



Cryptocurrency and Tech Stocks in Indonesia

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Abstract. This study aims to test the effect of Bitcoin (BTC) and Ethereum (ETH) on the Indonesia Tech Stock Index (IDXTECHNO). BTC and ETH have the potential to become a hedge asset and haven if they are negatively correlated to IDXTECHNO. This research uses the GARCH model using daily closing prices from January 25, 2021, to April 13, 2022. The result of this study shows that BTC return has a significant negative effect on IDXTECHNO return. Hence, BTC tends to have the ability to function as a hedging instrument against IDXTECHNO. Whereas on the contrary, ETH turns out to have a significant positive effect on IDXTECHNO return. This situation signifies that ETH functions as a diversifier asset against IDXTECHNO. The upcoming research agenda will further study the testing of BTC and ETH function as a hedge asset against tech stock using a dynamic portfolio approach that can generate hedging effectiveness.

Keywords: Bitcoin · Ethereum · Tech Stock · IDXTECHNO

1 Introduction

At the moment, cryptocurrency has become one of the alternative investments. According to coinmarketcap.com, the capitalization of all globally-traded cryptocurrencies has reached over 1 trillion US dollars. In fact, in several countries, many financial institutions manage crypto hedge funds as investment instruments in the form of a portfolio containing several types of cryptocurrency.

The cryptocurrency with the largest market capitalization is bitcoin (BTC), which is around 445 billion USD. Meanwhile, Ethereum (ETH) is the cryptocurrency with the second largest market capitalization, more than 205 billion USD. The market capitalization of the two largest cryptocurrencies, i.e., BTC and ETH, alone have dominated over 65% of the market capitalization of all traded cryptocurrencies.

Several studies have found that cryptocurrency can be a hedging and safe haven alternative against stocks during a crisis (Tzouvanas et al., 2020; Koutmos et al., 2021; Chkili et al., 2021). The research carried out by Widarto et al. (2022) has also found that stock portfolios, including crypto hedge fund instruments, are proven to produce hedging effectiveness that can reduce overall stock portfolio risk.

However, there is still a research gap, which needs more consistent research concerning the relationship between bitcoin and Ethereum to the stock market index. Several kinds of research found a negative correlation between bitcoin and the stock market

index (Bedowska & Kliber, 2021; Mariana et al., 2021). However, several researchers also found that bitcoin has a significant positive correlation to the stock market index (Conlon & McGee, 2020; Choi Jin, 2021). The inconsistency in research findings concerning Ethereum and the stock market index can also be seen from several types of research which find a negative correlation between Ethereum and the stock market index (Bedowska & Kliber, 2021; Mariana et al., 2021; Melki & Nefzi, 2021), and several other types of research that find a positive correlation between Ethereum and stock market index (Bouri et al., 2020; Conlon et al., 2020).

In their research on the US stock market, Bouri et al. (2020) found that, among other various sectoral indexes, bitcoin has the most significant relationship to the tech stock index. This phenomenon becomes interesting considering that during the Covid-19 pandemic, stocks of technology-based companies are also the sector with the smallest downside effect (Aloui et al., 2022; Izzeldin et al., 2021).

Many technology companies have gone public, including the Indonesia stock exchange. Moreover, the Indonesia Stock Exchange authority launched a new sectoral index for listed companies engaged in the technology sector, IDXTECHNO, on January 25, 2021. Previous research has not analyzed the relationship between cryptocurrency and Indonesia Tech Stock. This situation makes the relationship between cryptocurrency and Indonesia Tech Stock an appealing topic for further study.

2 Literature Review

Baur and Lucey (2010) first introduced the concept of the hedge, haven & diversifier asset as assets that can reduce overall portfolio risk. A hedge is an asset that negatively correlates to other assets or the average of the overall portfolio in normal conditions. A haven is an asset that negatively correlates to other assets or the average of the overall portfolio in extreme market conditions. Meanwhile, an asset that positively correlates to other assets or the average of the overall portfolio is called a diversifier asset.

Bouri et al. (2020) presented that BTC and ETH have the potential to become hedge and haven assets because they are proven to have a negative correlation to stock market indexes in the US, Europe, and Asia Pacific. Meanwhile, the research carried out by Mariana et al. (2021) found that BTC and ETH also have a negative correlation to stock price indexes. In addition, the correlation between BTC and ETH to stock indexes also tends to increase during the period of Covid-19 period as compared to the period before Covid-19 (Ustaoglu, 2022).

3 Research Method

The data used in this analysis is secondary data observed from January 25, 2021, until April 13, 2022. Data concerning the tech stock index is the IDXTECHNO index data derived from the Jakarta Stock Index (JSI). While data of Bitcoin price and Ethereum price used are the daily closing price.

In this research, the first step is doing a stationary test using Augmented Dickey-Fuller Test on the IDXTECHNO, Bitcoin, and Ethereum return data used under this analysis. If the data used in this research has been proven to be stationary, this research will proceed to the next step, a hypothesis test using the GARCH model.

The equation model used in this study is as follows:

$$IDXTECHNO = \alpha + \beta_1 BTC + \beta_2 ETH + \varepsilon_t$$

whereas IDXTECHNO is the daily price of the IDX TECHNO index, BTC is the daily closing price of Bitcoin, and ETH is the daily closing price of Ethereum.

4 Result and Discussion

The first step in this research is to do a stationary test using Augmented Dickey-Fuller Test. The result from Augmented Dickey-Fuller Test is shown in Table 1, where it is obtained that each data of IDXTECHNO return, Bitcoin return, and Ethereum return has a p-value that is less than the significance level of 5%. This issue means that the data of IDXTECHNO return, Bitcoin return, and Ethereum return are stationary.

After all, data are ensured to be stationary. The next step in this research is to test the hypothesis of the relationship between bitcoin return to IDXTECHNO return and the relationship between Ethereum return to IDXTECHNO return. The result of the hypothesis test using the GARCH model is shown in Table 2.

From Table 2, it is shown that the Bitcoin return has a negative correlation coefficient to the IDXTECHNO return. In contrast, the Ethereum return has a positive correlation coefficient to the IDXTECHNO return. Both bitcoin return and Ethereum return have less probability value from the 5% significance level, and therefore both bitcoin return and Ethereum return have a significant correlation to IDXTECHNO return.

Table 1. Augmented Dickey-Fuller Test on the data of IDXTECHNO, Bitcoin, and Ethereum return

Null Hypothesis: RETURN_IDXTECH has a unit root
 Exogenous: Constant
 Leg Length: 6 (Automatic - based on AIC, maxlag=15)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.752140	0.0038
Test critical values:		
1% level	-3.452290	
5% level	-2.871095	
10% level	-2.571932	

Null Hypothesis: RETURN_BTC has a unit root
 Exogenous: Constant
 Leg Length: 0 (Automatic - based on AIC, maxlag=15)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-17.89234	0.0000
Test critical values:		
1% level	-3.451847	
5% level	-2.870899	
10% level	-2.571828	

Null Hypothesis: RETURN_ETH has a unit root
 Exogenous: Constant
 Leg Length: 3 (Automatic - based on AIC, maxlag=15)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.955728	0.0000
Test critical values:		
1% level	-3.452066	
5% level	-2.870996	
10% level	-2.571880	

Table 2. GARCH (1, 1) between IDXTECHNO return with Bitcoin return and Ethereum return

Dependent Variable: RETURN_IDXTECH

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 05/18/22 Time: 14:48

Sample: 1/26/2021 4/28/2022

Included observations: 303

Convergence was achieved after 23 iterations.

Coefficient covariance computed using the outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001331	0.001326	1.003633	0.3156
RETURN_BTC	-0.093846	0.046794	-2.005522	0.0449
RETURN_ETH	0.123555	0.028343	4.359202	0.0000
Variance Equation				
C	4.41E-05	1.72E-05	2.570201	0.0102
RESID(-1)^2	0.203057	0.060137	3.376599	0.0007
GARCH(-1)	0.759362	0.041554	18.27420	0.0000
R-squared	-0.041911	Mean dependent var		0.005579
Adjusted R-squared	-0.048857	SD dependent var		0.032374
SE of regression	0.033156	Akaike info criterion		4.448194
Sum squared resid	0.329786	Schwarz criterion		4.374654
Log-likelihood	679.9013	Hannan-Quinn criteria.		4.418773
Durbin-Watson stat	1.133717			

5 Conclusion

Based on this research, Bitcoin return is proven to have a significant negative correlation to IDXTECHNO return. In comparison, Ethereum has a significant positive correlation to IDXTECHNO's return. At the same time, the movement of IDXTECHNO tends to be in the opposite direction with bitcoin return and turns out to be in the same direction with Ethereum return.

This issue indicates that bitcoin tends to play a role as a hedge asset against tech stocks because IDXTECHNO return tends to move in the opposite direction as Bitcoin return. In contrast, Ethereum tends to be a diversifier asset against IDXTECHNO. The movement of the IDXTECHNO return is in the same direction as the Ethereum return.

However, the future research agenda can further study the role of bitcoin and Ethereum as hedge and haven assets against tech stocks with a dynamic portfolio approach that can produce hedging effectiveness.

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