Return and Risk Analysis on Cryptocurrency Assets.

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ABSTRACT

This study aims to analyze the return and risk of Cryptocurrency assets in order to find out which crypto assets have small risks and large returns. In this research, the test procedures used were the Kruskal Wallis test and paired sample t-test. The research time span was obtained from January 1, 2019 to December 31, 2021 as well as the time span for data collection for price comparisons before and during the COVID-19 pandemic for 2 months from march 11, 2020. The results of this research are that bitcoin, ethereum, and dogecoin do not have a significant return comparison, for the results of risk research also have the result that there is no significant risk comparison between bitcoin, ethereum, and dogecoin. After that, for the results of the price comparison of bitcoin, ethereum, and dogecoin before the covid-19 pandemic and after the announcement of the covid-19 pandemic, the result is bitcoin and ethereum has a significant comparison between the time before the covid-19 pandemic and after the announcement of covid-19. On the contrary, dogecoin did not face a significant price comparison before the covid-19 pandemic as well as after the announcement of covid-19. Before starting an investment, it is better to look at the ability of Cryptocurrency assets to minimize risks and make sure whether the investment objectives are for the long and short term.

Keywords: Risk, Return, Cryptocurrency,Bitcoin, Ethereum, Dogecoin

INTRODUCTION

In 2019 to be precise on March 11, 2020, the World Health Organization published that the Covid-19 virus as a global pandemic and almost the entire world imposed lockdowns on each country, of course, this made the global economy sector affected, then this disrupted global market conditions, especially in the *Cryptocurrency* market.

In the Time of Revolution 4. 0 Advances The world of technology continues to be rapid and has taken the world towards the latest direction on almost all views of people's lives listed in economic activity. One of the economic advances that exists, we know that in the past, citizens carried out business fields only using conventional currency, now they have switched to technological finance or digitalization. To respond to the challenges of progress, some startups in the field of technology finance emerged, one of which is *Cryptocurrency* technology (Huda & Hambali, 2020).

It is named *Cryptocurrency* because *Cryptocurrency* relies on a branch of mathematics known as cryptography to guarantee the security of transactions (Ram, 2019). Cryptocurrencies are digital and not regulated by any central entity – decentralized cryptocurrencies (Nakamoto, 2008; Ram, 2019). Cryptocurrencies are controlled by computer nodes in a peer-to-peer network where all transactions are recorded on an irreversible public ledger called a blockchain (Ram, 2019).

The term *Cryptocurrency* is divided into tokens and coins. Coins are *Cryptocurrency* assets that have their own blockchain. Blockchain itself serves as a guarantee of transparency and reduces asset theft. Coins have the same characteristics as money, that is, they are interchangeable and have a limited supply. Unlike tokens, tokens are *Cryptocurrency* assets that do not have a blockchain, these tokens hitchhike to the blockchain from coins. Tokens have a market value only that tokens are not currencies

The progress of *bitcoin*, which is based on the supply and demand of its users, does not necessarily make *bitcoin*s then created despite the high number of transactions per day. *Bitcoin* since its emergence has been in the program only 21 million (Nakamoto, n.d.) with a recent spread of 19 million parts across the earth. The total number of *bitcoin* transactions reached 723 million transactions, of which 275 thousand transactions occurred every day (bitcoin.com, 2022). Many people carry out trading buying and selling *Bitcoin* as one of the investments. Eventually the number of *bitcoin*s to other currencies such as the Us Dollar continued to grow. One of the strategies for implementing investment is to take into account prices in the era that is about to arrive. To account for the price of *Bitcoin* until the historical data of the price of *Bitcoin* is to be studied until identifying specific patterns (Wildan Putra Aldi & Aditsania, n.d.).

In addition to *bitcoin*, there are also other crypto assets, for example, such as altcoins. Altcoins are atlernative coins of *bitcoin* which means coins other than *bitcoin*. Altcoins were first launched in 2011 where *bitcoin* itself was launched in 2009. Examples of altcoins consist of *Ethereum*, Binance, Tether, etc. In this study, the altcoin used is *Ethereum* is a digital currency formed with *bitcoin* innovation, with some big differences. *Bitcoin* and *ethereum* allow users to use digital money without payment providers (banks). *Ethereum* is programmable and users can also use it on a variety of different digital assets even on *bitcoin*. It also means *ethereum* is more than just a payment i.e. it is a market of financial services, games, and applications that cannot steal user data (Ethereum.org, 2022). *Ethereum* is experiencing an increase in price and is currently ranked second in *Cryptocurrency*.

In addition to *bitcoin* and altcoins this research also examines meme coins. A meme coin is a *Cryptocurrency* that is usually designed as an homage to a meme, an interesting or funny idea captured in an image, video, or other form of media. Like the memes on which they are based, meme coins are designed to go viral and be shared (crypto.com, 2022). Examples of meme coins that are popular today are *Dogecoin* and Shiba Inu. *Dogecoin* is a *Cryptocurrency* formed by Billy Markus of Portland as well as Jackson Palmer of Sydney in 2013 with the shiba inu dog as its logo. The doge coin was originally created just to mock another, more popular *Cryptocurrency*, namely *bitcoin*, added Bitwave CEO Pat White (Chohan, 2021).

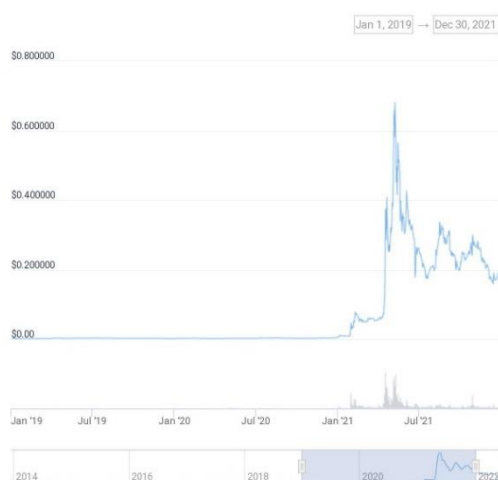Picture 1. Bitcoin chart Bitcoin price from 2019 – 2021
source: www.coingecko.com
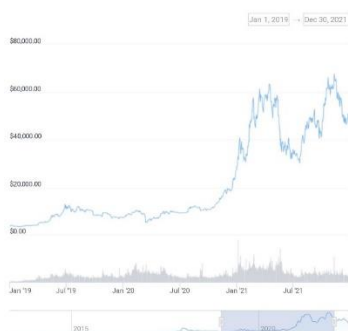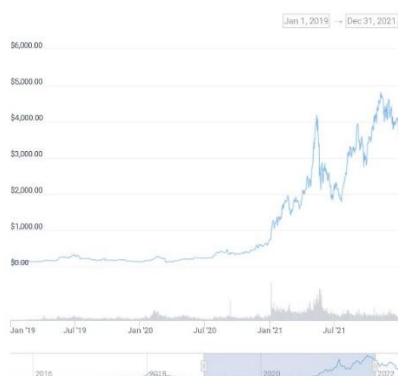
source: www.coingecko.com
Picture 2. Ethereum chart
Ethereum price chart from 2019 -2021

source: www.coingecko.com
Picture 3. Dogecoin chart
Dogecoin price chart from 2019 – 2021

When viewed from the chart above, it can be seen that the price of bitcoin and ethereum increases tend to increase within 3 years. On January 1, 2019 bitcoin had a price of $3,800.4 then in the following year the price of bitcoin became $7,199.8 and in 2021 the price of bitcoin became $29,359.9 an increase from 2019 to 2021 of $25,559.5 or 672.54% in a period of 3 years. For Ethereum on January 1, 2019 it had a price of $139.61 then the following year the price of Ethereum became $130.75 and in 2021 the price of Ethereum became $729.12 increase from 2019 to 2021 of $589.51 or 422.25%. And Dogecoin on January 1, 2019 had a price of $0.002340924 then in the next year Dogecoin had a price of $0.00203106 and in 2021 the price of

Dogecoin became $0.004706605 Dogecoin price increase from 2019 to 2021 of 0.002365681 or 101.05%. In just 3 years, these three coins can get a profit of more than 100%. Crypto itself is known for its own variety of fluctuations, and it is clear that of the 3 coins the fluctuations are very high. Since crypto has very high fluctuations then investors who have aggressive characteristics or like high risks are very appropriate to make this crypto investment. But for investors who don't like risk who tend to prefer safe, they can still make crypto investments by choosing cryptocurrencies that have low risk. So, in this research, you will see which coins have large profits but have not too high risks so that potential investors who are new or who don't like high risks want to start crypto investment do not choose the wrong coin.

By enforcing crypto as an investment, it is hoped that investors will start trying to switch investments to cryptocurrencies because the government has also given 229 crypto asset licenses through the Commodity Futures Trading Supervisory Agency (Bappepti) which was decided through a juridical approach in accordance with the provisions of article 3 paragraph (2) letter c perba number 5 of 2019 which is already available on the original Indonesian platform, for example PT Indodax and Tokocrypto.

The purpose of this study is for investors to be able to explore the difference in risk and return between bitcoin, ethereum, and dogecoin coins and decide to choose which coin to use as an asset. Investors can also find out the difference between bitcoin, altcoins, and coinmeme. The occurrence of the global Covid-19 pandemic on March 11, 2020 caused the world economic sector to experience shocks and then the global market was disrupted due to the Covid-19 pandemic. So, in this study will see if there were significant changes in prices before the covid-19 pandemic and during the covid-19 pandemic on bitcoin, ethereum, and dogecoin coins.

Cryptocurrencies

Cryptocurrency is the name given to a system that uses cryptography. The word "*Cryptocurrency*" comes from a combination of 2 words, namely "cryptography" which means secret code, and "currency" which means currency (Huda & Hambali, 2020).

Cryptocurrencies are digital currencies and financial assets formed from blockchain technology as a control in payment transactions. Cryptocurrencies offer businesses and individuals with low transaction fees, efficiency, high security and privacy (Rejeb et al., 2021).

So *Cryptocurrency* is a virtual currency that has a secret code that serves as a currency and is formed from a blockchain that serves as a control in payments.

Blockchain

Blockchain is a transaction recording technology that is interconnected and uses unique codes that are immutable. The way blockchain works is that when new existing transactions enter the blockchain, generally most nodes in the blockchain implementation have to run an algorithm for evaluation and verification of the proposed individual blockchain block history (Bagus & Bhiantara, 2018)

Blockchain management involves a global network of computers called miners. This recording is open, so that everyone around the world who has a computer connected to the internet can download the necessary software, become miners and join the blockchain network (Setiawan, 2020)

So it can be said that blockchain is a technology used as a digital data bank connected to cryptography.

Bitcoin

Bitcoin is a decentralized peer to peer digital cryptographic currency. The creator of *bitcoin* is unknown although Satoshi Nakamoto is often referred to as one of the developers of *bitcoin*. At the heart of *bitcoin*'s innovation is the blockchain, which forms an "incremental log of all transactions that have ever occurred since the creation of *Bitcoin*, starting with the "Genesis Block"—the first block in the chain" (Zohar, 2015, p 107). *Bitcoin* is the first implemented digital asset of (Nuraliati & Azwari, 2019). *Bitcoin* uses cryptographic principles to control the process of creating and exchanging *bitcoin* (Ciaian et al., 2014). The system of transfers and transactions first uses nodes and does not use processes from third parties and transaction confirmations. *Bitcoin* can make transactions directly between individuals (Faghih Mohammadi Jalali & Heidari, 2020). *Bitcoin* also has a ledger to record all transactions called blockchain (Sukamulja & Sikora, 2018).

Bitcoin is more of an investment asset than a currency. Adopting *bitcoin* in a global market portfolio can be attractive from an investment perspective. The reason why this can be interesting is that *bitcoin* in the long run is not related to global macroeconomics and financial developments (Baur & Lee, 2014)

So, *bitcoin* was the first cryptographic currency to use decentralized peer to peer digital and its creator was Satoshi Nakamoto.

Ethereum

Ethereum is a digital currency formed with the innovation of *bitcoin*, with some big differences. Both allow users to use digital money without a payment provider (bank). *Ethereum* is programmable and users can also use it on a variety of different digital assets even on *bitcoin*. It also means *ethereum* is more than just a payment i.e. it is a market of financial services, games, and applications that cannot steal user data (Ethereum.org, 2022).

Ethereum was developed by Vitalik Buterin in 2013 and officially released on July 30, 2015. The platform allows anyone to deploy a permanent and immutable decentralized application into it, with which users can interact. Decentralized finance (DeFi) applications provide a wide array of

financial services without the need for regular financial intermediaries such as brokers, exchanges, or banks, such as allowing users of cryptocurrencies to borrow from their holdings or lend them to earn interest. *Ethereum* also allows the creation and exchange of NFTs, which are nonfungible tokens that are connected to digital art crafts or other real-world goods and sold as unique digital properties (Chania et al., 2021).

Dogecoin

Dogecoin is a *Cryptocurrency* created by Billy Markus of Portland and Jackson Palmer of Sydney in 2013 with the shiba inu dog as its logo. The doge coin was originally created just to make fun of – another, more popular *Cryptocurrency*, *bitcoin*, added Bitwave CEO Pat White (Chohan, 2021)

Dogecoin initially reached its popularity in January 2021 which was marked by an increase in the exchange rate and the peak of popularity in May 2021. The rise in the exchange rate originated from the *Cryptocurrency* community on reddit forums that were widely discussed and supported *Dogecoin*. *Dogecoin* also has the support of public figures such as Elon Musk and Snoop Dog (Chohan, 2021).

Risk and Return

The purpose of investing is to make a profit. Before making a profit, you will definitely face *risk*s. *Risk*s and *return*s in investment will always be related where the higher the profit the higher the *risk* faced. Speculation is one of the motives for investors to invest (Chania et al., 2021)

1. *Risk*

In the context of investment management, *risk* is the magnitude of the deviation between the expected *return* and the actual *return*. The greater the deviation means the greater the degree of *risk*. If the *risk* is expressed in how far the results obtained can deviate from the expected results, then a measure of spread is used. Investment *risk* is the magnitude of the result of the investment. The relationship is that the more likely our investment is to get a low *return* or loss, it can be said that investment is *risk*y (Tesya et al., 2020).

2. *Return*

In the Big Indonesian Dictionary (KBBI) that profit (*return*) is profit. While the definition of *return* in terms is the profit obtained by individuals, companies or institutions from the results of investment policies that have been carried out (Fahmi, 2015).

The sources of investment *return*s consist of two components according to (Tandelilin, 2010) namely as follows:

a. Profit or loss of capital (capital gains/losses) is a profit or loss for investors obtained from an excess selling price or a purchase price above the price or selling price that both occur in the secondary market, in other words capital gains/losses.

b. Yield is the income or cash flow that investors receive periodically, for example in the form of dividends or interest.

Frame of Mind

Sourced from the theoretical studies developed above, until a framework of views was formed which was used as a principle for the researcher's thinking method to respond to research cases. There are also variables reviewed in the authorship of this research idea, namely *return* and *risk*. There is also a framework of views of the case that researchers can draw with the following chart:
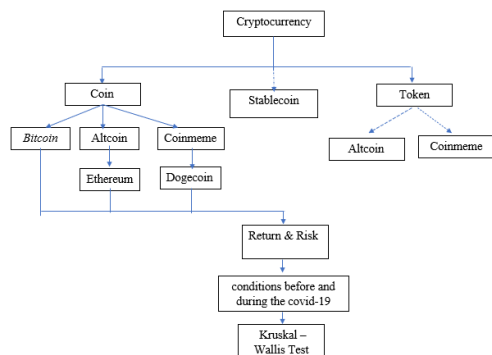
Cryptocurrency is a virtual currency system that acts as a kind of standard currency that allows consumers to carry out payments in a virtual way for business transactions that occur without service fees but always have a concentrated belief. Then the *Cryptocurrency* is broken down into 3 namely, coins, stablecoins and tokens. The comparison of coins and tokens is on the blockchain. Blockchain is a transaction recording technology that is related to using special cues in it that are eternal cannot be replaced. For coins they have their own blockchain in contrast to the tokens that hitchhike to the owner of the blockchain. Then there are stablecoins that are cryptocurrencies that offer price stability and are supported by other inventory assets. Stablecoins are specially designed to have a value similar to special assets, for example from stablecoins, namely USDT, USDC, DAI, etc. The coin itself consists of *bitcoin*, memecoins and altcoins. *Bitcoin* is a decentralized peer to peer digital currency. The creator of *bitcoin* is Satoshi Nakamoto. Altcoins are alternative coins to *bitcoin* which means coins other than *bitcoin*. Examples of altcoins include *Ethereum*, Binance, Cardano, etc. Memecoin is a *Cryptocurrency* that is usually designed as an homage to memes, interesting or funny ideas captured in an image, video or other form of media. Examples of popular memekoin are *dogecoin* and shiba inu. In this study will analyze the *risk* & *return* on *Cryptocurrency* assets whose main targets are *bitcoin*, *ethereum*, and *dogecoin*. And as a differentiating test used is the wallis scale test to determine which one gets a big profit from *bitcoin*, *ethereum*, and *dogecoin* and which one is very *risk*y than *bitcoin*, *ethereum*, and *dogecoin*

METHOD

This research is carried out with a quantitative descriptive approach, which is the presentation of charts and the results of calculations of various relevant statistics to improve the ability and *risk* of *Cryptocurrency* investment. To get the results of this research, it was obtained from 3 years before until December 31, 2021. The material in this research is in the form of secondary data obtained from the web www. investing. com and www. coingecko. com Both of these webs provide historical data on the prices of some cryptocurrencies, which can be downloaded for free. The observation time span is limited throughout the last 3 years, starting from January 1, 2019 to December 31, 2021, which uses monthly data. To view the price comparison of *Bitcoin*, *Ethereum*, and *Dogecoin* before and when the covid-19 pandemic was announced, the data used was daily data obtained 2 months before the covid-19 pandemic was announced and 2 months after the announcement of covid-19 exactly on March 11, 2020 at this time WHO (World Health Organization) declared the covid-19 virus as a pandemic, he meant that the covid-19 virus has spread throughout the earth.

Data analysis in this research consists of 2 important parts. The initial part is a descriptive analysis of the price, monthly *return*, or *risk* of *Cryptocurrency* investment. As well as the second part of the price analysis of *Bitcoin*, *Ethereum*, and *Dogecoin* price comparisons before the COVID-19 pandemic and during the COVID-19 pandemic. For the calculation of *Return* and *Risk* data is processed using Microsoft Excel. Analogy tests were tried with crucifix- wallis statistical tests. The Kruskal- wallis test is a non-parametric test with the aim of looking at the ratio between 2 or more elastic. As well as to look at the

price comparison at the time before the covid-19 pandemic and during the covid-19 pandemic using a paired sample t-test. The paired sample t-test is an analogy test that intends to recognize whether there is an average comparison on 2 interrelated samples.

The concept of *risk* and *return* for Markowitz (1995) tells the form in which investors are obliged to focus on 2 things is the expected *return* on an asset and the *risk* that can be observed from the standard deviation of the *return*. *Risk* calculations can be calculated from the standard deviation (σ) of the *return*. Calculation of the *return* and

risk that the investor wants to receive using the method:

R_i = return on t-to-period
P_t = price in the period to t
$P_{(t-1)}$ = price in the period to t
Standard deviation (σ)

$$\sigma = \sqrt{\frac{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})}}{n-1}}$$

σ = standard deviation
x_i = *return* on day to -i
$\bar{x}$ = average daily in one month
n = amount of data.

RESULTS and DISCUSSION

Table 1. Return bitcoin, ethereum, and dogecoin

| No	year	month	$ Bitcoin	Return	$ Ethereum	Return	$ Dogecoin	Return
1		1	3,437.20	-	106.71	-	0.001893	-
2		2	3,816.60	0.110381	135.47	0.269516	0.001927	0.017961
3		3	4,102.30	0.074857	141.79	0.046652	0.002076	0.077322
4		4	5,320.80	0.297029	161.8	0.141124	0.00251	0.209056
5		5	8,558.30	0.608461	267.99	0.656304	0.003396	0.352988
6	2019	6	10,818.60	0.264106	292.21	0.090377	0.003279	-0.03445
7		7	10,082.00	-0.06809	217.23	-0.2566	0.002897	-0.1165
8		8	9,594.40	-0.04836	171.62	-0.20996	0.002679	-0.07525
9		9	8,284.30	-0.13655	180.35	0.050868	0.002418	-0.09742
10		10	9,152.60	0.104813	182.37	0.0112	0.002633	0.088916
11		11	7,546.60	-0.17547	151.95	-0.1668	0.002394	-0.09077
12		12	7,196.40	-0.04641	129.21	-0.14965	0.002015	-0.15831
13		1	9,349.10	0.299136	179.91	0.392384	0.002381	0.181638
14		2	8,543.70	-0.08615	217.52	0.209049	0.002216	-0.0693
15		3	6,412.50	-0.24945	132.86	-0.38921	0.0018	-0.18773
16		4	8,629.00	0.345653	206.22	0.55216	0.00246	0.366667
17		5	9,454.80	0.095701	231.81	0.124091	0.002573	0.045935
18	2020	6	9,135.40	-0.03378	225.63	-0.02666	0.002314	-0.10066
19		7	11,333.40	0.240602	346.51	0.535744	0.003224	0.393258
20		8	11,644.20	0.027423	433.9	0.252201	0.00321	-0.00434
21		9	10,776.10	-0.07455	359.39	-0.17172	0.002634	-0.17944
22		10	13,797.30	0.280361	386.42	0.075211	0.002568	-0.02506
23		11	19,698.10	0.427678	615.92	0.593913	0.003551	0.382788
24		12	28,949.40	0.469654	735.94	0.194863	0.004666	0.313996
25	2021	1	33,108.10	0.143654	1,312.73	0.783746	0.036841	6.895628

26	2	45,164.00	0.364137	1,418.76	0.080771	0.048129	0.306398
27	3	58,763.70	0.301118	1,917.99	0.351878	0.053744	0.116666
28	4	57,720.30	-0.01776	2,772.78	0.44567	0.336635	5.263676
29	5	37,298.60	-0.3538	2,708.47	-0.02319	0.323951	-0.03768
30	6	35,026.90	-0.06091	2,273.84	-0.16047	0.253155	-0.21854
31	7	41,553.70	0.186337	2,532.19	0.113618	0.206627	-0.18379
32	8	47,130.40	0.134205	3,430.74	0.354851	0.278231	0.346537
33	9	43,823.30	-0.07017	3,000.59	-0.12538	0.204272	-0.26582
34	10	61,309.60	0.399018	4,287.56	0.428906	0.279928	0.370369
35	11	56,882.90	-0.0722	4,628.90	0.079612	0.214425	-0.234
36	12	46,219.50	-0.18746	3,677.85	-0.20546	0.170297	-0.2058

To test the comparison of *return* and *risk* on *bitcoin*, *ethereum*, and *dogecoin* using a non-parametric statistical test by conducting the Kruskal Wallis test. The use of the Kruskal Wallis test because the data from each variable does not meet the assumption of a normal distribution and is not homogeneous. The results of the Kruskal Wallis test are as follows:
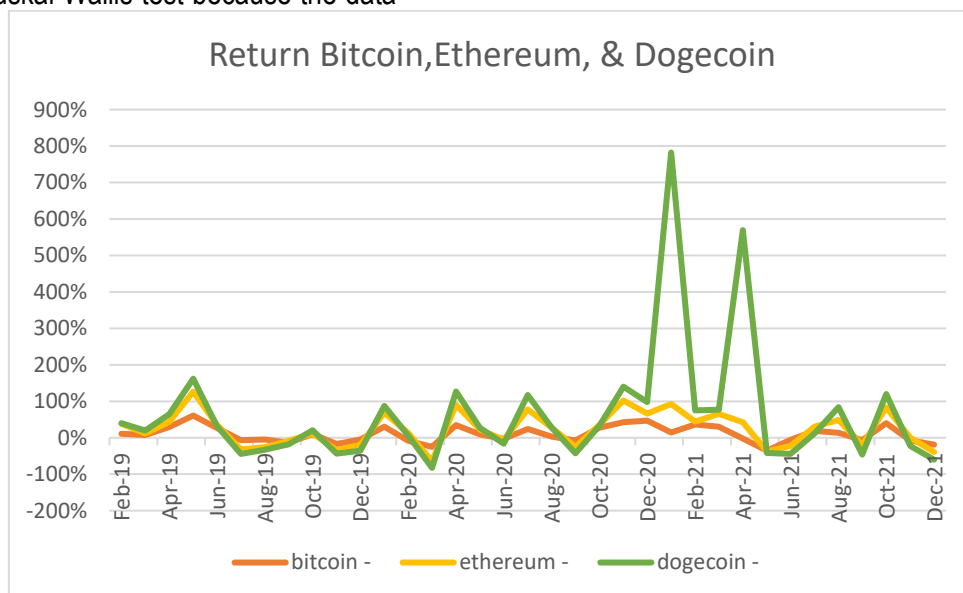
Picture 4. *Bitcoin*, *ethereum*, and *Dogecoin Return* Chart

Cryptocurrencies do have very high *return*s but have very big *risk*s as well. Based on the chart above, it can be seen that cryptocurrencies have fluctuating *return*s. The movement of *bitcoin* can be seen from the beginning of 2019 – the end of 2021 has a fairly stable *return* value but the price of *bitcoin* itself has a tremendous increase over 3 years. From the beginning of 2019 *bitcoin* had a price of $ 3,437.20 and at the end of 2020 the price of *bitcoin* soared to $ 46,219.50 there was an increase of 1245% over 3 years. When entering the Covid-19 pandemic, the price of *bitcoin*

decreased from the previous month to be precise in February, which was 24.94%. For *ethereum*, the movement in the chart above is quite volatile for the *return*s obtained and the movement of the line chart from the beginning of 2019 to mid-2020 is almost the same as that of *Dogecoin*. The price of *ethereum* at the beginning of 2019 was $ 106.71 and at the end of 2021 the price of *ethereum* became $ 3,677.85 from here it can be seen that there is an increase from the beginning of 2019 to the end of 2021 by 3347% this percentage is greater than the increase in the price of *bitcoin* in the same

period. It's just that during the pandemic, *Ethereum* experienced a decrease of 38.92% from the previous month. And the last one is *dogecoin*, *dogecoin* it has a very volatile pattern of *bitcoin* and *ethereum*. There are 2 moments of rising *return*s on *dogecoin*, the first is in January 2021 which rose by 689.56% which initially had a price of $ 0.004666 to $ 0.036841 this happened because Elon Musk stated that *Dogecoin* is his favorite crypto asset on his twitter account. Then the second increase occurred on April 15, 2021 again Elon Musk posted on his twitter account saying "Doge Barking at the Moon" the tweet made an increase in April to 526.36% which in the previous month *dogecoin* price was at $ 0.053744 to $ 0.336635 and after this increase in the following months experienced a decrease in the price of *dogecoin* even until the end of 2021 the price of *Dogecoin* to $ 0.170297 there was a decrease of 49.41% for 8 months. The *return* obtained from the beginning of 2019 to the end of 2021 on the crypto asset *Dogecoin* of 8896.14% started from having a price of $ 0.001893 to $ 0.170297. *Dogecoin* gets a huge *return* compared to *bitcoin* and *ethereum*.

Kruskal Wallis test results differ in the *return*s of *bitcoin, ethereum*, and *dogecoin*.

Test Statistics^{a,b}

	return
Kruskal-Wallis H	1.385
df	2
Asymp. Sig.	.500

a. Kruskal Wallis Test

b. Grouping Variable: coin

Picture 5. Kruskal – Wallis test result (*return*)

From the test results above, it can be observed that if the *return* variable has a number of 0.5, then 0.5 > 0.05 means that there is no significant *return* comparison between *bitcoin*, *ethereum*, and *Dogecoin*. That way, it can be concluded that the *return*s of *bitcoin*, *ethereum*, and *dogecoin* are similar.

Kruskal Wallis test results differences in *bitcoin*, *ethereum*, and *dogecoin risk*

Test Statistics^{a,b}

	risk
Kruskal-Wallis H	2.000
df	2
Asymp. Sig.	.368

a. Kruskal Wallis Test

b. Grouping Variable: coin

Picture 6. Kruskal – Wallis test result (*risk*)

From the results above, it can be seen that the *risk* variable has a value of 0.368, then 0.368 > of 0.05 means that it can be interpreted that there is no significant difference in *risk* between *bitcoin*, *ethereum*, and *Dogecoin*. Thus, it can be concluded that the *return*s of *bitcoin*, *ethereum*, and *dogecoin* are the same.

Paired Sample t-test

The difference in the price of *bitcoin* before the covid-19 pandemic and during the covid-19 pandemic.

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	pre covid19 - post covid19	2016.327869	1349.524603	172.7889196	1670.698569	2361.957168	11.669	60	.000

Picture 7. Test Results paired sample t-test (*bitcoin*)

The results on the paired sample t-test for *bitcoin* sig value (2-tailed) have a value of 0.000, which means that the sig value (2-tailed) of 0.000 < 0.05, it can be concluded that there is a significant difference between the price of *bitcoin* before the Covid-19 pandemic and during the Covid-19 pandemic. The price of *bitcoin* at the time before the announcement of the COVID-19 pandemic had an average price of 2 months before the announcement of covid-19 was $ 9,132.95 and after the announcement of the covid-19 pandemic to $ 7,142.79 there was a decrease of 21.79%.

The difference in the price of *ethereum* before the covid-19 pandemic and during the covid-19 pandemic

Paired Samples Test

		Paired Differences							
				Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation		Lower	Upper			
Pair 1	pre covid19 - post covid19	44.60150000	33.65228085	4.344490776	35.90819404	53.29480596	10.266	59	.000

Picture 8. Test Results paired sample t-test (*ethereum*)

The results on the paired sample t-test for *ethereum* sig numbers(2- tailed) have the number 0.000, which means the number sig(2- tailed) of 0.000 < 0.05 until it can be concluded that there is a significant comparison between the price of *ethereum* at the time before the covid-19 pandemic and when there was a covid-19 pandemic. On *ethereum*, there is also a price comparison before the covid-19 pandemic and during the covid-19 pandemic. In the 2 months when before the covid-19 pandemic was announced the average price of *ethereum* was $207.197541 and when the covid-19 pandemic started to $163.9 it could be seen a decrease of 20.90%.

The difference in *dogecoin* price before the covid-19 pandemic and during the covid-19 pandemic.

Paired Samples Test

		Paired Differences							
				Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation		Lower	Upper			
Pair 1	pre covid19 - post covid19	.002871836	.018703739	.002394768	-.001918414	.007662086	1.199	60	.235

Picture 9. Test Results paired sample t-test (*dogecoin*)

The results of the paired sample t-test for *Dogecoin* sig value (2-tailed) have a value of 0.798, which means that the sig (2-tailed) value of 0.798 > 0.05, it can be concluded that there is no significant difference between the price of *Dogecoin* before the Covid-19 pandemic and during the Covid-19 pandemic.

CONCLUSIONS and RECOMMENDATIONS
Conclusion

This research intends to analyze the *return*s and *risk*s of cryptocurrencies(*bitcoin*, *ethereum*, and *dogecoin*). The result of the Kruskal Wallis test on the types of *return*s for the three coins was that there was no significant *return* comparison. The results of The Kruskal Wallis test on *risk* prove that there is no significant or arguably similar *risk* comparison. In crypto investment, investors must be more careful in sorting out crypto assets because the *risk*s to be obtained by investors will be large. Then for the results of the paired sample t-test, whether there is a price comparison before covid-19 and after the announcement of covid-19. There are 2 coins that have a significant price comparison before and after the covid-19 pandemic claimed are *bitcoin* and *ethereum*. On the other hand, *Dogecoin* does not have a significant price comparison between before the covid-19 pandemic and after the announcement of the covid-1 pandemic.

Suggestion

Before starting to invest in cryptocurrencies, it would be nice for investors to see the performance of the *Cryptocurrency* asset in order to minimize the *risk*s that will be faced. Then determine the investment goal whether long-term or short-term so that investors can decide on the desired *return* and time. For beginners, it is recommended to invest in cryptocurrencies in the top 5 *Cryptocurrency* rankings and must have been registered with Bappepti in order to minimize the *risk*s that will be faced.

This study only used *bitcoin*, *ethereum*, and *dogecoin* coins as research data. For the upcoming research to analyze other coins listed on Bappepti and use different difference tests from this study.

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