Comparative Performance Analysis of Bitcoin, LQ45 Stocks, and Antam Gold as Investment Options

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ABSTRACT

The advancement of technology and digitalization has broadened access to various investment instruments, driving greater participation in investment activities, especially among younger generations. This shift highlights a contrast between classical investment theory, which emphasizes rational decision-making, and real-world investor behavior often influenced by trends, emotions, and phenomena like fear of missing out. This study aims to compare the performance of Bitcoin, LQ45 index stocks, and Antam gold using recent data, including local gold prices. A comparative analysis approach is used to evaluate which investment yields the best performance. The findings, based on the Sharpe, Treynor, and Jensen methods, reveal notable performance differences. Bitcoin achieved the highest Sharpe ratio, reflecting high potential returns relative to total risk, making it attractive for high-risk-tolerant investors. Antam Gold ranked highest on the Treynor ratio, indicating its strength in generating returns relative to market risk (beta), and serving as a more stable option for conservative investors. LQ45 stocks excelled using the Jensen method, showing their ability to deliver returns above market expectations, ideal for fund managers seeking to outperform benchmarks. This research reinforces the importance of aligning investment instrument choices with individual risk profiles and financial goals.

Keywords*: Antam Gold, Bitcoin, Cryptocurrency, Jensen Methods, LQ45 stocks, Sharpe Methods, Treynor Methods.*

ABSTRAK

Kemajuan teknologi dan digitalisasi telah memperluas akses ke berbagai instrumen investasi, mendorong partisipasi yang lebih besar dalam kegiatan investasi, terutama di kalangan generasi muda. Pergeseran ini menyoroti kontras antara teori investasi klasik, yang menekankan pengambilan keputusan yang rasional, dan perilaku investor dunia nyata yang sering dipengaruhi oleh tren, emosi, dan fenomena seperti fear of missing out. Penelitian ini bertujuan untuk membandingkan kinerja Bitcoin, saham indeks LQ45, dan emas Antam menggunakan data terkini, termasuk harga emas lokal. Pendekatan analisis komparatif digunakan untuk mengevaluasi investasi mana yang menghasilkan kinerja terbaik. Temuan tersebut, berdasarkan metode Sharpe, Treynor, dan Jensen, mengungkapkan perbedaan kinerja yang mencolok. Bitcoin mencapai rasio Sharpe tertinggi, mencerminkan potensi pengembalian yang tinggi relatif terhadap total risiko, membuatnya menarik bagi investor yang toleran risiko tinggi. Emas Antam menempati peringkat

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tertinggi pada rasio Treynor, menunjukkan kekuatannya dalam menghasilkan pengembalian relatif terhadap risiko pasar (beta), dan berfungsi sebagai opsi yang lebih stabil bagi investor konservatif. Saham LQ45 unggul menggunakan metode Jensen, menunjukkan kemampuannya untuk memberikan pengembalian di atas ekspektasi pasar yang ideal untuk manajer investasi yang ingin mengungguli tolok ukur. Penelitian ini memperkuat pentingnya menyelaraskan pilihan instrumen investasi dengan profil risiko individu dan tujuan keuangan.

***Kata kunci**: Emas Antam, Bitcoin, Mata Uang Kripto, Metode Jensen, Saham LQ45, Metode Sharpe, Metode Treynor.*

INTRODUCTION

The rapid economic development due to globalization requires every individual to have sufficient knowledge in managing finances, one of which is through investment. Investment itself is divided into two types, namely real investment, such as building a business, and financial investment, such as stocks and bonds, through the capital market (Fahmi, 2012; Fabozzi & Markowitz, 2011). In Indonesia, public interest in investment continues to increase, especially among young people under the age of 30. Digitalization has also expanded the choice of investment instruments, including the emergence of cryptocurrencies that offer high returns but are highly volatile and trigger the FOMO phenomenon (Bank Indonesia, 2022). Cryptocurrencies, such as Bitcoin, became known in the aftermath of the 2008 global crisis and are now one of the investment trends despite being high-risk. Crypto price volatility is very high, with drastic changes in value in a short period of time (Hardiyanto et al., 2023; Coinmarketcap, 2021; Jakpat, 2022). On the other hand, people still choose many instruments such as gold, property, stocks, and mutual funds that are considered safer (Dataindonesia.id, 2022; Kustodian Sentral Efek Indonesia, 2023). Gold in particular is considered a stable investment because its value tends to rise in tandem with inflation and has a low downside risk (Nurhalizza, 2022).

To answer the debate around investment instruments with the highest return value, various studies have been conducted in various parts of the world such as research that has been conducted by Adiyono et al. (2021) which shows that Bitcoin is a security with a return valuethe highest because it has an extraordinary performance then followed by LQ45 shares which have a fairly small risk and finally gold with considerable risk. Then there is a study conducted by Kurniawati (2024) which compares the performance of the cryptocurrency Bitcoin, stocks, and gold and found that the riskiest investment is Bitcoin, which is followed by gold and stocks. Bitcoin also offers the biggest return, followed by stocks and gold. Next, according to a study by Nurhaliza et al. (2022), equities rank last in terms of return value, whereas Bitcoin is the financial instrument with the highest return value based on a variety of metrics. These studies don't align with the research by Cheong (2019), which compared stocks, exchange rates, and cryptocurrencies and found that the cryptocurrency market is the most volatile when compared to foreign exchange and the stock market, making it a less profitable investment. Investing is an important strategy in long-term financial management, where Bitcoin, gold, and stocks are in high demand. Evaluations of all three often use Sharpe, Treynor, and Jensen ratios to assess performance based on risk and return (Setia et al., 2018).

Various studies have explored the performance of Bitcoin, stocks, and gold as investment instruments. For instance, Uyar and Kahraman (2019) found that Bitcoin delivers the highest returns but carries significant risk compared to major currencies. In contrast, Widiawira and Akbar (2023) demonstrated that stocks often outperform Bitcoin and gold in terms of Jensen Alpha, suggesting better risk-adjusted returns. Meanwhile, Setiawati and Diatmika (2023) emphasized gold's stability, noting its suitability as a low-risk investment during crisis situations, despite offering lower returns. However, these studies have notable limitations, as many only compare two of the three instruments rather than evaluating all simultaneously. Additionally, a portfolio approach incorporating risk simulation across these assets remains underexplored. This gap

highlights the need for further research that integrates up-to-date data, multivariate analysis, and optimal allocation simulations while considering diverse investor risk profiles, from conservative to aggressive. A dynamic portfolio approach utilizing the Sharpe, Treynor, and Jensen methods is strongly recommended to address these shortcomings (Verma & Hirpara, 2016).

Based on this description, this research is a development effort to re-examine studies conducted by several researchers. This study aims to compare the performance of various investment instruments in order to obtain the most optimal instrument information for investors, especially in the midst of increasing investment interest among the public. The main difference between this study and the previous study lies in the time span used. This study uses a more recent period compared to the previous study, taking into account the highly volatile price impact of each investment instrument, especially after the COVID-19 pandemic. In addition, a significant difference in this study is the use of different gold prices in gold investment instruments. This research uses the price of gold produced by PT. Aneka Tambang (Antam), compared to previous research, generally uses global gold prices or digital gold, namely Indogold (PT Aneka Tambang, 2023).

LITERATURE REVIEW

Theoretical Foundations of Investment Behavior and Portfolio Theory

Investment decision-making and portfolio management are grounded in classical economic theories and behavioral finance, offering a comprehensive lens to evaluate assets like Bitcoin, LQ45 stocks, and Antam gold. Classical theories, such as Modern Portfolio Theory (MPT) by Markowitz (1952) and the Capital Asset Pricing Model (CAPM) by Sharpe (1964), assume rational decision-making to optimize risk and return through diversification and the efficient frontier. These frameworks underpin performance metrics like the Sharpe ratio for total risk, the Treynor ratio for systematic risk, and Jensen's alpha for excess returns (Hossain, 2020; Lu et al., 2021; Brinza et al., 2023). However, behavioural finance highlights deviations from rationality, with psychological factors Like Fear of Missing Out (FOMO) driving speculative investments, particularly in cryptocurrencies (Justyanita & Agustin, 2023; Hasan et al., 2024).

The risk-return trade-off is central to investment analysis, where assets like Bitcoin offer high returns but significant volatility, appealing to aggressive investors, while gold provides stability for conservative ones (Alqemzi et al., 2022; Meiryani et al., 2023; Lei Xu & Kinkyo, 2023; Gokgoz et al., 2024). LQ45 stocks balance risk and return, offering moderate growth (Widiawira & Akbar, 2023). Recent studies emphasize aligning investments with risk tolerance and financial goals (Aji & Astuti, 2023; Setyawan & Tjiptodjojo, 2024; Pratama, 2025). Empirical research, such as Budiartomo and Setiyono (2023), confirms Bitcoin's high volatility, while Tunnisa and Darmawan (2023) highlight distinct risk profiles using Sharpe and Treynor ratios. Nurhakim et al. (2024) further demonstrate that Markowitz's model enhances cryptocurrency portfolio efficiency, underscoring the need for dynamic portfolio strategies integrating quantitative metrics and behavioral insights.

Hypothesis Development

Modern Portfolio Theory (MPT) provides a foundational framework for understanding how investors can optimize returns for a given level of risk through strategic diversification across assets with differing risk-return profiles (Markowitz, 1952). In volatile markets such as Indonesia, the comparative performance of cryptocurrencies, stock indices, and safe-haven assets is particularly relevant. Bitcoin, as a representative cryptocurrency, exhibits high volatility but offers the potential for substantial returns, especially during bull markets, though its risk-adjusted performance often remains suboptimal (Dasman, 2021; Maldini, 2022). In contrast, the LQ45 stock index represents equity markets and typically reflects macroeconomic recovery trends, showing consistent performance during post-shock periods. Meanwhile, gold, particularly Antam gold in the Indonesian context, functions as a traditional hedge, offering relative stability and lower

volatility, thereby mitigating portfolio risk during periods of economic turbulence such as the COVID-19 pandemic or rising inflation (Lei Xu & Kinkyo, 2023).

MPT emphasizes the importance of evaluating assets using risk-adjusted metrics. The Sharpe ratio measures returns relative to total risk, expressed as standard deviation, providing insights into the efficiency of returns given the asset's overall volatility (Sharpe, 1964; Jogiyanto, 2010). The Treynor ratio focuses on systematic risk, capturing sensitivity to market-wide movements through beta, favoring assets less correlated with the broader market in downturns (Lu et al., 2021; Brinza et al., 2023). Jensen's alpha assesses abnormal returns relative to a CAPM benchmark, identifying assets that outperform expected returns given their risk profile (Jogiyanto, 2010; Qur'anitasari et al., 2019). Empirical studies highlight the differential performance of these asset classes: Bitcoin's speculative nature produces superior nominal returns but often fails to maintain high risk-adjusted metrics (Adiyono et al., 2021; Kurniawati et al., 2024), LQ45 stocks yield market-aligned returns with moderate volatility (Chandra & Iryanto, 2023), and gold consistently demonstrates low beta and positive risk mitigation characteristics (Budiartomo & Setiyono, 2023).

In the Indonesian context, increasing cryptocurrency adoption has been fueled by speculative behavior and FOMO-driven investment patterns, amplifying Bitcoin's volatility (Hasan et al., 2024; Justyanita & Agustin, 2023). This creates opportunities and challenges for investors seeking optimal portfolio diversification. Hypotheses derived from these dynamics anticipate asset-specific strengths: Bitcoin is expected to excel in Sharpe ratios due to high nominal returns, Antam gold in Treynor due to its low systematic risk, and LQ45 stocks in Jensen's alpha owing to their consistent alignment with economic fundamentals (Adiyono et al., 2021; Meiryani et al., 2023; Tunnisa & Darmawan, 2023).

To accommodate the non-normal distribution of asset returns and volatility clustering observed in financial markets, the study employs non-parametric testing using the Kruskal-Wallis method, allowing robust comparisons across the three asset classes (Uyar & Kahraman, 2019; Nurhakim et al., 2024). Findings from these analyses are intended to guide investors in forming diversified portfolios that balance high-return potential with stability, in line with MPT principles (Eduardus Tandelilin & CWM, 2017; Setyawan & Tjiptodjojo, 2024; Pratama, 2025).

H1: There is a significant difference in the Sharpe performance among Bitcoin, LQ45 stocks, and Antam gold.

H2: There is a significant difference in the Treynor performance among Bitcoin, LQ45 stocks, and Antam gold.

H3: There is a significant difference in the Jensen performance among Bitcoin, LQ45 stocks, and Antam gold.

RESEARCH METHODS

This study applies a comparative quantitative approach, which is designed to compare two or more groups based on specific variables using numerical data and statistical analysis. The focus of the research lies in examining the performance and dynamics of three different investment instruments, namely Bitcoin as a representative of cryptocurrency, the LQ45 stock index as a benchmark for the Indonesian stock market, and Antam gold as a traditional safe-haven asset. The use of these three instruments allows for a comprehensive understanding of how modern digital assets, equity-based investments, and precious metals perform relative to each other over a given period of time.

The secondary data employed in this study are sourced from credible financial platforms to ensure validity and reliability. Monthly closing price data for Bitcoin and the

LQ45 stock index were obtained from investing.com, a trusted global financial market platform. Meanwhile, gold prices per gram were collected from harga-emas.org and markets.ft.com, which provide up-to-date information on gold movements both locally and globally. The period of observation spans four years, from January 1, 2020, to December 31, 2023. This particular timeframe was chosen because it encompasses significant global economic events such as the COVID-19 pandemic, post-pandemic recovery, inflationary pressures, and financial market volatility, all of which have had considerable influence on the movement of investment instruments.

The population of this study consists of the monthly closing prices of the three selected assets. Since the research aims for a comprehensive comparison, the sample taken includes the entire population, which is 48 monthly data points for each instrument, resulting in a total of 144 observations. These observations serve as the foundation for conducting robust comparative analysis. For the data analysis technique, this study employs several statistical tools using SPSS software. Descriptive statistical analysis is used to provide an overview of the data distribution, averages, and fluctuations. Classical assumption tests ensure the validity of the models and confirm whether the data meet the required statistical assumptions. Furthermore, hypothesis testing is conducted to determine the significance of the relationships or differences among the variables. To compare the three groups, both ANOVA (for parametric testing) and the Kruskal-Wallis test (as a non-parametric alternative) are applied, ensuring that the results remain reliable regardless of whether data assumptions are fully met.

RESULTS

This section presents the findings from the comparative analysis of Bitcoin, LQ45 shares, and Antam gold, focusing on their risk-adjusted performance using the Sharpe, Treynor, and Jensen methods. The analysis is based on monthly closing price data from January 2020 to December 2023, sourced from credible platforms such as investing.com, harga-emas.org, and markets.ft.com. Descriptive statistics, normality and homogeneity tests, and non-parametric Kruskal-Wallis tests were employed to evaluate performance differences across the three investment instruments.

Table 1. Descriptive Statistics of Returns

Variable	Instrument	N Valid	Mean	Minimum	Maximum	Std. Deviation
Returns	Bitcoin	48	0.0575	-0.3732	0.4697	0.20514
	LQ45 Shares	48	0.0006	-0.2142	0.1171	0.05483
	Antam Gold	48	0.0089	-0.0432	0.1464	0.03606
Risk	Bitcoin	48	0.032485	0.0118	0.0918	0.0140
	LQ45 Shares	48	0.011241	0.0042	0.0576	0.0080
	Antam Gold	48	0.006574	0.0000	0.0407	0.0060

Table 1 shows the return statistics for each investment instrument with the same amount of data, 48 monthly closing price data. With an average return value of 0.0575, the bitcoin investment return has the highest, lowest, and average values. Stock instruments have the lowest average value at 0.0006, while Antam gold is in second place with a value of 0.0089.

According to descriptive risk statistics in Table 1, the bitcoin cryptocurrency has the highest risk value, at 0.0918. The greatest value in relation to the maximum risk value of 0.0407 for gold and the highest risk value of 0.0576 for LQ45 stock. The bitcoin cryptocurrency achieves an average value of 0.032485 for all investment instruments.

Table 2. Sharpe's Performance Statistics

Instrument	N Valid	Mean	Minimum	Maximum	Std. Deviation
Bitcoin	48	-0.251804	-9.8247	14.0895	6.4745487
LQ45 Shares	48	-6.953708	-17.0239	3.0550	5.0181257
Antam Gold	48	-11.429037	-29.3166	6.2814	7.5398961

Descriptive statistics of performance Sharpe in Table 2 shows that, of each of the three investment instruments that are the subject of the research, Bitcoin cryptocurrency has the best value, where the minimum, maximum, and average values have the highest value compared to other investment instruments. Meanwhile, the instruments with the minimum, maximum, and lowest average values are owned by Antam Gold. Investment instruments can be said to be better if they have a higher Sharpe value. In descriptive statistics, it shows that the Bitcoin cryptocurrency has a higher Sharpe value compared to LQ45 shares and Antam's gold.

Table 3. Treynor Performance Statistics

Instrument	N Valid	Mean	Minimum	Maximum	Std. Deviation
Bitcoin	48	0.82642	-12.325	19.6845	4.6366475
LQ45 Shares	48	-0.0563	-0.2146	0.0436	0.0467367
Antam Gold	48	1.19223	-9.9965	10.5244	3.5919473

The descriptive statistics in Table 3 show the maximum value among the three investment instruments, namely bitcoin, LQ45 shares, and Antam gold owned by bitcoin which is then followed by Antam gold and LQ45 shares, which are calculated during the research period while the minimum value of treynor performance when compared to other instruments is owned by bitcoin with the smallest value of -12,325. Then for the average performance value owned by Antam gold with the largest value of 1.19223 which also indicates that among the three investment instruments that are the subject of research, Antam gold is the instrument with good treynor performance which is then followed by bitcoin which has a value of 0.82642 and the smallest average performance value is owned by LQ45 shares with an average performance value of -0.0563.

Table 4. Jensen's Performance statistics

Instrument	N Valid	Mean	Minimum	Maximum	Std. Deviation
Bitcoin	48	-0.004038	-0.4888	0.4373	0.214964
LQ45 Shares	48	0.039860	-0.2297	1.3625	0.209790
Antam Gold	48	-0.064890	-0.1336	0.0648	0.037087

When compared to the minimal value of the investment in LQ45 stocks and Antam gold that was examined throughout the research period, Table 4 demonstrates that the bitcoin cryptocurrency instrument has the lowest Jensen's performance. The LQ45 shares have the highest value of the three investment vehicles, followed by the Bitcoin and Antam gold cryptocurrencies.

Then, during the research period, the investment instrument with the highest average value among the three was LQ45 shares, which had a Jensen performance of 0.03986. Antam Gold's Jensen performance value came in second, at -0.06489, and the Bitcoin cryptocurrency had the lowest average value, at -0.004038. It is also evident from this descriptive statistic that LQ45 equities have the highest return value based on the Jensen approach because they typically yield positive returns for investors as opposed to other instruments that typically yield negative returns.

Table 5. Normality Test

Model	Instrument	Kolmogorov-Smirnov		
		Statistics	Df	Sig.
Sharpe	Sharpe Bitcoin	0.113	48	0.161
	Sharpe LQ45 Stock	0.087	48	0.200*
	Sharpe Gold	0.100	48	0.200*

Model	Instrument	Kolmogorov-Smirnov		
		Statistics	Df	Sig.
Treynor	Treynor Bitcoin	0.210	48	0.000
	Treynor LQ45 Shares	0.141	48	0.018
	Treynor Antam Gold	0.179	48	0.001
Jensen	Jensen Bitcoin	0.078	48	0.200*
	Jensen Antam Gold	0.149	48	0.009
	Jensen LQ45 Stock	0.294	48	0.000

Data with a significance value greater than 0.05 is considered normally distributed. As can be seen from Table 5, the majority of the data have a significance value more than 0.05, indicating that the Treynor, Jensen, and Sharpe performance data utilized in this study are not all normally distributed. The performance of the LQ45 stock and Antam Gold Jensen, as well as the Treynor value of the three investment vehicles, still contains some data that is not normally distributed, but with a significance value of less than 0.05. The findings of the normality test of Kolmogorov-Smirnov data using the Treynor and Jensen methods in this study are not normally distributed, indicating that some data is normally distributed while other data is not. Nonetheless, this study's Sharpe technique is regularly distributed.

Table 6. Homogeneity Test

Methods	Statistic	Levene Statistic	Sig.
Sharpe	Based on Mean	3.692	0.027
	Based on Median	2.849	0.061
	Based on Median and with adjusted df	2.849	0.062
	Based on the trimmed mean.	3.616	0.029
Treynor	Based on Mean	15.732	0.000
	Based on Median	14.137	0.000
	Based on Median and with adjusted df	14.137	0.000
	Based on the trimmed mean.	15.293	0.000
Jensen	Based on Mean	16.315	0.000
	Based on Median	15.290	0.000
	Based on Median and with adjusted df	15.290	0.000
	Based on the trimmed mean.	16.183	0.000

Based on Table 6, the results of this study's homogeneity test indicate that, according to the Sharpe calculation method, only the median value has a value greater than 0.05, while nearly all of the data have a significance value less than 0.05, indicating that the data is not homogenous or identical. Since the data utilized in this study is not homogeneous and is not normally distributed, a non-parametric statistical test named the Kruskal-Wallis test will be employed instead.

Table 7. Kruskal Test – Wallis

Model	Instrument	N	Mean Rank	Kruskal Wallis	DF	Asymp. Sig	Decision
Sharpe	Sharpe Bitcoin	48	103.13	46.132	2	0.000	Accepted
	Sharpe LQ45 Stock	48	68.71				
	Sharpe Gold	48	45.67				
Treynor	Treynor Bitcoin	48	75.06	8.093	2	0.017	Accepted
	Treynor LQ45 Shares	48	59.31				
	Treynor Antam Gold	48	83.13				
Jensen	Jensen Bitcoin	48	73.75	23.204	2	0.000	Accepted
	Jensen Antam Gold	48	92.35				
	Jensen LQ45 Stock	48	51.40				

Based on Table 7, the Kruskal-Wallis test results indicate significant differences in the performance of Bitcoin, LQ45, and Antam gold across all three measurement models. The Sharpe ratio ($\chi^2 = 46.132$, $p = 0.000$), Treynor ratio ($\chi^2 = 8.093$, $p = 0.017$), and Jensen's alpha ($\chi^2 = 23.204$, $p = 0.000$) all show significance values below 0.05, leading to the acceptance of the alternative hypothesis. These findings confirm that the three investment instruments exhibit distinct risk-adjusted returns and abnormal return performance, reflecting their different risk-return characteristics.

DISCUSSION

Given that Sharpe's performance has a significance threshold of 0.000<0.05, it can be said that H1 is accepted, indicating that the performance of the Sharpe cryptocurrency investment instruments differs significantly. The study's findings are consistent with research by Nurhaliza et al. (2022), which discovered that the Sharpe method's performance measurement differs significantly and actually from the investment instruments under investigation. Research by Qur'anitasari et al. (2019) also stated that Sharpe methods are most appropriate to be used in measuring portfolio. Furthermore, this analysis is consistent with studies by Lumantobing and Sadalia (2021), which also demonstrate a substantial Sharpe performance between Antam Gold, LQ45 Shares, and the bitcoin cryptocurrency.

With a significance level of 0.017<0.05 for Treynor's performance, it can be said that H2 is accepted, indicating a substantial difference between Treynor's performance and that of the bitcoin cryptocurrency investment instrument, LQ45 shares, and Antam Gold. When measured using the Treynor approach, this finding is consistent with research by Aves (2018) that indicates a considerable difference between the investment instruments of bitcoin, the LQ45 stock index, and Antam gold.

The findings of this study, however, contradict those of a study by Lumantobing and Sadalia (2021), which found no discernible difference in Sharpe's performance between gold, equities, and bitcoin as investment tools. Furthermore, another study by Adiyono et al. (2021) found that bitcoin, gold, and stock cryptocurrencies perform similarly when examined using the Treynor method; however, the findings of this study differ from those of the other study.

There is a substantial difference between Jensen's performance in cryptocurrency investment instruments, bitcoin, LQ45 shares, and Antam Gold, as indicated by the fact that his performance has a significance level of 0.000<0.05, indicating that H3 is accepted. These findings are consistent with a study by Lumantobing and Sadalia (2021) that found a substantial variation in Jensen's performance between gold, equities, and bitcoin. This result also supports a study by Adiyono et al. (2021), which found a significant difference in the study participants' Treynor performance.

The Mean Rank of each investment instrument's Treynor, Jensen, and Sharpe performance is displayed in the rankings above. The aforementioned table indicates that, with a Sharpe performance rating of 103.13, Bitcoin has the highest performance, followed by the LQ45 Stock Index with a score of 68.71, and Antam gold instruments with a score of 45.67. Antam Gold has the greatest rating in Treynor's performance, with a value of 83.13. Treynor's bitcoin performance comes in second with a value of 75.06, while bitcoin comes in last with a score of 59.31. Additionally, with a number of 92.35, the LQ45 Stock Index holds Jensen's best performance rating, followed by Bitcoin (173.75) and Antam Gold (51.40%).

The financial instrument with the highest Sharpe performance and the highest mean rank, according to the Kruskal-Wallis ranking, is bitcoin, which averages 103.13. Additionally, research by Adiyono et al. (2021) and Lumantobing and Sadalia (2021) that ranked bitcoin investment instruments first in Sharpe's average performance assessment is consistent with Sharpe's average performance rating.

According to the average results of the Kruskal-Valais Performance Treynor ranking test in this study, Antam's gold has the highest average (83.13), followed by Stuart T and

the LQ45 stock index. This suggests that Antam's gold can offer performance results with the highest value Return based on calculations of Return average and Risk-Free Rate, which are then compared with beta values in relation to other instruments that are the focus of the study. Cross-Swept results ranking. This contrasts with the study by Adiyono et al. (2021) and Adiyono et al. (2021), which both found that investment products Stuart T outperformed Treynor in terms of average performance rating. However, according to the study Kurniawati et al. (2024), LQ45 shares are the investment instruments with the first average rank in performance Treynor.

Additionally, LQ45 Shares, with a mean rank value of 92.35, is the investment instrument with the greatest Jensen performance in the cross-scale Walis rating test. Bitcoin comes in second, and Antam gold comes in last. This suggests that despite extremely erratic price swings, LQ45 shares might continue to perform well and turn a profit. The findings of this study's Jensen's average performance rating differ from those of a study by Adiyono M et al (2021), which found that gold is the investment instrument with the highest return value according to Jensen's average rating, followed by LQ45 stocks and bitcoin.

CONCLUSION

The comparative analysis of Bitcoin, LQ45 shares, and Antam gold reveals distinct performance profiles across the Sharpe, Treynor, and Jensen methods. Bitcoin excels in the Sharpe ratio, offering high returns relative to total risk, making it suitable for investors with high risk tolerance. Antam Gold leads in the Treynor ratio, demonstrating strong returns relative to market risk, appealing to conservative investors seeking stability. LQ45 shares outperform in the Jensen method, generating excess returns above market expectations, ideal for fund managers aiming to surpass benchmarks. These findings highlight the varied risk-return dynamics of each instrument, emphasizing the importance of aligning investment choices with individual financial goals and risk appetites to optimize portfolio performance.

The results imply that investors should adopt diversified portfolios tailored to their risk profiles, with Bitcoin for aggressive growth, gold for stability, and LQ45 shares for balanced returns. However, the study is limited by its reliance on secondary data from a four-year period, which may not capture long-term trends or extreme market events. Additionally, the analysis focuses solely on three instruments, potentially overlooking other viable assets. Future research should incorporate longer timeframes, additional investment options like bonds or real estate, and dynamic portfolio simulations to enhance allocation strategies. Exploring behavioral factors, such as investor sentiment, could further refine performance evaluations.

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