Effect of World Oil Prices on Cryptocurrency Return

Mohd. Heikal[1], Maulana Majied Sumatrani Saragih[2], Rico Nur Ilham[3], Muammar Khaddafi[4], Rusydi[5]
[1,3,4,5] Faculty of Economic and Business Universitas Malikussaleh
[2]CV.Radja Publika
Corresponding Author: mohdheikal@unimal.ac.id

Abstract
This study aims to determine the effect ofWorld Oil Priceseffect on Return Cryptocurrency. The researcher uses a descriptive quantitative approach. Replication research is the repetition of the basic experiment. The analytical method used is multiple linear regression model. As for the results of this study, the variable World Oil Price (X) can explain the Return Cryptocurrency variable (Y) of 27.9%.variableWorld Oil Prices(X) significant effectagainst the Return Cryptocurrency variable (Y). Oil price fluctuations on the world market have an effect on Cryptocurrency Return. In this study, it is found that fluctuations in oil prices in the world market have a positive impact on Cryptocurrency Return. That is, the increase in oil prices encourages the rise of Cryptocurrencies. Researchers suggest to pay more attention to world oil prices first before other commodities, because the impact of world oil prices is very large on commodity prices worldwide. So, for example, a decline in world oil prices can affect Cryptocurrency Return.

Keywords: World Oil Prices and Cryptocurrency Returns.

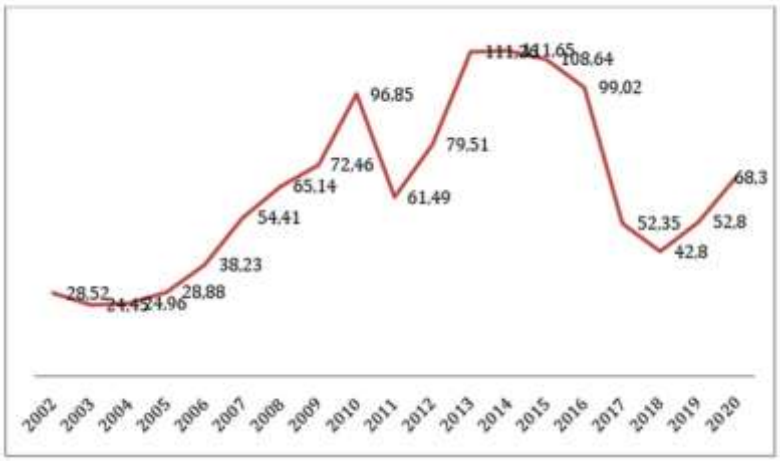
Introduction

Indonesia is known as a country rich in natural resources, the results of mining goods owned by Indonesia are also very abundant. Research conducted by Indonesia Policy Briefs said that Indonesia as one of the largest oil producers in the world, Indonesia became one of the important countries in the mining sector in the world (www.worldbank.org). Developments that occur in the mining sector index can be shown by changes in stock prices and the prices of cryptocurrencies traded. Cryptocurrency price movements can provide clues about the ups and downs of buying and selling cryptocurrencies. The fluctuations in supply and demand occur due to many factors, both internal (company performance) and external (exchange rates, interest rates, inflation, world oil prices).

The world oil price is a factor that affects the conditions on cryptocurrencies. Mining goods which are dominated by types of goods that can be used as energy sources are substitutes for the world's oil. So that the movement of world oil prices will also be followed by stock prices and cryptocurrencies. The increase in world oil prices, which was also followed by an increase in the price of mining goods, the increase in the price of mining products, increased the price of cryptocurrencies. The increase in cryptocurrency prices can move cryptocurrencies through the positive sentiment of cryptocurrency investors. So that the mining sector cryptocurrency index also increases following the increase in world oil prices. The mining sector not only has a high degree of dependence on fluctuations in world oil prices, Mining companies also depend on technology, foreign capital and imported materials. Mining companies carry out relatively high international trade activities through the export of mining products. Thus, mining companies are very sensitive to changes in exchange rates. Exchange rate fluctuations have the potential to affect the company's internal conditions which can ultimately lead to the risk of loss to the company. The decline in the rupiah exchange rate can also cause the company's total debt and production costs to increase significantly when valued in rupiah. Exchange rate fluctuations have the potential to affect the company's internal conditions which can ultimately lead to the risk of loss to the company. The decline in the rupiah exchange rate can also cause the company's total debt and production costs to increase significantly when valued in rupiah. Exchange rate fluctuations have the potential to affect the company's internal conditions which can ultimately lead to the risk of loss to the company. The decline in the rupiah exchange rate can also cause the company's total debt and production costs to increase significantly when valued in rupiah.

Petroleum as the main global energy has a very important role for the development of modern industry and the economy, therefore it is not surprising that petroleum is widely contested by countries in the world. Fluctuations in world oil prices have always been seen as a measure of the world's economy, so their changes have

often become hot topics for discussion in economic and political forums in several countries. The demand for petroleum as a world energy source raises several problems caused by an imbalance between supply and demand. Some of the factors that create this imbalance include the rapid rate of population growth and the massive industrialization of the world. This increases the world's energy consumption and causes the depletion of energy reserves, especially fossil energy.



Source: US Energy Information Administration (EIA), 2020

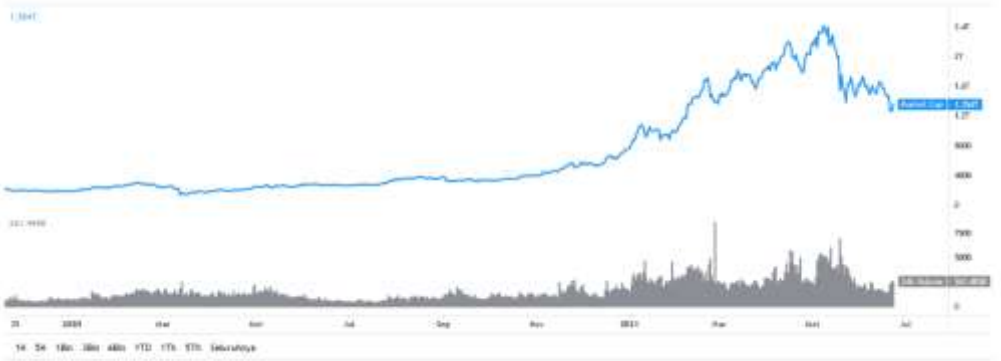
Figure 1.1
Average World Oil Price (Brent) in 2020 (Dollar per Barrel)

In line with the movement of international oil prices, the price of Indonesian crude oil or Indonesian Crude Oil Price (ICP) also experienced the same volatility. In principle, changes in oil prices in addition to potentially lowering export and import performance are also able to increase government revenues through oil and gas taxes, although on the other hand this means that the government spends more on subsidies. According to data from the 2017 BP Statistical Review, it is known that Indonesia's energy consumption in 2018 increased by 3.9 percent. Total oil production to meet consumption needs in 2018 only reached 54 percent. This means that domestic demand for oil that is not accompanied by an adequate amount of production requires Indonesia to import oil in order to maintain a conducive economy.

*Cryptocurrency*which is also called Virtual Currency (virtual currency or crypto currency) has become one of the topics that has attracted a lot of attention from various groups such as the general public, investors, and policy makers in recent years because of its rapid development and increasing market value.(Corbet, S., Meegan, A., Larkin, C., Lucey, B., & Yarovaya, 2017). According to(Sovbetov, 2018)Cryptocurrency is a digital or virtual currency that uses cryptography for its security system. Cryptography provides a mechanism that securely encodes the cryptocurrency system rules within the system itself(Narayanan, A., Bonneau, J., Felten, E., Miller, A., Goldfeder, S., & Clark, 2016). Cryptocurrencies use decentralized control that distinguishes them from centralized electronic money and central banking systems(Jaysing Bhosale, 2018).

In Indonesia itself, cryptocurrency has been inaugurated by CoFTRA (Commodity Futures Exchange Trading Supervisory Agency) which includes cryptocurrency as one of its commodity groups and there have been official regulations regarding the technical provisions of the physical market for crypto assets (crypto assets) on futures exchanges through regulation No. 5 years. 2019(Bosnia, 2018), making cryptocurrency even more interesting to research because of the large growth opportunities in the future even in Indonesia itself. Cryptocurrencies are entered into crypto stock exchanges, in several countries have opened and legalized cryptocurrency stock exchanges. CryptoSecurities Exchange (CSX) which became the world's first blockchain-based stock exchange. The exchange is registered with the United States Securities and Exchange Commission (SEC). In Indonesia itself has a digital currency exchange that has been registered with the Commodity Futures Trading Regulatory Agency (CoFTRA) and officially has CISA/CISSP certification. namely the Indonesian Crypto-Asset Exchange Monitoring System or the Indonesian Crypto-Asset Exchange Monitoring System by Digital Future Exchange Indonesia (DFX).(Umah, 2020).

The fact is that Cryptocurrencies do have a significant return / rate of profit, but on the other hand, cryptocurrencies also have a high potential for investment risk, here are some data / sources that the authors found in the research. Cryptocurrencies have extreme volatility, spikes in price increases and decreases very quickly, high volatility is a reflection of the level of risk faced by investors. Cryptocurrency volatility is only influenced by past prices and is not influenced by other variables so it is difficult to predict(Warsito, OLD, & Robiyanto, 2019). The next fact is the high profit potential of cryptocurrency investments is supported by price increases that are beyond common sense. Because the basic value of cryptocurrencies based purely on buying and selling power is not guaranteed by anything, it is not uncommon for cryptocurrencies to have a decrease or increase of more than 20% in a day which can actually be used to trade for profit. Fluctuating cryptocurrency values increase the possibility of greater potential losses and gains compared to other investments.



Source: coinmarketcap.com

Figure 1.3
Increase in Crypto Prices Period 2021

One of the investments that is increasing in demand from 2020 to 2021 is investing in digital currencies or commonly called Cryptocurrencies. Cryptocurrency is a technology of creating digital currency that uses cryptography for security which makes it impossible to counterfeit. Usually a currency in Cryptocurrency is called a coin. Cryptocurrency value movements are very unstable, can go up and down very quickly. As such, it is difficult to think of Bitcoin as an efficient currency to invest in. George Soros in(Ferraro, P., King, C., & Shorten, 2018)states that Bitcoin is not a currency because of the element of speculation there. The author also observes historical data on the movement of cryptocurrency values in recent years, it can be concluded that the volatility of cryptocurrencies is very high.

Research Method

Quantitative Research is a research method that emphasizes the aspect of measuring objectively on social phenomena. To measure, each social phenomenon is described in several components of the problem, variables and indicators.(Sugiyono, 2012)The purpose of quantitative research is to develop and use mathematical models, theories or hypotheses related to natural phenomena. The measurement process is a central part of quantitative research, because it provides a fundamental link between empirical observations and the mathematical expression of quantitative relationships..

Methods of data collection by using the method of literature and documentation methods. The library method, namely by getting data from reading and studying written sources or references related to the problems discussed. Documentation method, namely by obtaining data from documents in the form of Cryptocurrency (Bitcoin) price reports through the websitewww.indodax.com. The analytical method used is a simple linear regression model to determine the direction of the relationship between the independent variable and the dependent whether each variable is positively and negatively related whose equations are

Results and Discussion

Crypto Assets are digital assets that use cryptography, peer-to-peer networks and public ledgers to manage new unit generation, verify transactions and secure transactions without intermediary intervention. The definition of crypto assets has the same elements as the definition of cryptocurrency. This is because crypto assets began as cryptocurrencies when bitcoin was launched in 2009, but there have been many developments in crypto technology so that cryptocurrencies are not able to cover all existing crypto products. Crypto assets have many functions and uses, depending on the purpose of the crypto asset owner and the type of crypto asset itself. Crypto assets can be used as a means of payment and can also be used as an investment instrument because their value is very volatile.

The lowest crude oil production in 1980-2020 was of 40.73 million tons and the highest was 81.01 million tons, while the average of crude oil production, which is 63.45 million tons. World oil prices are also a factor in the amount of oil imports where price also affects the level of supply and demand of the country in the world until now the lowest price in 1998 was 12.72 US$ while the highest in 2020 was 111.67 US$. Ascension and this decrease in price occurs because of supply and demand from crude oil so that world crude oil prices tend to fluctuate.

3.1 Normality test

Normality test aims to test whether in the regression model, the confounding or residual variables have a normal distribution (Ghozali, 2016:154).

Table 3.1. One Sample Kolmogorov Smirnov Test

One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			210
Normal Parameters, b	mean		,0000000
	Std. Deviation		2979,27926068
Most Extreme Differences	Absolute		,210
	Positive		,210
	negative		-,135
Test Statistics			,210
asymp. Sig. (2-tailed)			,324c
Monte Carlo Sig. (2-tailed)	Sig.		,534d
	99% Confidence Interval	Lower Bound	,224
		Upper Bound	,335

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Based on 10000 sampled tables with starting seed 2000000.
Source: Processed data (2022)

From the internal output, it can be seen that the significance value (Monte Carlo Sig.) of all variables is0.534 If the significance is more than 0.05, then the residual value is normal, so it can be concluded that all variables are normally distributed.

3.2 Multicollinearity Test

The multicollinearity test aims to determine whether there is a correlation between the independent variables in the regression model. The multicollinearity test in this study is seen from the tolerance value or variance inflation factor (VIF). The calculation of the value of tolerance or VIF with SPSS 25.00 for windows program.

Table 3.2 Multicollinearity Test Results

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1555,142	250,550		6,207	,000		
	Price_Oil_World_X	5,216	,576	,532	9.054	,000	1,000	1,000

a. Dependent Variable: Return_Cryptocurrency_Y

Source: Processed data (2022)

Based on table 4.3 it can be seen that the tolerance value ofWorld Oil Price (X) is 1,000, all of which are greater than 0.10 while the VIF value of World Oil (X) is 1,000, all of which are less than 10. Based on the calculation results above, it can be seen that the tolerance values for all variables independent variables are greater than 0.10 and the VIF value of all independent variables is also smaller than 5 so that there is no correlation symptom in the independent variables. So it can be concluded that there is no symptom of multicollinearity between independent variables in the regression model.

3.3 Heteroscedasticity Test

The heteroscedasticity test aims to test whether from the regression model there is an inequality of variance from the residuals of one observation to another observation. A good regression model is one with homoscedasticity or no heteroscedasticity. One way to detect the presence or absence of heteroscedasticity is the Glejser test, in the Glejser test, if the independent variable is statistically significant in influencing the dependent variable, then there is an indication of heteroscedasticity.

The results of data processing using SPSS 25.00 show the results in the following table:

Table 3.3. Glejser Test Results

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2478,064	156.728		15.811	,000		
	Price_Oil_World_X	-,698	,360	-,133	-1,937	,154	1,000	1,000

a. Dependent Variable: ABS_RES

Source: Processed data (2022)

The table shows the significance value of the World Oil Price (X) variable of 0.154, where the value of this variable is greater than 0.05 so it can be concluded that there are no symptoms of heteroscedasticity.

3.4 Autocorrelation Test

The autocorrelation test aims to test whether in the linear regression model there is a correlation between the confounding error in period t and the confounding error in period t-1 (previous). Autocorrelation test using Durbin-Watson test, with criteria du < d < 4-du.

Table 3.4. Autocorrelation Test

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,532a	,283	,279	2986,432	2,150

a. Predictors: (Constant),Price_Oil_Dunia_X

b. Dependent Variable: Return_Cryptocurrency_Y

Source: Processed data (2022)

From tableWith the Durbin-Watson value of 1.785 and the number of samples 30 (n), the number of independent variables 1 (k=1), the Durbin-Watson value, DW 2.150 is greater than the upper limit (du) 1.489 and less than 1-2.150 (3 -1.489 du), with the table value at a significance level of 5%, it can be concluded that there is no autocorrelation in this regression model, or the calculation can be concluded that the DW value lies in the test area. with the upper limit (du) 1.489 and the lower limit (dl) 1.352.

3.5 Simple Linear Regression Test

Simple linear regression test explains the magnitude of the role of the variableWorld Oil Price (X) against the Return Cryptocurrency variable (Y). Data analysis in this study used simple linear regression analysis using SPSS 25.0 for windows.

Table 3.5. Simple Linear Regression Results

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1555,142	250,550		6,207	,000		
	Price_Oil_World_X	5,216	,576	,532	9.054	,000	1,000	1,000

a. Dependent Variable: Return_Cryptocurrency_Y

Source: Processed data (2022)

Based on these results, the simple linear regression equation that describes the simple linear regression equation above is as follows: Based on these results, the multiple linear regression equation has the formulation: Y: a +x + e, so we get the equation: Y =1555.1+5,216X

a. The constant value (a) of 1555.1 indicates the magnitude of Return*Cryptocurrency*(Y) ifWorld Oil Price (X) is equal to zero.
b. Price regression coefficient valueWorld Oil (X) (b1) of 5.216 shows the large role of World Oil Price (X) on Return*Cryptocurrency*(Y) assuming Return . variable*Cryptocurrency*(Y) constant. It means ifWorld Oil Price (X) increases by 1 unit value, so it is predicted that Return*Cryptocurrency*(Y) increased by 5,216 units of value assuming Return*Cryptocurrency*(Y) constant.

3.6 Coefficient of Determination (R2)

The coefficient of determination is used to see how much the independent variable contributes to the dependent variable. The greater the value of the coefficient of determination, the better the ability of variable X to explain Variable Y. If the determination (R2) is greater (closer to 1), it can be said that the influence of variable X adbig disgrace to*ReturnCryptocurrencies.*

Table 3.6. Coefficient of Determination

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,532a	,283	,279	2986,432	2,150

a. Predictors: (Constant),Price_Oil_Dunia_X
b. Dependent Variable: Return_Cryptocurrency_Y

Source: Processed data (2022)

Based on this, it can be seen that the adjusted R square value is 0.279 or 27.9%. This shows that the World Oil Price (X) variable can explain the Cryptocurrency Return (Y) variable of 27.9%, the remaining 72.1% (100% - 27.9%) is explained by other variables outside this research model. Such as the Reference Coal Price and World Gold Price variables.

3.7 t test (Partial)

The t statistic test is also known as the individual significance test. This test shows how far the influence of the independent variable partially on the dependent variable. In this study, partial hypothesis testing was performed on each independent variable.

Table 3.7. Partial Test (t)

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1555,142	250,550		6,207	,000		
	Price_Oil_World_X	5,216	,576	,532	9.054	,000	1,000	1,000

a. Dependent Variable: Return_Cryptocurrency_Y

Source: Processed data (2022)

a. Hypothesis Testing the Effect of World Oil Price Variables (X) on Return Variables*Cryptocurrency*(Y). From the table, the tcount value is 9.054. With = 5%, ttable (5%; 30-k"(1)" = 29) the ttable value is 2.045. From the description it can be seen that tcount (9.054) > ttable (2.045), as well as the significance value of 0,000< 0.05, it can be concluded that the first hypothesis is accepted, meaningvariableWorld Oil Prices(X) significant effectagainst the Return Cryptocurrency variable (Y).

3.8 Discussion

Based on the results of hypothesis testing that has been done, the next step is to explain the relationship between the variables in this study which is then associated with consumer behavior, previous studies and management science so that it can support pre-existing statements. Explanation of the results as follows:

a. The Effect of World Oil Prices (X) on Cryptocurrency Return Variables (Y)
   Based on the resultsvariableWorld Oil Prices(X) significant effectagainst the Return Cryptocurrency variable (Y). This is in line withResearch conducted by Ardiman (2019),The Effect of World Oil Prices on Cryptocurrency Profitability and Return on Mining Companies Listed on the Indonesia Stock Exchange for the 2015-2017 Period. The role of world oil prices in this study can affect Cryptocurrency Return, meaning that if world oil prices strengthen, it will increase Cryptocurrency prices and have a positive impact on the sustainability of Cryptocurrencies.

Conclusion

Based on the results of research and discussion in the previous chapter, it can be concluded as follows:

a. The results of the determinant test state that the World Oil Price (X) variable can explain the Cryptocurrency Return (Y) variable of 27.9%. The first hypothesis statesvariableWorld Oil Prices(X) significant effectagainst the Return Cryptocurrency variable (Y).
b. Oil price fluctuations in the market the world influences *ReturnCryptocurrency*. In study This results obtained that price fluctuations oil on the world market provides positive impact on*ReturnCryptocurrency*. That is, the increase in oil prices push up*Cryptocurrency*.

References

Bosnia, T. (2018). CoFTRA: Bitcoin Cs Enters the Commodity Futures Exchange Category. CNBC Indonesia. Retreived November 1, 2019 fromhttps://www.cnbcindonesia.com/fintech/20180605082419-37-17841/bappebti-bitcoin-cs-enter-categories-komoditas-bursa-berjangka.

Corbet, S., Meegan, A., Larkin, C., Lucey, B., & Yarovaya, L. (2017). Exploring the Dynamic Relationships between Cryptocurrencies and Other Financial Assets. Retrieved fromhttps://ssrn.com/abstract=3070288.

Ferraro, P., King, C., & Shorten, R. (2018). Distributed ledger technology for smart cities, the sharing economy, and social compliance. IEEE Access, 6, 62728-62746.

Ghozali, Imam. 2016. Application of Multivariete Analysis With IBM SPSS 23 Program (8th Edition). VIII Printing. Semarang : Diponegoro University Publishing Agency.

Jaysing Bhosale, Sushil Mavale. 2018. Volatility of select Crypto-currencies: A comparison of Bitcoin, Ethereum and Litecoin. Annual Research Journal of SCMS Vol. 6.

Narayanan, A., Bonneau, J., Felten, E., Miller, A., Goldfeder, S., & Clark, J. (2016). Bitcoin and Cryptocurrency Technologies Introduction to the book.

Sovbetov, Y. (2018). MP RA Factors Influencing Cryptocurrency Prices: Evidence from Bitcoin, Ethereum, Dash, Litcoin, and Monero. In Journal of Economics and Financial Analysis (Vol. 2)

Sugiyono. (2012). Understanding Qualitative Research". Bandung : ALFABETA.

Umah, Anisatul. (2020, November 07). Official! RI Can Already Transaction Bitcoin Cs on Local Exchanges. Taken fromhttps://www.cnbcindonesia.com/tech/20201107140630-37-200067/resmi-ri- already-bisa-transaksi-bitcoin-cs-di-bursa-lokal

Warsito, OLD, & Robiyanto, R. (2020). Analysis of Cryptocurrency Volatility, Gold, Dollar, and Stock Price Index (IHSG). International Journal of Social Science and Business,4(1).