The Effect of Cryptocurrency Returns and Cryptocurrency Volume on the Stock Price Index of Indonesia, Singapore, Thailand

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Article Information	ABSTRACT
	The title of this study is to analyze the effect of cryptocurrency returns and cryptocurrency volume on the stock price indices of Indonesia, Singapore and Thailand. This research was conducted using the panel data regression method by combining cross section data with time series data using Eviews software. This study uses cryptocurrency returns and volumes in a weekly period from 1 January 2018 to 31 December 2021 for 48 weeks for each country with a total of 144 data. The results of this study indicate that cryptocurrency returns have a significant positive effect on the stock price indexes of Indonesia, Singapore, and Thailand. and cryptocurrency volume has a significant positive effect on the stock price indices of Indonesia, Singapore and Thailand.

INTRODUCTION

National economic growth has led to significant changes in the financial sector, especially payment instruments (Harahap et al., 2017). Starting with barter, it developed into goods/commodities and ended with the use of metal and paper as money items. The evolution of the role of money as a means of payment continues to change form, namely as a means of payment of checks and demand deposits, allowing payment transfers from the image of accounts between financial institutions, especially banks. One form of online commerce transactions (e-commerce) today is to use e-money payment instruments (electronic money). Electronic money (digital money) is money used in internet transactions by electronic means. According to Rivai (2007) Electronic money is a method of electronic payment that can be obtained by making a payment in advance to the issuer directly or through the issuing office, or with a bank account, and the value of money in the electronic money media operates in Rupiah units and is used for payment transactions.

Electronic money began to become a phenomenon in society since the emergence of crypto currency (cryptocurrency) as a manifestation of technological developments in ecommerce activities. Cryptocurrency is a series of cryptographic codes that are formed in such a way that they can be stored in computer devices and can be transferred like electronic mail and allow them to be used as a means of payment in a commercial transaction (Hassani et al., 2022). The cryptocurrency market is considered a major fintech innovation that facilitates transactions and plays an important role as a medium of exchange (Abramova et al., 2021). For example, cryptocurrencies occupy a special place in the international financial market, especially after their rapid development and rapid expansion. Cryptocurrency is currently attracting many enthusiasts among the public as an option for investing and trading. There are more than 300 million cryptocurrency investors worldwide in 2021 and more than 18 thousand companies already accept payments with cryptocurrencies (katadata.co.id). Cryptocurrency or crypto currency is starting to become a very popular investment instrument. The cryptocurrency market offers investors some exciting opportunities that are likely to affect the performance of the stock market.

The cryptocurrency market as a potential investment option includes investments in money market instruments, capital markets, exchange rates, commodities, bonds, and more recently investments in cryptocurrencies such as Bitcoin and Ethereum (Chania et al., 2021). Cryptocurrencies are one of the most popular investment and transaction options in the financial world. Cryptocurrency is a digital currency and digital financial asset formed using blockchain technology to verify payment transactions. Current studies assume that the stock market is driven by three main factors: Fundamental, macroeconomic and institutional factors (Niroomand et al., 2014). Based on the above literature, this paper introduces the cryptocurrency market as an additional factor that determines the performance of the stock market.

The influence between stock prices and cryptocurrency movements has received a lot of attention from researchers and the public. This issue is becoming more important as market integration between traditional financial assets and cryptocurrencies increases (Bouri et al., 2018). When cryptocurrency prices rose sharply in 2017, cryptocurrencies gained worldwide attention, and investors began allocating large sums of money from their investments to this new type of financial asset. In 2008 cryptocurrencies emerged as a new means of investing in the global financial system (Nakamoto, 2008). The cryptocurrency market, which currently includes more than 5,000 currencies, is a newly developed financial tool derived from blockchain technology (Coinmarketcap, 2020). Cryptocurrency is a global trading and exchange activity with several advantages related to high security, no border boundaries, decentralization and transparency (Abboushi, 2017; Filbert, 2017).

Sihombing et al., (2020) found that cryptocurrency returns have a positive effect on banking stock prices in Indonesia. Which, if the price of cryptocurrency increases, then the price of banking stocks will also increase (Corbet et al., 2018; Trimborn et al., 2019). This is according to the results of Liu's (2019) research which built 6 classic portfolio models to test the benefits of diversification in 10 different cryptocurrencies from Bitcoin, Ethereum, Litecoin, Monero, Ripple, Stellar, Dash, Tether, Verge, and NEM, the results show that diversification between these currencies increases portfolio diversification. In a similar work, Wang et al., (2019) assessed the potential use of a large group of cryptocurrencies to hedge against stock market risk. Their results suggest that a mix of large-cap stocks with cryptocurrencies could lead to portfolios with lower levels of risk. Conrad et al., (2018), Shahzad et al., (2019); Ozturk (2020) researched more about bitcoin's role in short-term and long-term risk reduction, their results provide clues about the potential benefits of bitcoin diversification in the long term due to the low rate of return correlation with traditional assets and gold, especially during volatile periods, and these results are in line with the findings of Baur &; Dimpf (2021); Baumöhl (2019) who asserts that Bitcoin's returns are not correlated with conventional assets such as stocks or bonds, and thus can be a potential asset for portfolio diversification.

In general, crypto asset trading volume is the total number of asset units traded on all exchanges (centralized and decentralized) in a given period of time. However, exchanges will usually only display the volume traded. Trading volume is an important metric in the crypto market as it supports various technical indicators such as liquidity, market trends, market forces, accumulation, and market reversals. Usually when the trading volume of a cryptocurrency is high it can mean a price increase and a low cryptocurrency volume can indicate a price drop (Sofi.com). Research on cryptocurrency volume conducted by Sami & Abdallah (2020), suggests that there is a negative influence of cryptocurrency volume on stock price indices. But different results were put forward by Katsiampa et al., (2018), Bouri et al., (2018), and Naeem et al., (2019) who stated that the volume of cryptocurrency has a positive effect on cryptocurrency returns, and the increase in cryptocurrency returns indicates a positive influence on the stock price index.

In 2021, the Commodity Futures Trading Supervisory Agency (Bappebti) as the authority that regulates this matter, issued an update regarding crypto assets in Indonesia. Until early 2021, there are 13 companies that have obtained registration marks from Bappebti as prospective physical traders of crypto assets. The number of crypto investors in Indonesia doubled in 2021 to more than 12 million people, according to data from the Commodity Futures Trading Supervisory Agency (Bappepti). Singapore is one of the most forex-friendly countries in the world, and its crypto regulatory framework is very effective. The country has a Cryptocurrency and Blockchain Industry Association (CBIA) that focuses on helping small and medium-sized businesses thrive in the industry. In addition, Singapore has a modern regulatory structure covering a wide range of financial system-related activities. These factors make Singapore an ideal destination for investors looking to establish a presence in the crypto industry. Thailand leads the world in the proportion of internet users owning cryptocurrencies at 20.1% aged 16-64, it is clear why many companies choose to invest or facilitate this very popular and rapidly growing market, gradually changing the dynamics of money and finance with important implications for the country's future. Notably, SCB (Siam Commercial Bank) bought a cryptocurrency exchange through a cryptocurrency exchange company (Bitkub), last November for 18 billion baht. This propelled the unicorn startup, which started in 2018, into the top ten of global cryptocurrency exchanges. Thai companies are supporting this trend and now accept cryptocurrencies as payment for goods and services.

METHODS

The population in this study is cryptocurrencies listed on the Indonesia Stock Exchange (IDX), Singapore Stock Exchange, and Thailand Stock Exchange during the period January 1, 2018-December 31, 20221 with data in weekly. As well as price changes from the stock price indices of Indonesia, Singapore and Thailand in the weekly period starting from January 1, 2018 - December 31, 2021. Sample selection is carried out using the purposive sampling method, which is a sampling method that is adjusted to certain criteria.

There are two variables in this study, namely the dependent variable and the independent variable. The independent variables in this study were cryptocurrency return and cryptocurrency volume. The dependent variables in this study are the stock price indices of Indonesia, Singapore and Thailand. The research variables used in this study can be seen in Table 1 below.

Table 1. Variable Indicators

Variable	Indicators
Return on cryptocurrency	$\text{return} = \dfrac{P_t - P_{t-1}}{P_{t-1}}$
Cryptocurrency volume	Changes in *cryptocurrency volume* every week
Indonesia stock index (JCI)	JCI price changes every week
Singapore stock index (STI)	STI price changes every week
Stock indices of Thailand (SETI)	SETI price changes every week

RESULTS

1. Descriptive Analysis

Table 2. Descriptive Statistics of Research Variables

	Y	X1	X2
Mean	-0,003051	0,075112	0,158683
Maximum	0,212000	0,797600	5,339300
Minimum	-0,489000	-0,540800	-0,944900
Std. Dev.	0,066008	0,303119	0,801139
Observations	141	141	141
Cross sections	3	3	3

Source: Descriptive Statistical Data Processing Results

Based on Table 2 above, the following can be explained:

a) The average Stock Price Index of Indonesia, Singapore and Thailand (Y) is -0.003051, the minimum value is -0.489000, the maximum value is 0.212000, and the standard deviation is 0.066008 with the number of observations (n) of 141. The average value of the Indonesia, Singapore, and Thailand Stock Price Index (Y) is close to the standard deviation value of 0.066008, thus the deviation of Indonesia, Singapore, and Thailand (Y) Stock Price Index data is low.

b) The average *Return on Cryptocurrency* (X1) is 0.075112, the minimum value is -0.540800, the maximum value is 0.797600, and the standard deviation is 0.303119 with the number of observations (n) of 141. The average value of Return Cryptocurrency (X1) is close to the standard deviation value of 0.303119, thus the deviation of *Return Cryptocurrency* (X1) data is low.

c) The average *Cryptocurrency* Volume (X2) is 0.158683, the minimum value is -0.944900, the maximum value is 5.339300, and the standard deviation is 0.801139 with the number of observations (n) of 141. The average value of Cryptocurrency Volume (X2) is close to the standard deviation value of 0.801139, thus the deviation of *Cryptocurrency* Volume (X2) data is low.

1.1 Chow Test and Hausman Test

Model selection in this study used the Chow and Hausman tests to select Common *effect, Fixed* Effect or *Random Effect* models. Here is a table of Chow test results and Hausman test:

The Chow test is used to choose between a common effect model or *a fixed effect model*. To determine the estimation model can be seen from the magnitude of the probability value, if the probability value < 0.05 then the *Fixed effect model* will be chosen for the estimate, and vice versa.

Table 3. Model Selection Results with Chow Test

Type	Chow Test	Probability	Model Selection Results
Yit= α+ β1X1it + β2X2it + e	23,095744	0,0000	Receive *Fixed Effects*

Source: Appendix of Chow Test Data Processing Results

From the Chow test result table for equation model selection:

Yit = α+ β1X1Eit + β2X2it + β3X3it + e above shows that the Chow Test probability value of **0.0000 is smaller than alpha 0.05 (0.0000** < 0.05), so it can be concluded that the *Fixed Effect* **model is** good for estimate.

The Hausman test is used to choose between a random effect model or *a fixed effect model*. To determine the estimation model can be seen from the magnitude of the probability value, if the probability value < 0.05 then **the** *Random effect model* will be chosen for the estimate, and vice versa.

Table 4. Model Selection Results with the Hausman Test

Type	**Hausman Test**	**Probability**	**Model Selection Results**
Yit= α+ β1X1it + β2X2it + e	24,181168	0,0000	Receive *Random Effect*

Source: Appendix of Hausman Test Data Processing Results

 From the table of Hausman test results for equation model selection:

Yit = α+ β1X1it + β2X2it + e **above shows that the value of the** Hausman Test probability value of **0.0000 is smaller than alpha 0.05 (0.0000** < 0.05), so it can be concluded that the *Random Effect* **model** is good for estimation.

1.2 Test Hypothesis T

Table 5.   Results of Random Effect Model Estimation GLS Method

Variable	**Regression Coefficient**	**Standart Error**	**Probability**
Constant	-0,016597	0,002849	0,0000
X1	0,147962	0,017537	0,0000
X2	0,015324	0,006635	0,0224
R² : 0.712			
Adjusted R² : 0,708			
F-test : 174.184, Sig. 0.000			
N : 141			

Source : Appendix of *Random Effect* Model Data Processing Results

a.   Testing the Effect of *Cryptocurrency Return* (X1) on the Stock Price Index of Indonesia, Singapore, and Thailand (Y).

With *the level of Level of Significant* (α) = 5% = 0.05.

Based on the results of data processing obtained a value of 0.000 < 0.05, then Ha is accepted and concluded that there is a positive and significant influence of the *variable Return Cryptocurrency* (X1) on the Stock Price Index of Indonesia, Singapore, and Thailand (Y).

b.   Testing the Effect of *Cryptocurrency* Volume (X2) on the Stock Price Index of Indonesia, Singapore, and Thailand (Y).

Level *of Significant* (α) = 5% = 0.0 5

Based on the results of data processing obtained values of 0.0224 < 0.05, it was concluded that there was a positive and significant influence of the *variable Cryptocurrency* Volume (X2) on the Stock Price Index of Indonesia, Singapore, and Thailand (Y).

2. Discussion

2.1 The Effect of Cryptocurrency Return (X1) on the Stock Price Index of Indonesia, Singapore, and Thailand (Y)

The results of multiple regression analysis of the *Random Effect* model show that *Return Cryptocurrency* (X1) has a positive and significant effect on the Stock Price Index of Indonesia, Singapore, and Thailand (Y). This means, if the *Return of Cryptocurrency* (X1) increases, then the Stock Price Index of Indonesia, Singapore, and Thailand (Y) will increase significantly. *Cryptocurrency* is a digital currency and digital financial asset that can be used as an alternative investment that can be done such as investment in money market instruments, capital markets, foreign exchange, commodities, obigasi and the latest is investment in *cryptocurrency.* In this study, Indonesia, Singapore, and Thailand are countries that accept *cryptocurrency* as a promising investment tool.

In 2019, the Futures Trading Supervisory Agency (Bappebti) of the Ministry of Trade issued a registered statement for cryptocurrency trading companies. The crypto asset trading mechanism is further promulgated in Bappebti Regulation Year 2019 Number 5 Technical regulations to regulate the physical market of crypto asset futures exchanges. In early 2021 (Bappebti) as the authority that regulates *cryptocurrencies* that

currently there are 383 types of crypto assets that can be traded in Indonesia. *Cryprocurrency* trading is increasing rapidly as noted by the Indonesian Blockchain Association in July 2022 there are around 18.4% crypto ownership in Indonesia of the total world ownership (katadata.co.id), but Indonesia is not included in the list of Top 10 crypto-hubs in the world at the beginning of 2023 where this *crypto-hub* is the country with the largest number of users in the world today. This can prove that *cryptocurrency* is an investment tool that is accepted and in demand by investors in Indonesia. The same thing also happens in Singapore which is known as one of the countries in Asia that is quite high in technology consumption. Singapore's *cryptocurrency* regulator has an effective regulatory framework. The government of Singapore through the Monetary Authority of Singapore (MAS) is working with several payment institutions to ensure that the emergence of cryptocurrency sales platforms continues to enforce the rules. Singapore is also encouraging the banking industry to collaborate and compete in research on the use of *blockchain* as a cross-border interbank payment solution. Cryptocurrency investment in Singapore jumped sharply by around 25% as of July 2022 (katadata.co.id). This is a record high while reinforcing Singapore's assumption as a crypto-hub country as a digital asset that makes Singapore occupy the fourth position in the list of "Top 10 *crypto-hubs* in the world" in early 2023. While the Thai government has not been fully open to *cryptocurrencies*, uniquely, Thailand's capital city, Bangkok, is emerging as a new crypto hub. Thailand has a fairly high crypto ownership rate of around 21.3% as of July 2022 (katadata.co.id). *BeinCrypto stated* that Thailand entered the list of "Top 10 *Crypto-hubs* in the world", ranked tenth, despite the Thai government's non-openness to cryptocurrencies apparently Thais think differently because they feel that investing in *cryptocurrencies* benefits them.

Based on the explanation above, itwas found that the positive influence of *cryptocurrency returns* on the stock price indices of Indonesia, Singapore and Thailand is due to its investors, the crypto market has much easier regulation because they do not have minimum daily buying rules and trading 24 hours a day and seven days a week. These low barriers make the crypto market attractive to both new and novice traders especially within the Millennial and Gen-Z demographics. Crypto trading can serve as a gateway to stock trading. An increase in participants in one market can lead to an increase in participants in another. And also any major changes or trends in the crypto market will have an impact on the stock price movements of companies owning or operating in the crypto market. For example, if a *cryptocurrency* experiences a rapid rise , the shares of companies that mine *cryptocurrencies* can also experience a rapid rise. In addition, the positive influence of cryptocurrency *returns* is also caused by cryptocurrency can be used as an investment option to diversify portfolios due to the low correlation and even a negative correlation between *cryptocurrency* and stock prices. This portfolio diversification theory is supported by the results of research by Gil-Alana et al., (2020) and Hassanudin (2021), which state that there is a negative correlation between cryptocurrencies and stock prices, so that there is a significant role of cryptocurrencies in investors' portfolios because it serves as a diversification option that confirms that *cryptocurrencies* are a new investment asset class, investors see *Cryptocurrencies* as a complement to their portfolio are not a substitute.

The results of this study are in line with research conducted by Sami & Abdallah (2020), Gil-Alana *et al.,* (2020), and Hassanudin (2021) which states that *cryptocurrency returns* have a positive effect on stock price indices.

2.2 Effect of Cryptocurrency Volume (**X2**) on Indonesia, Singapore, and Thailand Stock Price Index (Y)

The results of multiple regression analysis of the *Random Effect* model show that *Cryptocurrency* Volume (X2) has a positive and significant effect on the Stock Price Indices of Indonesia, Singapore, and Thailand (Y). This means, if the Volume *of Cryptocurrency* (X2) increases, then the Stock Price Index of Indonesia, Singapore, and Thailand (Y) will increase significantly.

Cryptocurrency trading volume is the sum of all trades for a particular coin that occur on centralized (CEX) and decentralized (DEX) crypto exchanges during a given time frame. Cryptocurrency trading volume is an important metric for understanding market trends. Price movements accompanied by high volumes of *cryptocurrencies* indicate the beginning of a strong trend, high volumes accompanied by an uptrend indicate high buyer interest pushing asset prices higher. A large increase in volume often indicates a lot of interest in a particular coin and most likely an increase in price, in addition to this increase in volume also indicates an increase in *cryptocurrency returns* so there is a possibility of affecting the stock price index. Volume in the crypto market has predictive power for its returns (Chen et al., 2016). In addition to the discussion above, there is a possibility that this result will be obtained because the increase in the *volume of cryptocurrencies* moves in the same direction as their liquidity. Liquidity in *cryptocurrency* is the ease of buying or selling a particular asset quickly without harming the value of the asset. Trimborn et al. (2017) suggest a *risk-preturn* optimization approach related to liquidity due to the high liquidity of cryptocurrencies to optimize stock

portfolios, so that the positive influence of *cryptocurrency* volume on the stock price indices of Indonesia, Singapore, and Thailand due to increased volume can indicate that *cryptocurrencies* It is liquid and good to invest.

This result is not in accordance with the results of Sami & Abdallah's (2020) research; Akinci & Li (2018) who stated that *volume cryptocurrency* has a negative influence on the Stock Price Index. The results of this study rejected the hypothesis because it was found that the *volume of cryptocurrencies* had a significant positive effect on the stock price indices of Indonesia, Singapore and Thailand.

CONCLUSION

Based on data analysis and discussion, conclusions and suggestions are described as follows: The results show that H1 is accepted, where the Return of Cryptocurrency (X1) has a positive and significant effect on the Stock Price Index of Indonesia, Singapore, and Thailand (Y). This means, if the Return of Cryptocurrency (X1) increases, then the Stock Price Index of Indonesia, Singapore, and Thailand (Y) will increase significantly. The results of the analysis show that H2 was rejected because the results of Cryptocurrency Volume (X2) had a positive and significant effect on the Stock Price Indices of Indonesia, Singapore, and Thailand (Y). This means, if the Volume of Cryptocurrency (X2) increases, then the Stock Price Index of Indonesia, Singapore, and Thailand (Y) will increase significantly.

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