords: *Hedge, safe haven, cryptocurrencies, Generalized Autoregressive Conditional Heteroscedasticity (GARCH), Quantile Regression (QREG).*

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INTRODUCTION

The Indonesian capital market provides various investment products such as mutual funds, stocks, Sukuk, and bonds, some of the macroeconomic indicators in Indonesia. There are many go public companies listed on Indonesia Stock Exchange (IDX) in the capital market as the reason. The volume of trading describes the condition of securities traded in the Indonesian capital market. It makes it essential for investors because the trade volume is an indicator of the liquidity of stocks (Bose and Rahman 2015). In addition to the liquidity variable, volatility is also a variable considered by investors because it determines the return rate for investors. If the volatility level is high, the return gained is higher; however, the risk is also high and vice versa (Sutrisno 2017). Therefore, investors who have the characteristics to avoid risk will choose a low-level effect of volatility because of the low risk to feel safer (Haryadi *et al.*, 2015).

As Sumiadji *et al.* (2019) elaborated, macroeconomic conditions such as the global economic crisis can lead Indonesian capital market conditions to enter turbulence. On March 2, 2020, Joko Widodo, the president of Indonesia, announced that Indonesia had been exposed to coronavirus or Covid-19. Since then, most external and internal investors sell the assets they consider high risks, such as stocks in the Indonesia Stock Exchange (IDX). The impact is the stock price in the IDX will fall; this phenomenon will be seen from Composite Stock Price Index (CSPI). If the CSPI's position is weakening, the stock price on IDX is declining in general, and vice versa Agyei-Ampomah *et al.* (2013) explained that the price of gold would stabilize or even increase when stock prices in the capital market fall. As Worthington and Pahlavani (2007) believed, gold is an alternative investment. It attracts investors' attention because gold is considered a stable investment when the market condition is recessionary, such as high inflation risks, the falling exchange rate, and the collapse of the banking sector. Roache and Rossi (2010) claimed that gold prices have opposite cycle movements. In other words, gold is considered as a hedge and a safe haven to invest when the macro condition or the market is uncertain (Agyei-Ampomah *et al.*, 2014; Capie *et al.*, 2005; Le Ja Dyk 2005; Triki and Ben Maatoug 2020)

However, along with the development of the financial markets, there is a new instrument called cryptocurrency, which is electronic money used digitally without intermediaries or third parties such as bank services (Nakamoto 2009). According to id.investing.com (2020), Bitcoin (BTC), Ethereum (ETH), Ripple (XRP), Tether (USDT), and Bitcoin Cash (BCH) are the top five cryptocurrencies in the world because they have the largest market capitalization in the world. The capitalization of the top five cryptocurrencies makes the attraction for investors when the capital market is unstable. Kaponda (2018) also stated that sometimes Bitcoin is a type of cryptocurrency which refers to digital gold. Bitcoin can be used as an alternative when investors are disappointed because assets price has fallen. As seen from CSPI's position, the stock price on the Indonesia Stock Exchange is currently weakening and even falling. According to Bouri *et al.* (2017) and Brandvold *et al.* (2015), cryptocurrencies had shifted the paradigm of investors in the capital market.

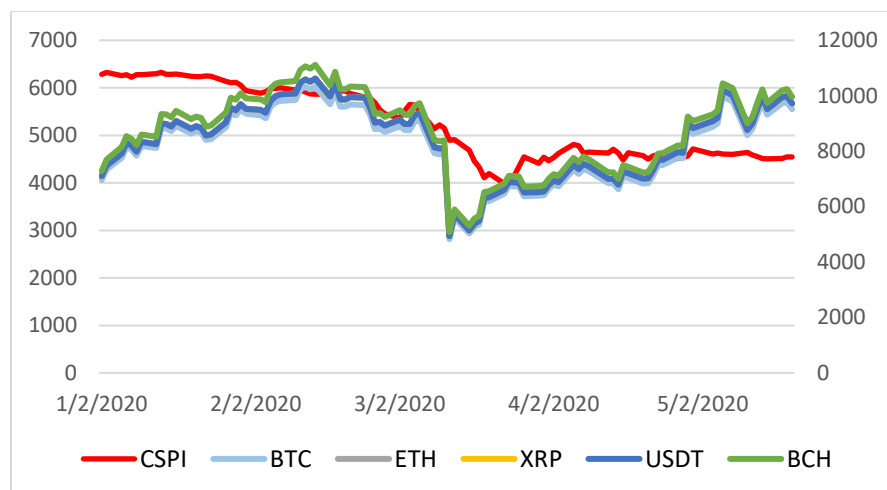


Figure 1. The Price of Composite Stock Price Index (CSPI) and Cryptocurrencies

Source: id.investing.com (2020)

Figure 1 shows the Composite Stock Price Index (CSPI) price on Indonesia Stock Exchange (IDX). The price of the top five cryptocurrencies such as Bitcoin (BTC), Ethereum (ETH), Ripple (XRP), Tether (USDT), and Bitcoin Cash (BCH) from January 2, 2020, to May 20, 2020 that the price of CSPI is fluctuating but tends to weaken. The stock price on its first sharp decline occurred when Covid-19 was announced and spreading in Indonesia on March 2, 2020. It was recorded that the Composite Stock Price Index (CSPI) on the Indonesia Stock Exchange (IDX) declined to 5,361,246. After that, the price of CSPI began to rise slightly, and the movements were relatively stable, seen from May 2, 2020, to May 20, 2020. On the same date, it also showed that cryptocurrencies have the opposite cycle movements or negative correlations from the Composite Stock Price Index (CSPI) price. When CSPI prices weaken, and the price of cryptocurrencies strengthens. Besides, from January 2, 2020, to February 2, 2020, when the CSPI's movements strengthen, the price movements of cryptocurrencies weaken. According to Baur and Lucey (2010), an instrument is said to be a safe haven when it does not correlate or negatively correlates with other assets at a particular time (e.g., financial crisis). Hedge as an asset does not associate or has a negative correlation with other assets over time. Therefore, investors should know the instrument hedge and safe haven to stop their investment's value from falling (Sakemoto, 2018).

Balcilar *et al.* (2017), Bouri *et al.* (2017), Chang (2019), and some other researchers believed in cryptocurrency as a hedge and safe haven in Indonesia (i.e., Susilo *et al.* (2020) and Robiyanto *et al.* (2020)). Most of them still explained hedge and safe haven on cryptocurrencies when the global economic crisis occurred in 2008. However, the research on cryptocurrency with the Indonesian capital market as a variable, especially in this Covid-19 pandemic era, is still not much.

Therefore, the purpose of this research is to know if the top five cryptocurrencies in the world, based on id.investing.com (2020), can be an instrument hedge and safe haven in this Covid-19 pandemic era for Indonesia Stock Exchange (IDX). The benefit of this research is to help the investors make decisions when Indonesia's capital market condition is in turbulence as it is today. For academics, this research is expected to be a reference in subsequent studies.

Cryptocurrency is a name for securely sending data with a cryptographic system (Eli Dourado 2008). Bitcoin (BTC), Ethereum (ETH), Ripple (XRP), Tether (USDT), Bitcoin Cash (BCH) are some examples of cryptocurrency's type. According to Nakamoto (2009), bitcoin (BTC) is an alternative digital currency that is decentralized or does not have a central bank peer-to-peer networking. In the transaction, bitcoin is stored on a public ledger is called a blockchain. Initially, bitcoin is used as payment instruments by members of the game online. Then Tiara *et al.* (2015) argued that in tandem with the many market demands causing the bitcoin exchange rate rises rapidly. Bitcoin has an increasing trend due to its bubble formation (Bouri *et al.*, 2019; Cheah and Fry, 2015; Corbet *et al.*, 2018; Shu and Zhu, 2020), high price volatility (Bouri *et al.*, 2017), and speculative nature (Baur *et al.*, 2018; Cheah and Fry, 2015). Bouri *et al.* (2017) explained that bitcoin could serve as a hedge and safe haven for investors when the global equity market uncertainty, especially when uncertainty is either low or high and the market is functioning in bear and bull shorter investment horizons.

Investments are activities that follow the moving of markets. The market movement has more considerable risks while experiencing a recession like the current situation of the Indonesian market because of the presence of the Covid-19 pandemic. Then, a hedge can be used as an instrument of investing in reducing the likelihood of losses incurred. Risk is the most avoided thing for investors to transfer to other types of investments, such as cryptocurrency. With the emergence of this cryptocurrency, investors may consider it a hedging instrument in the Indonesian capital market, especially in this Covid-19 pandemic era. According to Bouri, Gupta *et al.* (2017) and Bouri, Molnár *et al.* (2017), bitcoin can act as a hedge against global market uncertainty in short-term investments. Bitcoin but cryptocurrency (such as ethereum, tether, ripple, and so on) can function as a hedge (Bouri *et al.*, 2020). Demir *et al.* (2018) found that bitcoin has a negative effect with the significance value on higher quantile so that bitcoin can be used as a hedge in extreme times of uncertainty. As Baur *et al.* (2018), Telli and Chen (2020) claimed that bitcoin has a different volatility movement than other assets. Thus it does not have any correlations with other assets. Bitcoin is a risk-averse for investors in anticipation of bad market conditions (Dyhrberg, 2016a). Dyhrberg (2016b) explained that bitcoin functions as a hedge to minimize or eliminate certain market risks. However, Fang *et al.* (2019) added that bitcoin has an unstable hedge function in the capital market. Cryptocurrency will be considered a hedging instrument if correlated negatively or does not have any correlations with other average assets (Wahyudi *et al.*, 2019).

***H_{1a}*: Bitcoin can act as a hedge for the Indonesian capital market in the Covid-19 pandemic era.**

***H_{1b}*: Ethereum can act as a hedge for the Indonesian capital market in the Covid-19 pandemic era.**

***H_{1c}*: Ripple can act as a hedge for the Indonesian capital market in the Covid-19 pandemic era.**

***H_{1d}*: Tether can act as a hedge for the Indonesian capital market in the Covid-19 pandemic era.**

***H_{1e}*: Bitcoin cash can act as a hedge for the Indonesian capital market in the Covid-19 pandemic era.**

Based on the Composite Stock Price Index (CSPI) data, the Indonesia Stock Exchange (IDX) state is weakening due to the impact of the Covid-19 pandemic. During turbulence in the IDX, the investors will try to find a transfer so that the investment value does not fall. A redirection instrument is a cryptocurrency. The investors consider cryptocurrency to be a safe haven in the Indonesia Stock Exchange, especially in this Covid-19 pandemic era. According to Bouri, Molnár, *et al.* (2017), bitcoin as a cryptocurrency can act as a safe haven between horizons. Blau (2018) also claimed that Bitcoin has high volatility, which negatively correlates with high speculative activity. However, Shahzad *et al.* (2019) found that bitcoin is a weak safe haven in some cases. Cryptocurrency will be considered as a safe haven if it has correlated negatively or does not have any correlations with other assets during volatile market conditions. It can be said to be a safe haven (Baur and Lucey 2010; Robiyanto 2018).

***H_{2a}*: Bitcoin can act as a safe haven for the Indonesian capital market in the Covid-19 pandemic era.**

***H_{2b}*: Ethereum can act as a safe haven for the Indonesian capital market in the Covid-19 pandemic era.**

***H_{2c}*: Ripple can act as a safe haven for the Indonesian capital market in the Covid-19 pandemic era.**

***H_{2d}*: Tether can act as a safe haven for the Indonesian capital market in the Covid-19 pandemic era.**

***H_{2e}*: Bitcoin cash can act as a safe haven for the Indonesian capital market in the Covid-19 pandemic era.**

RESEARCH METHODS

Data Types and Sources

In this research, the data are taken from secondary data sources; the data of Composite Stock Price Index (CSPI), bitcoin (BTC), tether (USDT), ethereum (ETH), ripple (XRP), and bitcoin cash (BCH) was obtained from id.investing.com. The price of BTC, XRP, ETH, USDT, and BCH in this data will be converted into Rupiah before doing analysis. This research uses BTC, XRP, ETH, USDT, and BCH because these cryptocurrencies are the five best cryptocurrencies and the largest market capitalization in the world (id.investing.com)

Research Design

This research uses quantitative methods, and the data uses time series. The period of this research started from January 3 to June 16, 2020, using Composite Stock Price Index (CSPI), bitcoin (BTC), ripple (XRP), ethereum (ETH), tether (USDT), and bitcoin cash (BCH).

Definition of Operation Variable

The return of BTC, ETH, XRP, USDT, and BCH can be calculated as the return of cryptocurrency by using the formula below:

$$R_{Cryptocurrency} = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Where,

P_t = price for time t, cryptocurrency in this research using BTC, ETH, XRP, USDT, and BCH

P_{t-1} = price for time t-1, cryptocurrency in this research using BTC, ETH, XRP, USDT, and BCH

In this research, the return of the Indonesia Stock Exchange (IDX) can be calculated through the return of the Composite Stock Price Index (CSPI) using the following formula:

$$R_{CSPI,t} = \left[\frac{CSPI_t - CSPI_{t-1}}{CSPI_{t-1}} \right]$$

Where,

$CSPI_t$ = CSPI's closing price for Indonesia Stock Exchange at month t

$CSPI_{t-1}$ = CSPI's closing price for Indonesia Stock Exchange at month t – 1

Analysis Techniques

This research uses GARCH. The GARCH specification with different error distribution assumptions such as student's-t distribution, gaussian, and Generalized Error Distribution (GED) as standard GARCH. GARCH is applied to look at BTC, ETH, XRP, USDT, and BCH as a hedge.

The function of GARCH:

$$Instrument = \alpha + \beta_1 CSPI_1 + \varepsilon_t$$

With

$$\varepsilon_t = \Phi_t \varepsilon_{t-1} + \dots + \Phi_t \varepsilon_{t-p} + \eta_t$$

$$\eta_t = \sigma_t \epsilon_t$$

$$\sigma_t^2 = \alpha + \beta_1 \eta_{t-1}^2 + \dots + \beta_p \eta_{t-p}^2 + \gamma_1 \sigma_{t-1}^2 + \dots + \gamma_q \sigma_{t-q}^2$$

Where,

ε_t = residual term

σ_t^2 = the conditional volatility

ϵ_t = independent and identical distributed N (0,1), which is not affected by past data from

η_{t-p}

For checking whether BTC, ETH, XRP, USDT, and BCH, can act as a robust, safe haven for the Indonesia Stock Exchange (IDX), the data analysis is also carried out using Quantile Regression (QREG).

$$R_{Instrument,t} = \alpha + \beta_1 R_{CSPI(Q50\%,40\%,30\%,20\%,10\%)} + \varepsilon_t$$

Where,

ε_t = residual term

$R_{Instrument,t}$ = return on BTC, ETH, XRP, USDT, BCH

R_{CSPI} = return on Composite Stock Price Index (CSPI) for Q50 percent, 40 percent, 30 percent, 20 percent, and 10 percent

The Quantile Regression (QREG) technique is commonly applied, especially in safe-haven instrument research (Robiyanto 2018). Using QREG can provide instrument sensitivity and resilience to worsening market conditions. QREG analysis in this study aims to test whether the variables in it can be a safe haven.

Diagnostic and Robustness

Augmented Dickey-Fuller (ADF) tests and Cumulative Sum of Squares (CUSUM) must be carried out before analyzing data that aims to detect potential violations (Robiyanto and Puryandani, 2015). Generalized Autoregressive Conditional Heteroscedasticity (GARCH) tests are selected for a better model when the model has the lowest Akaike Information Criterion (AIC). After the model is selected, it will be analyzed using Quantile Regression (QREG). Diagnosis of autocorrelation using Q-statistics in the correlogram of residual diagnostics. This study uses the Theil coefficient to calculate the strength of the model. Theil coefficient lies between zero and one. The smaller the Theil coefficient means the better the model. According to Woschnagg and Cipan (2004), the Theil coefficient equals zero, meaning that the model has a perfect fit.

RESULTS AND DISCUSSION

Diagnostic Test Results

This study uses the Augmented Dickey-Fuller (ADF) Test to examine the root unit in the data. Based on Table 1, there is no unit root test return of CSPI (Composite Stock Price Index), BTC (Bitcoin), ETH (Ethereum), XRP (Ripple), USDT (Tether), and BCH (Bitcoin Cash). Thus, all variables are stationary, indicated by the probability value smaller than the test critical values, 0.0000. It shows that the return of CSPI, BTC, ETH, XRP, USDT, and BCH are stationary or variant data, which is not too large, and the tendency to approach the average value.

Table 1. The result of the Unit Root Test for return of CSPI, BTC, ETH, XRP, USDT, and BCH from January 3, 2020, to June 16, 2020

Variable Name	ADF Statistic	Probability	Conclusion
CSPI	-9.045637	0.0000	Stationary
BTC	-13.45288	0.0000	Stationary
ETH	-13.64533	0.0000	Stationary
XRP	-13.01757	0.0000	Stationary
USDT	-15.23362	0.0000	Stationary
BCH	-12.91639	0.0000	Stationary

Source: Secondary data source processed (2020)

Table 2 shows the results of diagnostic autocorrelation using Q-statistics and the correlogram of residual diagnostics. The results indicate that all cryptocurrencies except for BCH have a significant autocorrelation with a significance level of 1 percent. Furthermore, the data will be analyzed using the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) method through Student's t, Gaussian, and GED models.

Table 2. Autocorrelation Test Result by Correlogram (36 Lags)

	OLS	Quantile				
		0.5	0.4	0.3	0.2	0.1
BTC	2	1	1	2	2	1
ETH	2	3	3	3	2	2
XRP	1	None	None	None	1	None
USDT	16	24	27	30	30	27
BCH	None	None	None	None	None	None

Source: Secondary data source processed (2020)

Note: None has a significant Q Statistics at a significance level of 1 percent

Table 3. GARCH to Find the Best Model

Dependent Variable	Independent Variable	GARCH		
		Student's t	Gaussian	GED
BTC	CSPI	0.12742 (0.8986)	2.94586*** (0.0032)	1.19601 (0.2317)
ETH	CSPI	0.71651 (0.4737)	4.68918*** (0.0000)	0.85734 (0.3913)
XRP	CSPI	1.81139* (0.0701)	2.41197** (0.0159)	1.56926 (0.1166)
USDT	CSPI	5.49999*** (0.0000)	6.20466*** (0.0000)	4.150*** (0.0000)
BCH	CSPI	2.0013** (0.0454)	15.1501*** (0.0000)	2437.86*** (0.0000)

Source: Secondary data source processed (2020)

Note: -Numbers within parentheses are probability level

-Numbers within the grey color has the lowest Akaike Information Criterion (AIC)

The model used by five cryptocurrencies, as shown in Table 3, indicates that BTC, ETH, and BCH include in the Generalized Error Distribution (GED) model in GARCH because the AIC (Akaike Information Criterion) in GED has the lowest value. Thus, GED is chosen to be a better model for BTC, ETH, and BCH. Based on AIC as the basic for model selection, XRP and USDT include Student's t model in OLS because the model has the lowest AIC value compared to Gaussian and GED. So that Student's t has been selected as the best model for XRP and USDT. Therefore, according to findings from Table 3, GED is the best model for BTC, ETH, and BCH,

Student's t is the best model for XRP and USDT, so that subsequent calculations use this predetermined model.

Table 4. The Results of OLS, GARCH, and QREG for Indonesian Capital Market

	GARCH	Quantile				
		0.5	0.4	0.3	0.2	0.1
BTC						
C	0.004928*** (2.625536)	0.004928 (1.139476)	-0.000678 (-0.159448)	-0.008373* (-1.950238)	-0.018973*** (-3.640264)	-0.04797*** (-4.962923)
CSPI	-0.076733 (-0.685574)	-0.076733 (-0.401235)	-0.021715 (-0.112713)	0.039057 (0.197811)	0.157813 (0.712127)	0.442358** (1.998359)
ETH						
C	0.002044 (1.208935)	0.002232 (0.372129)	-0.00245 (-0.415774)	-0.012602** (-2.193387)	-0.024555*** (-3.860197)	-0.061088*** (-5.072818)
CSPI	-0.037047 (-0.251384)	-0.03889 (-0.132821)	0.007049 (0.024617)	0.106673 (0.399541)	0.411617 (1.422217)	0.582459** (2.22788)
XRP						
C	0.004778 (1.268282)	0.005627 (1.179661)	-0.00512 (-1.038923)	-0.015047*** (-2.821955)	-0.023103*** (-3.892473)	-0.057371*** (-5.060929)
CSPI	0.034472 (0.192564)	-0.051853 (-0.173326)	0.05078 (0.160021)	0.158099 (0.403201)	0.39217 (0.834262)	0.990779*** (2.844806)
USDT						
C	-3.82E-05 (-0.582767)	-9.34E-06 (-0.06375)	-0.000298** (-1.985199)	-0.000612*** (-3.853044)	-0.000998*** (-5.921245)	-0.001695*** (-7.41887)
CSPI	-0.003189 (-0.657826)	-0.0047 (-0.540899)	-0.002476 (-0.292099)	0.005822 (0.96593)	0.004274 (0.553668)	0.000161 (0.01697)
BCH						
C	0.001188 (0.978484)	0.002447 (0.467344)	-0.005671 (-1.02813)	-0.018355*** (-2.939936)	-0.03072*** (-4.605533)	-0.064766*** (-4.247303)
CSPI	-0.294201*** (-2.581127)	-0.249679 (-0.864717)	-0.050333 (-0.178727)	0.194359 (0.67953)	0.315689 (1.241625)	0.649786* (1.857377)

Source: Secondary data source processed (2020)

Note: Numbers within parentheses are t-statistic and z-statistic

* significant at a significance level of 10%; ** significant at a significance level of 5%; *** significant at a significance level of 1%.

The analysis technique used in this study is Generalized Autoregressive Conditional Heteroscedasticity (GARCH). The model is represented in Table 3 and Quantile Regression (QREG) from quantiles 50 percent to 10 percent. Table 4 shows the results of GARCH and QREG calculations of returns of BTC (Bitcoin), ETH (Ethereum), XRP (Ripple), USDT (Tether), and

BCH (Bitcoin Cash) for (CSPI) Composite Stock Price Index or Indonesian capital market. According to GARCH results, CSPI does not significantly influence BTC, ETH, and USDT with a negative CSPI sign. However, it still shows that BTC and BCH can act as a hedge for the Indonesian capital market in the Covid-19 pandemic era because, based on Wahyudi *et al.* (2019), cryptocurrency will be considered as a hedging instrument if it is correlated negatively. BCH can act as a hedge for the Indonesian capital market in the Covid-19 pandemic era because of the significant negative CSPI regression coefficient (Demir *et al.*,2018). However, XRP cannot act as a hedge for the Indonesian capital market in the Covid-19 pandemic because of the positive sign with CSPI. This statement not in line with Wahyudi *et al.* (2019). Then it can be concluded that H_{1a} , H_{1b} , H_{1d} , and H_{1e} are accepted, and H_{1c} is rejected.

In Table 4 about the Quantile Regression (QREG) results, ETH and XRP cannot act as a safe haven for the Indonesian capital market in the Covid-19 pandemic era. It can be seen from the results of the QREG of ETH and XRP analysis that have quantiles 50 percent to 10 percent, except 50 percent and 10 percent, which have a positive sign. In the quantile of 50 percent, CSPI has an insignificant negative effect. In the quantile of 40 percent, 30 percent, and 20 percent, CSPI has a minor positive impact on ETH and XRP. Furthermore, in the quantile of 10 percent, CSPI has a positive effect on ETH with a significance level of 5 percent. CSPI has a positive impact on XRP with a significance level of 1 percent. This analysis shows that the extreme turmoil in the Indonesian capital market, ETH, and XRP can be a diversifier. At the most extreme condition, ETH and XRP can lead a significant negative return due to selling action from investors that there is a psychological effect such as fear on investors in the Indonesian capital market in the Covid-19 pandemic era. In general, the QREG results represent that ETH and XRP cannot be a safe haven for the Indonesian capital market in the Covid-19 pandemic era because not in line with Baur, Lucey (2010), and Robiyanto (2018) that cryptocurrency will be considered as a safe haven if it has correlated negatively or does not have any correlations with other assets during volatile market conditions. Thus, H_{2b} and H_{2c} are rejected.

The QREG results also imply that BTC and BCH cannot act as a safe haven for CSPI. Only 50 percent of the QREG and 40 percent have a negative sign; other quantiles have a positive and insignificant sign added to the 10 percent quantile. BTC has a positive effect with a significance level of 5 percent, and BCH has a positive impact with a significance level of 10 percent. Then it can represent that the role of BTC and BCH in the extreme condition cannot act as a safe haven for the Indonesian capital market but becoming a diversifier. It also shows extreme turmoil at CSPI. Hence, BTC and BCH have a higher positive correlation. While, according to Baur, Lucey (2010), and Robiyanto (2018), cryptocurrency will be considered as a safe haven if it has correlated negatively. Thus, BTC and BCH cannot be a safe haven. Based on that, H_{2a} and H_{2e} are rejected.

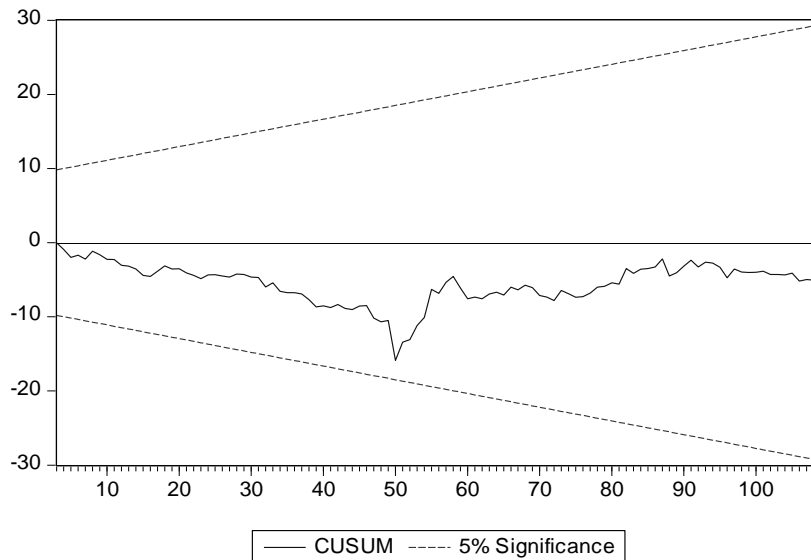
The USDT found similar results. They are the CSPI coefficient of the quantile of 50 percent to 10 percent, except the quantile of 50 percent and 40 percent, had insignificant positive signs and the only quantile of 50 percent and 40 percent had insignificant negative signs. In order to the USDT in the more extreme condition, it can act as a diversifier that does not have correlated negatively (Baur and Lucey 2010; Robiyanto 2018). Thus USDT cannot serve as a robust, safe haven for the Indonesian capital market in the Covid-19 pandemic era. Based on the occurrence, H_{2d} is also rejected.

Table 5. Theil Coefficient for Each Model

	Quantile				
	0.5	0.4	0.3	0.2	0.1
BTC	0.91749	0.98871	0.89095	0.80342	0.72769
ETH	0.96709	0.9716	0.87506	0.79129	0.73478
XRP	0.91573	0.92127	0.81695	0.75361	0.69498
USDT	0.93513	0.85399	0.77634	0.72472	0.69856
BCH	0.93728	0.94314	0.84003	0.783	0.72502

Source: Secondary data source processed (2020)

Table 5 reveals the results of Theil Coefficient Calculations on QREG intending to measure the robustness of the model. According to Woschnagg and Cipan (2004), the smaller the Theil coefficient means the better model. At the quantile, 50 to 10 shows a smaller quantile. It also means a smaller Theil coefficient. The BTC, ETH, XRP, and BCH at the smaller quantile the Theil coefficient will also be smaller, so they include ETH, BTC, XRP, and BCH, cannot be a robust, safe haven because CSPI's regression coefficient is positive. When the CSPI is getting more extreme, then the positive correlation between them will be stronger.

**Figure 2. CUSUM Test Results OLS only**

Source: Secondary data source processed (2020)

Looking at the USDT model (appendix) in all quantiles shows that smaller quantiles will produce smaller Theil coefficients. When financial market conditions are worse, it will lead to better conformity. USDT can only act as a diversifier for CSPI because the QREG results in Table 4, which has half of the CSPI regression coefficient in the USDT model, are insignificant positive. Likewise, the results of the CUSUM test for OLS are represented in Figure 1. The CUSUM test results show that BTC, ETH, XRP, USDT, and BCH are stable both in parameters and variance.

Discussion

Bitcoin, ethereum, ripple, tether, and bitcoin cash can serve as a hedge for the Indonesian capital market in the Covid-19 pandemic era (H_{1a} , H_{1b} , H_{1c} , H_{1d} , and H_{1e}).

This research found that bitcoin (BTC), ethereum (ETH), tether (USDT), and bitcoin cash (BCH) can be a hedge for the Indonesian capital market, especially in this Covid-19 pandemic era. This statement is based on previous studies, such as research conducted by Balcilar *et al.* (2017); Baur *et al.* (2018); Bouri *et al.* (2020); Gupta *et al.* (2017); Molnár *et al.* (2017); Brandvold *et al.* (2015); and Dyhrberg (2016). But ripple (XRP) could not act as a hedge for the Indonesian capital market in the Covid-19 pandemic. This statement also in line with Fang *et al.* (2019).

Bitcoin, ethereum, ripple, tether, and bitcoin cash can serve as a safe haven for the Indonesian capital market in the Covid-19 pandemic era (H_{2a} , H_{2b} , H_{2c} , H_{2d} , and H_{2e}).

However, this study does not find that BTC, ETH, XRP, USDT, and BCH can act as a safe haven or a robust, safe haven in the Indonesian capital market in the Covid-19 pandemic era. The statement appears from the results of research by Shahzad *et al.* (2019). Thus this finding contradicts the results of several studies, such as research from Blau (2018), Bouri *et al.* (2017), and Molnár *et al.* (2017). It can be explained by using the assumption that this study uses a shorter period than those studies.

The results of this study are following the research conducted by Fang *et al.* (2019). That research said that bitcoin has an unstable safe haven when capital market conditions change. ETH and XRP on quantile 50 can be a safe haven, but in quantiles 40 to 20, ETH and XRP function as a diversifier, and in quantile 10, when market conditions worsen, the value of ETH and XRP follows the current market price. In the 50 and 40 quantiles, BTC and BCH can be a safe haven, but in the 30 and 20 quantiles, BTC and BCH turn into diversifiers. In the worsening market conditions, BTC and BCH will follow the market flow. The findings support the study that cryptocurrencies can be diversifier instruments in certain situations for the Indonesian capital market during the Covid-19 pandemic. It follows the results of Feng *et al.* (2018) and Stensås *et al.* (2019).

The result of this analysis is represented in Table 4; it shows that BTC, ETH, USDT, and BCH can only act as a hedge. Besides, only XRP cannot act as a hedge. On the other hand, BTC, ETH, XRP, USDT, and BCH cannot serve as a safe haven for the Indonesian capital market in the Covid-19 pandemic era. It is indicated by a positive effect on CSPI in most quantiles and has a significant positive impact on CSPI at quantile 10 for all types of cryptocurrencies except USDT. USDT can act as a diversifier in the Indonesian capital market because USDT has a positive relationship with CSPI during market turbulence.

The result gives a practical implication when the Covid-19 pandemic, investors are advised to choose bitcoin, ethereum, tether, and bitcoin cash as hedging their assets. This finding also implies that investors should not constrain their preferences to the top five cryptocurrencies: bitcoin, ethereum, tether, ripple, and bitcoin cash and other instruments to escape during the Covid-19 pandemic.

CONCLUSION

The discussion reveals that bitcoin (BTC), ethereum (ETH), tether (USDT), and bitcoin cash (BCH) as cryptocurrencies can only act as a hedge. Still, they cannot serve as safe haven or robust, safe haven for the Indonesian capital market when the Covid-19 pandemic era. On the other hand, ripple (XRP) cannot act as a hedge and a safe haven for the Indonesian capital market when Indonesia hits by the Covid-19 pandemic era. In specific conditions, it can be a diversifier when market conditions get more extreme. Thus, BTC, ETH, XRP, USDT, and BCH start to follow market movements.

This research proves that all cryptocurrencies can act as hedges except for ripple. Thus, it is recommended in times of turmoil in the Indonesian capital market, such as current conditions. This research may be beneficial as a reference for the investors to observe cryptocurrencies in investing on Indonesia Stock Exchange (IDX) during the Covid-19 pandemic. It should be considered since bitcoin, ethereum, tether, and bitcoin cash can act as a hedge for the Indonesian capital market in the Covid-19 pandemic era. In contrast, ripple cannot act as a hedge for the Indonesian capital market in the Covid-19 pandemic era. Bitcoin, ethereum, ripple, tether, and bitcoin cash cannot serve as a safe haven for the Indonesian capital market in the Covid-19 pandemic era. Investors may choose other instruments that it is considered the safest places to escape during the Covid-19 pandemic. The role of bitcoin, ethereum, ripple, tether, and bitcoin cash as safe havens will fade when conditions in the Indonesian capital market become more extreme.

This study's limitation uses daily data by doing an observation period from January 2020 to June 2020 when the Covid-19 Pandemic phenomenon occurred in Indonesia. Future studies recommend adding the daily data period to get deeper into the potential variables because the data exists in this study.

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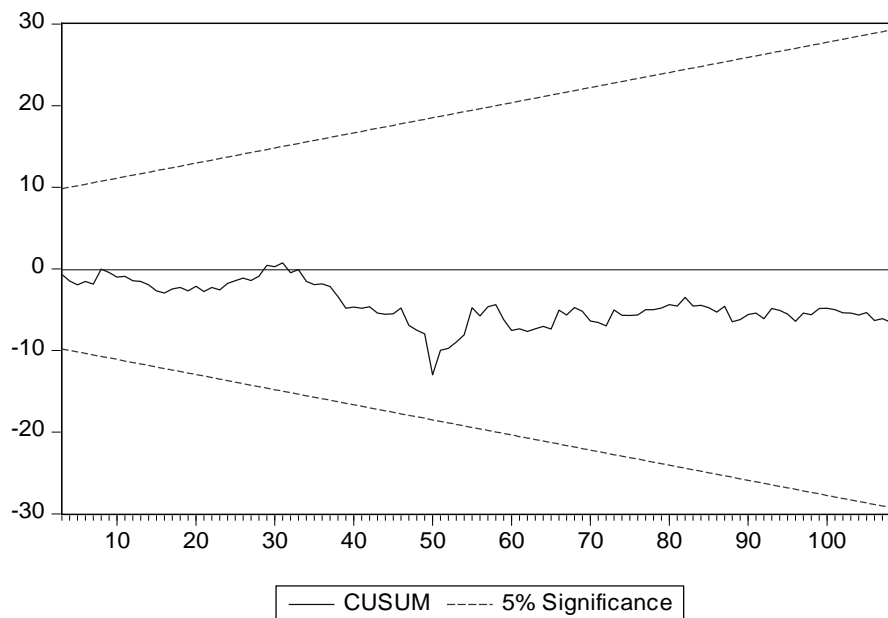
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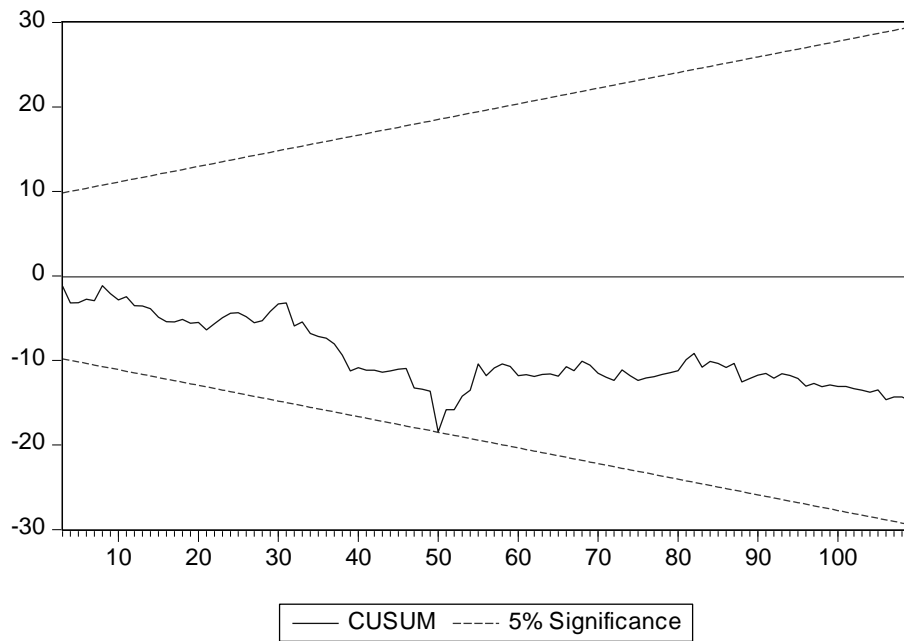
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APPENDIX

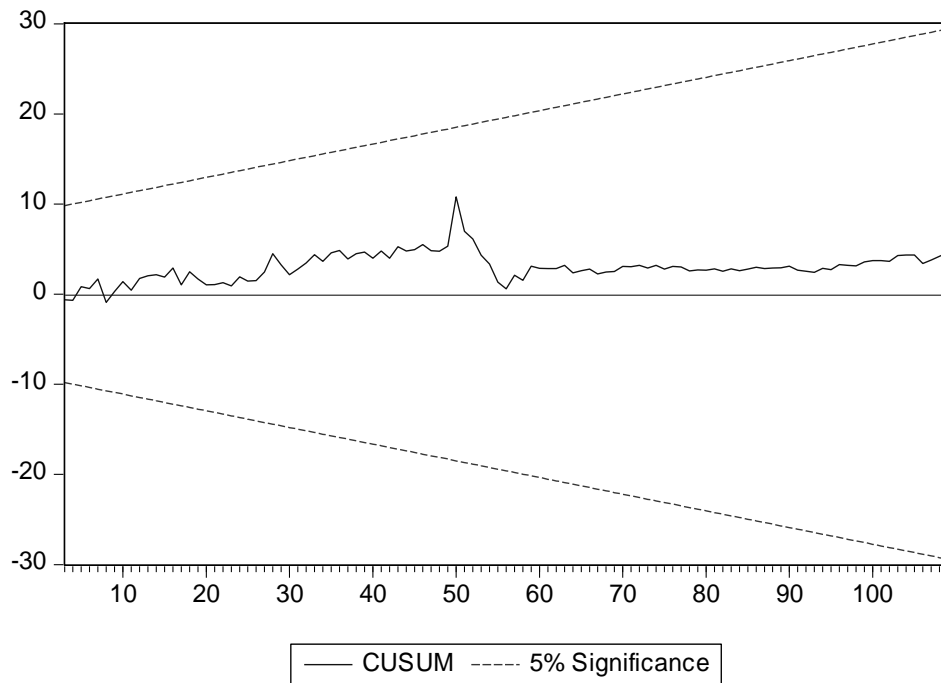
BITCOIN (BTC)



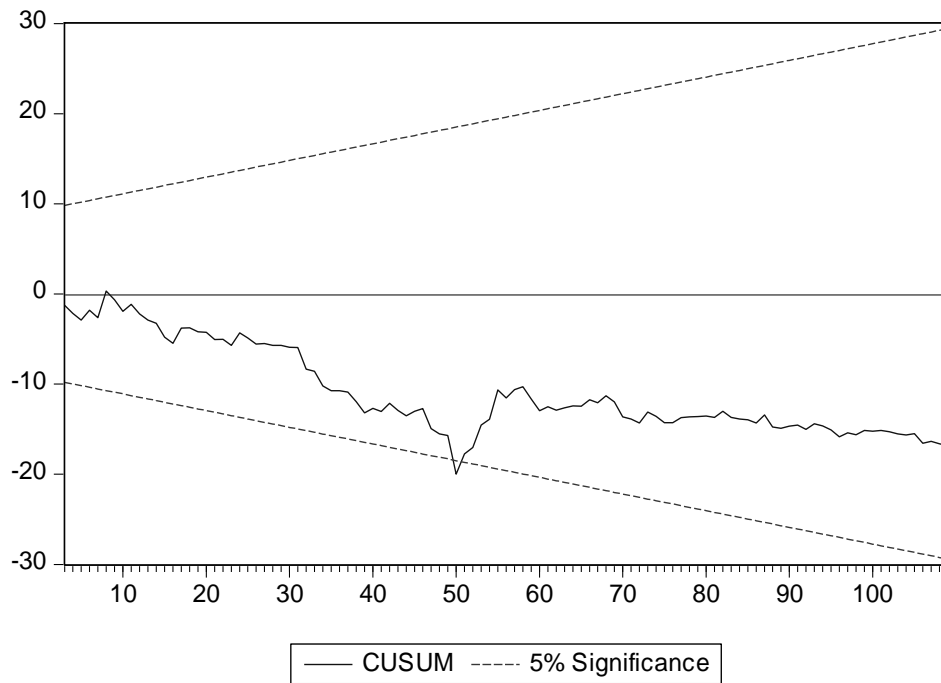
ETHEREUM (ETH)



RIPPLE (XRP)



TETHER (USDT)



BITCOIN CASH (BCH)