Jurnal Ekonomi Perusahaan
Volume 30, Issue 1, March 2023
ISSN: 0854-8154 (print), 2830-1560 (online)

The Comparison of the performance of crypto assets, stocks, bonds, and gold in Indonesia during Covid-19 Pandemic

Vergo Chandra[1]
M. Budi Widiyo Iryanto[2*]

[1]Department of Management, Kwik Kian Gie School of Business, Jakarta, Indonesia.
*Corresponding address: budi.widiyo@kwikkiangie.ac.id

ABSTRACT

This study aims to determine whether crypto assets are suitable as an alternative investment when compared to the performance of the LQ 45 stock index, 10-year Indonesian Government Bonds, and Antam's precious metal in the form of gold. The measurement of the performance of an investment is not only seen from the rate of return but also needs to pay attention to the risks to be borne, then the performance measurement is used using the Sharpe, Treynor, and Jensen measurement methods. The three models base their analysis on past rates of return to determine the compensation for the returns obtained for each measure of risk borne. This study used descriptive analysis with case study methods, while hypothesis testing was carried out by nonparametric statistical tests using Kruskal-Wallis H because there were more than two independent variables. The values of the Sharpe Index and Jensen Index show that Bitcoin investment instruments are the highest-performing instruments while the LQ45 stock index is the lowest. The conclusion of this study shows that there is no significant difference between investment performance using the Sharpe method, while in the Treynor and Jensen methods, there are significant differences.

Keywords:

Investment rate of return, investment risk, investment performance, performance investment measurement, Kruskal-Wallis test

How to Cite (APA):

Chandra, V., & Iryanto, M. B. W. (2023). The Comparison of the performance of crypto assets, stocks, bonds, and gold in Indonesia during Covid-19 Pandemic. *Jurnal Ekonomi Perusahaan*, *30*(1), 30–38. https://doi.org/10.46806/jep.v30i1.930

INTRODUCTION

Everyone has various choices in determining the proportion of resources or funds used now or in the future. Postponing consumption to allocate available funds to productive activities aimed at obtaining future profits is referred to as investment (Adnyana, 2020).

The crisis caused by the Covid-19 pandemic, which has hit the world since March 2020, has prompted investors to look for new options or alternatives in investing. One of the investment options is crypto assets. According to Corbet et al., crypto assets are a popular alternative investment instrument for investors because their value tends to increase over time. During the pandemic, crypto assets were considered to be a better investment than other traditional financial assets, such as precious metals.

Indonesian Central Securities Depository (KSEI) data shows that the number of stock investors on the Indonesia Stock Exchange (IDX) in 2021 increased to 7.5 million, an increase of 93 percent compared to 2020. The BAPPEBTI also noted an increase in the value of crypto asset transactions in Indonesia reaching 859.4 trillion rupiahs in 2021. Historically the rate of return on the crypto asset "Bitcoin" is indeed higher compared to other asset classes.

According to Choudry et al. (2015), in situations of uncertainty, investors prefer to invest in fields where changes in value are relatively stable, such as gold. During the 2020-2021 covid pandemic which was full of economic uncertainty, investment growth in the cryptocurrency sector was the highest. This trend is an anomaly. Now the question arises, what is the actual rate of return for Bitcoin compared to other investment classes? This study aims to answer this question.

Besides the rate of return, the performance of investment instruments also needs to consider investment risk. Three methods can be used to measure portfolio performance that was developed by Sharpe, Treynor, and Jensen, so that a measure based on Sharpe's performance, Treynor's performance, and Jensen's performance is known. This research is also intended to find out whether the very high level of risk of crypto assets compensates for the rate of return relative to other traditional assets.

The study is conducted in Indonesia. Therefore, it contributes academically by reflecting the behavior of Indonesian investors. The results of this study are also expected to provide Indonesian investors the information about the level of profit and risk of every investment class that can be used as input in determining investment choices.

LITERATURE REVIEW

Evolution of Standard Financial Theory

The financial theory is built on various assumptions that strengthen its position when faced with real conditions. Ilham et al. (2020) note some of the main assumptions of standard financial theory regarding investor behavior. These assumptions are investor rationality in every decision-making process carried out (perfect rationality), investors are willing to pay attention to all available information that is complete and transparent (perfect information), and investors can evaluate it carefully to make the right decisions for personal interests based on analysis. rational for the information (perfect self-interest).

Modern Portfolio Theory (MPT)

Economist Markowitz introduced Modern Portfolio Theory (MPT) in his essay in 1952. TMT which is an analysis of the average variance is a mathematical framework for constructing a portfolio of assets in such a way that the expected return is maximized for a certain level of risk. This theory is the formalization and expansion of diversification in investing, the idea that owning different types of financial assets is less risky than owning only one type. His key insight is that the risk and return of an asset should not be judged by itself, but by how it contributes to the risk and return of the portfolio as a whole. It uses the asset price variance as a proxy for risk.

Capital Asset Pricing Model (CAPM)

The CAPM was independently introduced by Treynor (1961, 1962), Sharpe (1964), Lintner (1965a,b), and Mossin (1966), which was developed based on Markowitz (1952) on diversification and modern portfolio theory. The CAPM is a model used to determine the theoretically required rate of return on assets, to make decisions about adding assets to a well-diversified portfolio. The CAPM takes into account the sensitivity of an asset to non-diversifiable risk (also known as systematic risk or market risk), often represented by the quantity of beta (β) in the financial industry, as well as the expected return from the market and expected returns.

Efficient Market Hypothesis (EMH)

Handini and Astawinetu (2020) notes that the concept of the Efficient Market Hypothesis (EMH) was first formulated by Paul Samuelson and Eugene Fama in the 1960s. In general, EMH theory holds that securities markets very efficiently reflect information about individual stocks and the stock market as a whole. EMH is based on the view that when information appears, it spreads very quickly and blends into security prices without any delay (Fama, 1970). The word "efficient" in EMH emphasizes that in the capital market, investors cannot get above-average returns without accepting above-average risk. In an efficient market, abnormal returns will not be found.

Prospect Theory

In Prospect Theory, Tversky and Kahneman (1979) suggest that investors will give different weights between gains and losses. Investors will feel more pressured (distressed) by the possibility of losses that will be obtained than the pleasure of the profits that may be obtained in the same amount. This theory assumes that individuals value losses higher or more "painful" than gains. Therefore, in general, investors will give greater weight to the losses suffered than the profits to be obtained in making decisions.

Prospect theory also assumes that individual decisions are also based on expectations of loss or gain and try to minimize the risk of regret. This principle is following Markowitz's (1952) statement regarding asset diversification, especially uncorrelated assets, with which investors can reduce the risk of loss (regret) in the future.

Prospect theory also shows that investors have an irrational tendency to be more reluctant to risk profits than losses. In a loss condition, investors will be more willing to take risks compared to profit conditions. In a bet, investors will feel more pain from losing a certain amount of money than the pleasure from winning with the same money. That's why in a loss situation people are more desperate to take risks.

RESEARCH METHODS

Research Object

In this study, the objects studied were crypto assets in the form of Bitcoin, the LQ45 stock index, 10-year State Bonds, and Antam's gold to represent precious metal instruments in Indonesia. Bitcoin controls or represents around 73% of the total crypto asset market

capitalization (US$ 2.38 trillion) in mid-2020. The LQ45 stock index is a stock market index on the Indonesia Stock Exchange (IDX) which consists of 45 selected companies that meet certain criteria One of them is having high liquidity and market capitalization. The 10-year State Bond is a debt instrument with a tenor of 10 years issued by the central government, used as a reference for yield on state bonds. Antam's gold is the gold price per gram which has a certificate issued by PT Aneka Tambang Tbk. The data is retrieved.

Data Collection

The data collected is in the form of quantitative data, namely data in the form of numbers or numbers. The data source is in the form of secondary data obtained using literature study techniques through internet research, which is done by observing and collecting historical data from related investment instruments via websites and blogs (Sekaran & Bougie, 2016). The data is in the form of historical prices and interest rates from Bank Indonesia's SBI reports. The financial data comes from https://investing.com, which is a financial market platform that provides real-time data and analysis of various financial instruments. In addition, data was also taken from the official website of Bank Indonesia, namely https://bi.go.id and https://pusatdata.kontan.co.id.

Research variables

This study utilized four variables in the form of the rate of return from each investment instrument included in the study. The rate of return on crypto assets from Bitcoin, the rate of return on the LQ45 stock index, the rate of return on government bonds with a tenor of 10 years, and the return on metals starting in gold.

Bitcoin Rate of Return

Crypto assets in this study are measured using the percentage change in the last (closing) daily Bitcoin price concerning international time (UTC) and the Bitcoin price is the value that must be issued to obtain one Bitcoin. Here is the formula for calculating the Bitcoin rate of return:

$$R(Btc_t) = \frac{Btc_{t-1} - Btc_t}{Btc_{t-1}} \; x \; 100$$

Rate of Return of LQ45 Stock Index

To represent stock returns, the LQ45 stock index is used. The data used is the percentage change taken from daily transaction data from January 2020 to December 2021. The following is the formula for calculating the rate of return for the LQ45 Stock Index:

$$R(LQ45_t) = \frac{LQ45_{t-1} - LQ45_t}{LQ45_{t-1}} \; x \; 100$$

Rate of Return on Government Bonds

To represent bond assets, ten-year government bonds are used. Daily transaction data, coupons, and maturity are taken from the id.investing.com website. Bond prices are calculated using the concept of the time value of money and then principal payments are discounted to their present value based on prevailing interest rates. Here is the formula for calculating the bond price and rate of return:

$$Price\ Obligation\ \ (ID\ 10\ YT) = \sum \frac{C_n}{(1+YTM)^n} + \frac{P}{(1+i)^n}$$

$$R(ID10YT_t) = \frac{ID10YT_{t-1} - ID10YT_t}{ID10YT_{t-1}}\ x$$

Gold Return Rate

To represent the price of gold, the "buy" price of Antam's gold is used. The following is the formula for calculating Antam's gold returns:

$$\mathrm{R(Antam_t)} = \frac{\mathrm{Antam_{t-1} - Antam_t}}{\mathrm{Antam_{t-1}}}\ \mathrm{x}\ 100$$

Data Analysis Procedures

The authors collect performance-related data, namely returns and risks, standard deviation and beta daily and annual data of Bitcoin, LQ45 stock index, ten-year sovereign bond, Antam gold, and the Jakarta Composite Index. Furthermore, the performance of investment instruments is calculated using the Sharpe, Treynor, and Jensen measurement methods with the help of the Microsoft Excel program. After that, the Kruskal-Wallis statistical test was carried out using the SPSS program.

Sharpe Measurement Method

Calculation of performance with the Sharpe measurement model is done by dividing the difference between the rate of return and the risk-free rate (excess return) with the variability (standard deviation) of portfolio returns. The greater the Sharpe ratio obtained, the better the performance of the instrument being measured. The formula used is as follows:

$$S_i = \frac{(\bar{R}_i - \overline{RFR})}{\sigma_i}$$

Treynor Measurement Method

Unlike the Sharpe method which divides excess return by variability (standard deviation), performance calculations using the Treynor method are performed by dividing the difference between excess return and risk-free rate by volatility (beta). The formula used is as follows:

$$T_i = \frac{(\bar{R}_i - \overline{RFR})}{\beta_i}$$

Jensen Measurement Method

The Jensen measurement model is carried out by subtracting the average return on investment instruments from the expected rate of return according to the CAPM (Adnyana, Investment Management, and Portfolio Ed. 9, 2020). The equation is as follows:

$$\alpha_j = R_i - [RFR_t + \beta_i\ (R_{mt} - RFR_t)]$$

Kruskal Wallis Test

The Kruskal-Walis test is a rank-based nonparametric test to determine whether there is a significant difference between two or more groups of independent variables (Syahza, 2021). The more different the number of ratings between the groups being compared, the greater the difference in one or more variables within a group. This test does not identify which variables or how many variables are dominant or show different performances within groups. The Kruskal-Wallis uses the following formula:

$$\mathrm{H} = \frac{12}{N(N+1)}\left(\sum \frac{{R_i}^2}{n_i}\right) - 3(N+1)$$

Others formulas

The other formulas used in this study are presented in Table 1. These formulas also reflect how are the variables operationalized.

Table 1

The formula of RFR, Beta, and Variance

No.	Variable	Definition	Formula
1	*Risk-free return (RFR)*	Risk-free/very low-risk interest rate	$R_f = \sqrt[n]{[(1+Rf_1)(1+Rf_2)..(1+Rf_n)]} - 1$
2	*Beta*	Beta is a comparison of stock returns with returns on the market	$\beta_i = \frac{\sigma_{im}}{\sigma^2{}_m}$
3	Variance	Unsystematic risk is a risk that is not related to market changes as a whole and a risk that can be eliminated by diversification	$\sigma^2 = \sum_{i=1}^{n} \frac{(R_i - \bar{R})^2}{n-1}$

RESULT AND DISCUSSION

The Comparison of Rates of Return on Bitcoin, LQ45 Stock, Antam Government Bonds, and Gold

Based on the daily rate of return during the period January 1 2020 to December 2021, Bitcoin is the most profitable investment instrument with an average of 0.431 % and 0.198% respectively. The second rank is held by a 10-year tenor State Bond with an average rate of return of -0.075% in 2020 and 0.020 in 2021. Then Antam's Gold returns

with a value of 0.067% in 2020 and -0.013% in 2021, together with Gold Futures with a value of 0.084 % which then decreased to -0.022% in 2021. Meanwhile, the LQ45 stock index has an average return of -0.019% in 2020 and -0.005% in 2021.

The Comparison of the Risk Level of Bitcoin, LQ45 shares, Antam's Government Bonds, and Gold.

Based on the daily average standard deviation or risk for the period January 1 2020 to December 2021, the investment instrument with the lowest risk is the State Bond with the lowest average standard deviation, which is 0.86%. The second lowest order is Antam's Gold at 1.05%, then Gold Futures at 1.13%. Next is the LQ45 stock index of 1.71%. Bitcoin has the highest risk with an average standard deviation of 3.5%.

The Comparison of Investment Performance in Bitcoin, LQ45 shares, Antam's Government Bonds and Gold using the Sharpe Method

The performance measurement of investment instruments was conducted from January 1 2020 to December 2021. The measurement showed that Bitcoin is the best investment instrument with a ratio of 4,476 and 0,684 respectively. The number two position is best occupied by Antam Gold with a ratio of 1,225 and -0,332. The next position is the 10-year tenor State Bonds with a ratio of 0.130 and 0.241. In the last position, there are LQ45 shares with a ratio of -0.339 and -0.0230. So, during the research period (2020-2021), the instrument that provides the greatest compensation against total risk is Bitcoin.

The Comparison of Investment Performance in Bitcoin, LQ45 shares, Antam's Government Bonds, and Gold using the Treynor Method

Measurement of the performance of investment instruments using the Treynor method in the period January 1 2020 to December 2021 shows that LQ45 shares are the most attractive investment instrument with ratios of -0.090 and -0.033. Government bonds are in second place with a Treynor ratio of -0.094 and -0.364. Next door is Antam with a ratio of -7,430 and -0,318. Lastly is Bitcoin with a ratio of -19.537 and 0.841. So, based on the Treynor ratio, the instrument that provides the greatest compensation during the study period (2020-2021) for total risk is the LQ45 stock index.

The Comparison of Investment Performance in Bitcoin, LQ45 shares, Antam's Government Bonds, and Gold using the Jensen Method

The measurement of the performance of investment instruments using the Jensen method from January 1 2020 to December 2021 shows that Bitcoin is the best investment instrument with a ratio of 2,662 and 0,404 respectively. In the runner-up position is Antam Gold with a ratio of 0.193 and -0.074. State bonds with a tenor of 10 years are in third position with a ratio of 0.048 and 0.032. In the last position, there are LQ45 shares with a ratio of -0.179 and -0.097. These results show that Bitcoin's performance was the highest over the 2020-2021 period.

Test the performance differences of Bitcoin, LQ45 Stock Index, Government Bonds, and Antam's Gold with the Kruskal-Wallish Rating Test

The Kruskal-Wallish ranking test shows that a significant difference in investment performance only occurs between Bitcoin and LQ45 stocks, especially for the Treynor

(Table 3) and Jensen methods. The Kruskal-Wallis test of differences in performance as measured by the Sharpe method lacks sufficient evidence to disprove Ho: "The performance of Bitcoin, LQ45 Stock Index, Sovereign Bonds, and Antam's Gold by the Kruskal-Wallish Rating Test is the same."

Table 2
Dunn's Post Hoc Comparison Table based on the Treynor Method

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Bitcoin-Antam	-13.958	8.041	-1.736	.083	.496
Bitcoin-LQ45	-18.771	8.041	-2.334	.020	.117
Bitcoin-ID 10 Y T	-24.854	8.041	-3.091	.002	.012*
Antam-LQ45	4.813	8.041	.598	.550	1.000
Antam-ID 10 Y T	10.896	8.041	1.355	.175	1.000
LQ45-ID 10 Y T	-6.083	8.041	-.756	.449	1.000

*α<0.05

Table 3
Dunn's Post Hoc Comparison Table based on the Treynor Method

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
LQ45-Antam	-5.917	8.038	-.736	.462	1.000
LQ45-ID 10 Y T	-7.250	8.038	-.902	.367	1.000
LQ45-Bitcoin	23.000	8.038	2.862	.004	.025*
Antam-ID 10 Y T	1.333	8.038	.166	.868	1.000
Antam-Bitcoin	17.083	8.038	2.125	.034	.201
ID 10 Y T-Bitcoin	15.750	8.038	1.960	.050	.300

*α<0.05

CONCLUSION

This study found no difference in the performance of Bitcoin, the LQ45 Stock Index, Government Bonds, and Antam Gold when measured using the Sharpe method. Significant differences between the performance of Bitcoin, the LQ45 Stock Index, Government Bonds, and Antam's Gold occur when measured using the Jensen method of Treynor.

SUGGESTION

Sharpe, Treynor, and Jensen's method use historical data, so it does not describe the performance of the instrument in the future. New investment instruments, such as crypto assets, are strongly influenced by high investor sentiment or speculative elements. The Sharpe and Jensen method only pays attention to the average rate of return (expected return) and risk (variance) of returns, without taking into account asymmetric payoffs.

With this explanation, investors are expected to gather additional information if they are interested in cryptocurrency investment instruments.

To evaluate the performance of investment instruments using the Risk-Adjusted Return method, it will be easier to use the Sharpe method because the measurement uses total risk so it is more reliable and accurate. Treynor and Jensen's method relies heavily on beta estimation, which requires a suitable benchmark. Therefore, if you continue to use the Treynor and Jensen method, further researchers are advised to find an appropriate benchmark or use an adjusted method if using more than one benchmark.

REFERENCES

Adnyana, I. M. (2020). Manajemen Investasi dan Portofolio. 9th Edition. Jakarta: Lembaga Penerbitan Universitas Nasional (LPU-UNAS).

Handini, S., & Astawinetu, E. D. (2020). Teori Portofolio dan Pasar Modal. Indonesia. Surabaya: Scopindo Media Pustaka.

Ilham, R. N., Fachrudin, K. A., Sinurat, M., & Khaddafi, M. (2020). Manajemen Investasi Legal Investment versus Fake Investment. Sukabumi: CV Jejak, IKAPI.

Jensen, M. C. (1968). The performance of mutual funds in the period 1945-1964. The Journal of Finance, 23, 389-416. https://doi.org/10.1111/j.1540-6261.1968.tb00815.x

Kahneman, D., Tversky, A. (1972). Subjective Probability: A Judgment of Representativeness. In: Staël Von Holstein, CA.S. (Eds). The Concept of Probability in Psychological Experiments. Theory and Decision Library, 8. Springer, Dordrecht. https://doi.org/10.1007/978-94-010-2288-0_3

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. Econometrica, 47(2), 263–291. https://doi.org/10.2307/1914185

Lintner, J. (1965) The Valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. The Review of Economics and Statistics, 47, 13-37. http://dx.doi.org/10.2307/1924119

Markowitz, H. (1952) Portfolio Selection. The Journal of Finance, 7, 77-91. https://doi.org/10.1111/j.1540-6261.1952.tb01525.x

Mossin, J. (1966) Equilibrium in a capital asset market. Econometrica, 34, 768-783. http://dx.doi.org/10.2307/1910098

Sharpe, W. F. (1966). Mutual Fund Performance. The Journal of Business.

Sharpe, W. F., Gordon, J. A., & Jeffery, V. B. (2005). Investasi Ed. 6. Jakarta: Indeks.

Thaler, R. (1999). Mental Accounting Matters. Journal of Behavioral Decision Making, 12(3), 183-206. https://doi.org/10.1002/(SICI)1099-0771(199909)12:3%3C183::AID-BDM318%3E3.0.CO;2-F

Treynor, J. (1965). How to Rate Management of Investment Funds. Harvard Business Review, 41, 63-75.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. Science, 185(4157), 1124–1131. https://doi.org/10.1126/science.185.4157.1124