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Determinant of The Bitcoin Prices as Alternative Invesment in Indonesia

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Article Information	Abstract
	The aims of this study to know the determinant that affect bitcoin prices and how bitcoin prices response to the shock from GDP (Gross Domestic Product), inflation, exchange rate, JCI (Jakarta Composite Index. The method that was used in this research was quantitative analysis, with data analysis tools Vector Error Correction Model (VECM). Data used in this research was secondary data taken from Bank Indonesia, Bitcoincharts, and Yahoo Finance. The results of this study showed that (1) inflation in short term and in long term has negative significant effect on bitcoin prices, exchange rate in long term has positive significant effect on bitcoin price. In short term and in the long term GDP and JCI do not have significant effect on bitcoin prices (2) The results of IRF shows bitcoin prices respond negatively shock from GDP and exchange rate, while shock from inflation and JCI responded posifively by bitcoin prices.

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INTRODUCTION

Technology that increasly developing have a wide impact on various aspects of human life, especially after the advent of the internet. The emergence of the internet has changed economic aspect of human life. With the internet, economic activity increasingly wide reach and more advance. One of them with the emergence of a virtual currency that can be used to trade on the internet. One of the fastest growing virtual currency is bitcoin. Bitcoin was created by Satoshi Nakamoto in 2009 after publishing his thoughts about bitcoin with the title "Bitcoin: A Peer-to-peer Electronic Cash System". In his writing Nakamoto (2008) explain that on an electronic payment system is a system based on cryptographic evidence rather than trust, two people can trade directly to each other without involving third parties. There is many type of virtual currency and bitcoin is one of them.

Bitcoin has no physical form like fiat currency and do not have regulatory that regulates its circulation. Bitcoin is regulated by a system called system peer-to-peer (p2p) in its circulation. System p2p is a system where its user can interact directly. Bitcoin has a limit on his circulation with the storage limit is 21 million unit on 2040, which means that there is no more bitcoin added in circulation (Bouoiyour & Selmi, 2015).

The purpose of bitcoin is as a payment instrument, but many countries reject bitcoin as a payment instrument. The use of bitcoin change into as an investment commodity. Bitcoin is a virtual currency with a lot of weakness. On 2014 Mt Gox one of the biggest bitcoin market at the time that handle 70% bitcoin transaction all accros the world has been hacked and lost 740.000 bitcoin (6% of total bitcoin in circulation at the time) (Norry, 2018). Because of that incident bitcoin lost his price up to US$100 becomes US$517/bitcoin, with losses suffered by the user are estimated at US$300 Million (detikFinance, 2014). Bitcoin weakness is can be used for money laundry, because of this factor bitcoin has been banned in many countries. But there is some country that already regulated bitcoin circulation.

Table 1. Bitcoin Regulation in Some Countries

Countries	Regulation
Argentina	Legal, bitcoin recognizes as a good, not as a legal payment instrument.
Australia	Legal and regulated, bitcoin recognizes as currency and taxes accordingly.
Bulgaria	Legal and regulated
Canada	Legal and regulated, bitcoin recognized as an "intangible" under the Personal Property Security Act. As with all G7 nations.
China	Legal, China allows private parties to store and trade altcoin in the nation. Financial institutions are prohibited from handling altcoin transactions.
Germany	Legal and regulated, recognizes bitcoin as "private money" and a "unit of account" for the purposes of tax and trading. It can be used for "multilateral clearing circle" and is regulated the same as domestically-held fiat currency.
Japan	Legal, recognized bitcoin as money and as legal tender for the payment of debt
United States	Legal and regulated, bitcoin have varying legality, depending on the state.
United Kingdom	Legal and regulated, bitcoin are recognized simultaneously as "foreign currency" and "private money". VAT is waived for exchange purchases, but will be collected for other altcoin transactions. Bitcoin is subject to capital gains.
Philippines	Legal and regulated.

Source: Reese (2017)

Based on table 1 there is a difference of a country that legalize bitcoin recognize it. Some countries recognize bitcoin as a currency, and other country recognize bitcoin as a good.

In Indonesia bitcoin can't be used as a currency, and Bank Indonesia has issued a ban the use of bitcoin as a legal payment, through press conference BI No.20/4/Dkom (2018) which confirm a virtual currency include bitcoin not recognized as a legal payment. Acceptance bitcoin as currency is take a lot of time to study such as reviewing redenomination policy. Stabel macroenomic condition is needed to apply a policy about currency (Febrida & Sebayang, 2016). The ban from Bank Indonesia didn't stop bitcoin growing in Indonesia, the number of user bitcoin in INDODAX (Indonesia Digital Asset Exchange) as the biggest bitcoin market in Indonesia up to 1,1 Million users on March 2018, almost equal to investor in Indonesia Stock Exchange 1,18 Million investors (Setyowati, 2018).

Bitcoin other weakness is instability price, because basically bitcoin is speculative. Based on figure 1 show that the fluctuations of bitcoin prices, but the fluctuations show positive trend with the raise of the price.
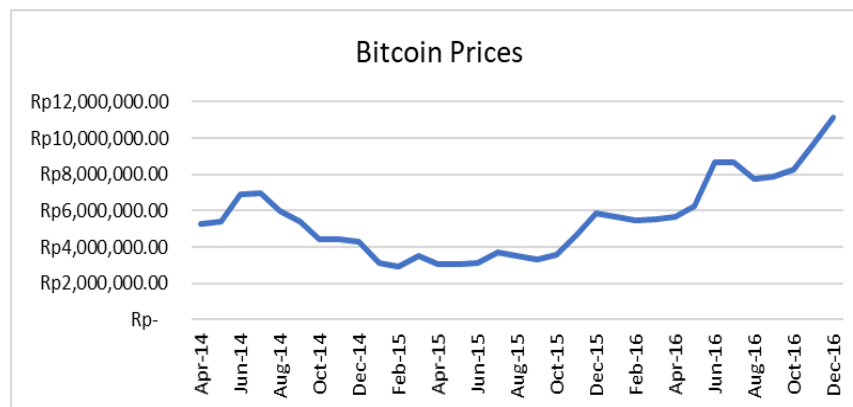

Figure 1. Bitcoin Prices From April 2014 to December 2016
Source: Bitcoincharts (2018)

There is some research about determinant bitcoin prices, according to Van Wijk at Ciaian et al, (2016) variable like composite index, exchange rate, and oil price can determine bitcoin prices. Good macroeconomic condition and financial development may can increase usage of bitcoin on trade, so the raise of bitcoin demand can lead into the raise of bitcoin price. Different result come from Kristoufek (2013) the bitcoin price formation can not be explained by ordinary economic theory, like future cash-flow model, purchasing power parity, or uncovered interest parity, because several things on money demand and supply which usually form the basis of money prices, not on the bitcoin market. Bitcoin itself is not issued by a central bank or government. Therefore, bitcoin is detached from the original economy which means that there are no macroeconomic fundamentals that can explain the formation of its price. Research on factors that influence investment in Indonesia is carried out by Tesa (2012) about determinant affect JCI shows that exchange rate is the dominant factor on JCI. Which it can be the same to the bitcoin as alternative investment. Bitcoin as alternative investment supported by research from Wu and Pandey (2014) bitcoin less usefull as currency, but can increase investor portfolio efficiency.

The development of bitcoin is still far from expectations and also bitcoin still has some limitations. The existence of differences in the results of previous studies related to factors that influence the price of bitcoin is the basis of the problems in this study. Besides that the fluctuation of the bitcoin price changes need to know what factors influence the Indonesia bitcoin price movement, and how bitcoin reacts to shock from other variabels. Then a research was made to discuss the problem with the title of the research "Determination of Bitcoin Prices as an Alternative Investment in Indonesia".

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RESEARCH METHODS

The research design used in this study is a quantitative research. In this study the data that used was monthly time series secondary data that is bitcoin prices, gross domestic produk, inflation, exchange rate, and Jakarta composite index from April 2014 to December 2017. The souce of data is from sites Bank Indonesia, Bitcoin, and Yahoo Finance. Method use in gathering the data is literatur review that is getting information from notes, literatur, documentation, and etc that still relevan to use in this research.

The data analysis technique used in this research is Vector Error Correction Model (VECM) and processed using EViews 10, VECM is the form of resctricted Vector Autoregression This additional restriction must be given because the form of data is not stationary but cointegrated. VECM then uses the cointegration restriction information into its specifications. In estimation the data will convert with code into Bitcoin Prices → BTC, Gross Domestic Product → PDB, Inflation → INF, Exchange Rate → KURS and Jakarta Composite Index → IHSG.

RESULTS AND DISCUSSION

The first step of VECM Analysis isi Stationary test, that can be done with Augmented Dickey-Fuller test in the same level until it's obtained a stationary data, that the variance data is not too large and has a tendency to approach its average value (Enders, 1995). Based on ADF result show that the data stationary at first difference and the value of ADF statistic in all variabel BTC, PDB, INF, KURS, IHSG lower than MacKinnon Critical Value 5%.

The criteria used in determining the optimal lag length is Likelihood Ratio (LR), Final Presdiction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) dan Hannan-Quinn Criterion (HQ). According to Eviews 10 output the result show that SC and HQ optimal at lag 1, LR and FPE optimal at lag 3. Because two criteria optimal at lag 1 and 2, to determine the optimal lag is using AIC with the lowest value,

so the optimal lag is at lag 3. On VECM the optimal lag is p-1, so the lag used is lag 2.

Based on the results of the Granger causality test, there is a one-way influence between the variable bitcoin price and the JCI variable, the exchange rate variable with the bitcoin price variable, the JCI variable with the exchange rate variable.

Table 5. VECM Estimation In Short Term

Variabel	Coefisien	Std. Error	T-stastisic
CointEq1	-0,076909	0,04552	-1,68956
D(LN_BTC(-1))	-0,002826	0,16686	-0,01694
D(LN_BTC(-2))	-0,269022	0,17930	-1,50042
D(LN_PDB(-1))	-3,327731	2,28526	-1,45617
D(LN_PDB(-2))	0,645840	2,17145	0,29742
D(INF(-1))	-0,094515	0,03901	-2,42294
D(INF(-2))	-0,078874	0,04652	-1,69555
D(LN_KURS(-1))	-0,543758	1,77182	-0,30689
D(LN_KURS(-2))	0,890615	1,62281	0,54881
D(LN_IHSG(-1))	1,556544	0,88184	1,76511
D(LN_IHSG(-2))	-1,773672	0,98284	-1,80464

Source: Data Processed 2018

Based on table above VECM estimation results indicate that in the short term the variables bitcoin, GDP, exchange rate, and JCI have no significant effect on the price of bitcoin. Variables that have a significant influence on the price of bitcoin are inflation variables on lag 2. Inflation has a negative influence on the price of bitcoin in the short term. The t value of the inflation variable statistics at lag 2 is -2.42294 so that H_0 is rejected and H_a is accepted. The effect of inflation on bitcoin price is -0.094515, meaning that if inflation rises by one percent in the previous month, it will reduce the price of bitcoin by 0.094515. The error correction parameter value is -0.076909 but it is not statistically significant

because the t value of statistics is -1.68956 which means that H_0 is accepted.

Table 6. VECM Estimation In Long Term

Variabel	Coefisien	Std. Error	T-stastisic
LN_PDB(-1)	8,436879	4,74898	1,77657
INF(-1)	-0,781911	0,10428	-7,49836
LN_KURS(-1)	22,10339	4,74599	4,65728
LN_IHSG(-1)	-0,059041	2,20471	-0,02678

Source: Data Processed 2018

Based on table 6 of VECM estimation in long term above, it can be explained that the inflation variable has a negative and significant effect on the price of bitcoin of -0.781911. That is, if there is an increase in inflation by one percent, it will reduce the price of bitcoin by -0.781911 then the exchange rate variable has a positive and significant effect on the price of bitcoin of 22.10339. That is, if the exchange rate depreciates by one percent, it will increase the price of Bitcoin by 22.10339. The IRF analysis will explain the impact of shock on one variable on another variable or innovation of an independent variable equal to one standard deviation.
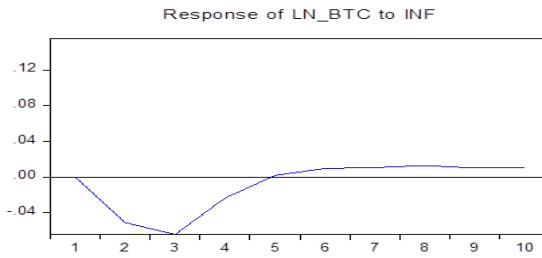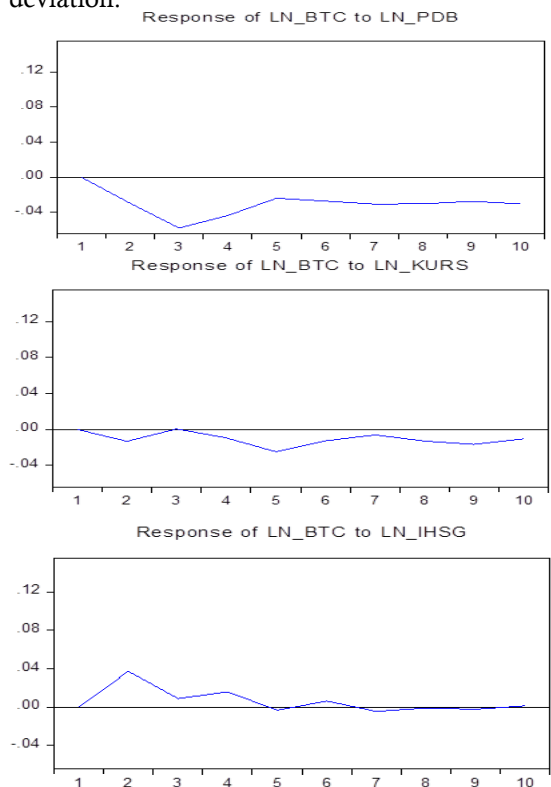

Figure 2. Impulse Response Function
Source: Data Processed 2018

Based on the result of IRF above we can see response of bitcoin prices to the GDP shock in the first period to the third period decreased by showing a negative trend. In the fourth period until the fifth period the response value has increased with the trend still negative. Then in the fifth to tenth period the response of bitcoin prices against the GDP shock was stable with a negative trend.

The response of bitcoin prices to inflation shock from the first period to the third period the response value has decreased with a negative trend. Then in the third period until the sixth period the response value increases with a positive trend because the position is above the horizontal line. From the sixth period to the tenth period the response of bitcoin prices to the shock of inflation was stable with a positive trend.

Bitcoin price response to exchange rate shock. From the first period to the second period the response value has decreased by showing a negative trend, then from the second period to the third period the response value has increased by showing a positive trend. From the fourth period to the fifth period, the response value decreased by showing negative trends and had an increase in the response value from the fifth period to the seventh period. The response of bitcoin prices to the exchange rate shock in the eighth period has decreased and has increased in the ninth period to the tenth period while still showing negative trends.

The response of bitcoin prices to the shock of the JCI in the first period to the second period experienced an increase by showing a positive trend. Then in the second period until the third period the response value decreased but still showed a positive trend. In the third period, there was an increase, which then in the fourth period

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until the fifth period decreased by showing a negative trend. In the sixth period the response value increases and then the response value falls again in the seventh period with a negative trend. In the eighth period until the tenth period showed that the price of bitcoin did not respond too much to the shock that occurred in the JCI. This can be seen from the response line that is close to the horizontal line.

Variance decompotition or also called forecast error variance decompotition is a device in the VECM model that will separate variations from a number of variables estimated to be shock components or become innovation variables, assuming the innovation variables are not correlated. Then variance decompotition will provide information about the proportion of the movement of the effect of shock on a variable to other variable shock in the current period and the future period (Ajija, et al., 2011). By using the variance decomposition method in Eviews, the following results are obtained:

In the first period bitcoin prices was greatly influenced by the shock of bitcoin prices itself by 100 percent. Meanwhile, in the first period GDP, inflation, exchange rates, and JCI have not affected bitcoin prices. Starting from the first period to the tenth period, the proportion of shock of the bitcoin price itself is still large, but the proportion of influence is down little by little against the price of bitcoin itself from the first period to the tenth period.

GDP in the second period began to influence bitcoin prices by 1.72 percent. GDP influence to bitcoin prices has increased from period to period, in the third period GDP shock to bitcoin prices has increased to 6.12 percent until the fourth period with a large shock of 7.42 percent. Then the influence of GDP shock to bitcoin prices had decreased from the fifth period to 7.10 percent. In the sixth period until the tenth period the influence of the GDP shock has always increased up to the tenth period of the influence of the GDP shock of 7.9 percent.

Inflation variables in the second period influenced bitcoin prices by 5.12 percent. The influence of the inflation shock to bitcoin prices has increased in the second period to 9.81 percent. Then the shock inflation influence

decreased continuously from the fourth period to the tenth period with a large shock to 5.74 percent in the tenth period.

The exchange rate variable and the JCI variable have little effect on bitcoin prices. This is indicated by the influence of less than 2 percent. In the first period the effect of exchange rate shock on bitcoin prices is only 0.33 percent and continues to increase until the tenth period of 1.17 percent. Inversely proportional to the exchange rate variable, the JCI variable has decreased from the first period to the tenth period. In the first period the influence of the JCI was 2.76 percent. Then it continued to decline until the tenth period to be 1.32 percent.

The estimation results that have been carried out show that the variables of inflation are short and long term have significant negative effect against bitcoin prices. While exchange rate variable in long term has a significant positive effect on bitcoin prices.

Inflation variables have a significant negative effect on the price of bitcoin in the short and long term. This is consistent with portfolio theory, in the theory of one's decision portfolio in doing depends on expected inflation. When inflation experiences a higher level, people will tend to exchange the wealth of money or securities with physical assets such as houses or jewelry. One of the things that greatly affects the price of bitcoin is market demand, when demand has decreased due to an increase in inflation, the price of bitcoin will decrease. The results of this study are supported by research by Li and Wang (2017) stated that economic factors such as inflation in the long run began to affect the price of bitcoin when market speculation began to have no significant effect on the long term. Exchange rate variables have a significant positive effect on the price of bitcoin in the long run. The results of this study are different from the results of research conducted by Ciaian, et al (2016) which explains that the exchange rate affects the price of bitcoin only in the short term, in the long run the exchange rate does not determine the price of bitcoin.

The IRF result shows bitcoin prices has negative response to changes in GDP, namely the increase in GDP will cause bitcoin prices to

decrease the price of bitcoin. If Indonesia's GDP experiences an increase, it means that the overall economic condition in Indonesia has increased. Bitcoin as an alternative investment will compete with other investments such as stocks. When GDP has increased, the level of investor confidence to invest in Indonesia will increase, bitcoins that are classified as new investments in Indonesia will be less competitive with stocks that already have regulations in Indonesia. Then the demand for bitcoin will decrease which has an impact on the decline in bitcoin prices.

The result of IRF shows bitcoin prices respon positively to changes in inflation. In portfolio theory, an increase in inflation will affect a person's decision to exchange their wealth such as money or securities in this case bitcoin with physical wealth such as a house or jewelry. When there is an increase in inflation physical goods will follow price increases in accordance with inflation. But when inflation increases the price of bitcoin can also increase, because inflation can indirectly affect the exchange rate, bitcoin which can be exchanged with other countries' currencies will indirectly increase the price of bitcoin in Indonesia when there is a change in the Rupiah exchange rate.

The result of IRF shows bitcoin prices respon negatively to changes in exchange rates shows. If the exchange rate is appreciated, the price of bitcoin will increase. When the exchange rate is appreciated, the price of bitcoin in Indonesia will experience a decrease in response to the appreciation of the exchange rate, with the decline in the price of bitcoin will increase the demand for bitcoin itself which will increase the price of bitcoin responding to the increasing demand for bitcoin.

The result of the IRF shows bitcoin prices respon positively to changes in the JCI shows a positive response, which means that when the JCI strengthens, it will increase the price of bitcoin. This can happen because, in the selection of portfolio decisions to determine the type of investment is chosen based on the risk borne. bitcoin itself is more risky than stocks because bitcoin does not yet have regulations that regulate it differently from stocks that already have regulations. With a big risk, bitcoin in the past

few years is indeed more profitable because it experienced a quite high price surge. However, the JCI at the same time is also experiencing a strengthening.

CONCLUSION

Based on the results of research conducted regarding the determination of bitcoin prices in Indonesia as an alternative investment in the period April 2014 to December 2017, the following conclusions can be drawn:

Inflation variables in short and long term have a significant negative effect on bitcoin prices. Whereas for other variables such as exchange rates and GDP have insignificant negative influence on bitcoin prices in the short term, the JCI variable has a insignificant positive effect on bitcoin prices in the short term. Variable exchange rate in long term has a significant positive effect on bitcoin prices, GDP variable has a positive and not significant effect on bitcoin prices, the JCI variable has insignificant negative effect on bitcoin prices. The IRF results show a negative response on bitcoin prices against the shock of GDP. Bitcoin prices also show a negative response to shock at the exchange rate. While the shock that occurred in inflation was responded positively by bitcoin prices and shock on the JCI was positively repressed by bitcoin prices.

Suggestion for this study for for the investors in predicting changes in bitcoin prices can consider inflation rates and exchange rates, then bitcoin can be one of the long-term investment alternatives because the amount of bitcoin in circulation is only 21 million. For the general public, it is better to avoid bitcoin as an alternative investment, especially short-term investment, and to wait for legal certainty regarding the use of bitcoin as an investment commodity.

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