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Cryptocurrencies vs Stocks: Analyzing Returns, Risks, and Performance to Determine the Best Investment

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Abstract–This study compares the investment performance of selected cryptocurrencies and stocks over the period 2020–2024 by analyzing returns, risk and relative performance. A quantitative descriptive approach was employed with a saturated sample of 40 assets (cryptocurrencies and stocks) and 2,400 monthly closing-price observations. The analyzed metrics include monthly returns, volatility (as a proxy for risk) and the Sharpe ratio for risk-adjusted performance. Results indicate that cryptocurrencies produced higher average returns but exhibited substantially greater volatility; DOGE shows the highest risk with a value of 14.02955. In a risk-adjusted comparison based on the Sharpe ratio, TRX achieves the highest Sharpe ratio with a value of 1.29783, followed by NVDA at 1.21917 and AVGO at 1.15028, suggesting that several assets delivered superior returns with relatively controlled risk. Yearly comparisons revealed shifting performance leaders, reflecting temporal market dynamics across the five-year window. These findings imply that portfolio allocations should explicitly consider the trade-off between higher returns from cryptocurrencies and their increased volatility, and should incorporate risk-adjusted metrics such as the Sharpe ratio when selecting assets. This study can be used as a reference to improve investors' understanding of asset performance and the risks of cryptocurrencies and stocks, and can encourage further research on investment analysis and risk management across various asset classes.

Keywords: Cryptocurrency; Investment; Performance; Risk; Stocks

1. INTRODUCTION

Investing is an interesting subject that has always been a topic of conversation. Today, the world is becoming more and more modern, which has changed the way we invest. In the past, we used to invest by buying gold, land, houses, farms, and other physical assets. With the development of technology, investing is easier to do even with small capital through digital platforms. Now people can invest in financial assets such as stocks, bonds, mutual funds and cryptocurrencies (Hamdika et al., 2022). Easy access to information, transactions and the development of digital platforms have resulted in more people being interested in investing in financial assets. This is evidenced by the many news reports about the increasing number of stock and cryptocurrency investors. Indonesia Central Securities Depository (KSEI) released data on investor growth from 2021 to 2024. The results are quite interesting, in 2021 capital market investors in Indonesia amounted to 7,489,337 people and by the end of 2024 it rose to 14,871,639 people, this shows massive growth because in just 3 years the number of capital market investors grew by almost 100% (see Figure 1).

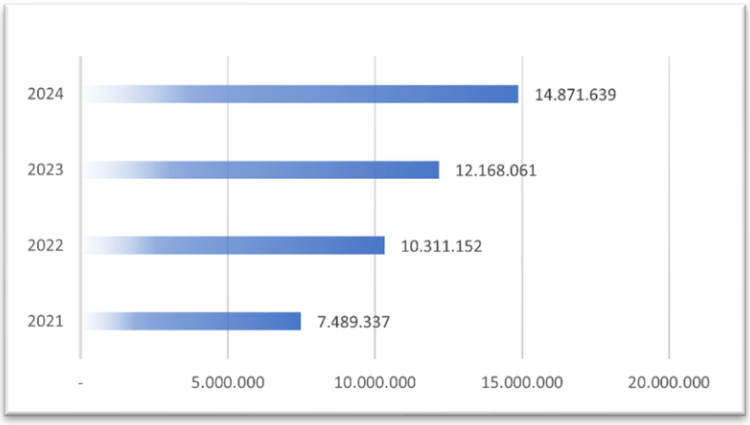

Figure 1. Indonesian Capital Market Investor Growth
Source: Indonesian Capital Market Statistics - KSEI December 2024

The Director of the Indonesia Stock Exchange (IDX) stated that in the global economic uncertainty, IDX performance still shows competitive competitiveness compared to other global exchanges (Hamdani, 2024). Even according to the IDX press release, throughout 2024 the average daily transaction value (RNTH) was in the position of IDR 12.9 trillion (Exchange, 2024). This is proof that currently many investors are interested in investing in the Indonesian capital market.

Not only the capital market, digital assets such as cryptocurrencies are also of interest to investors. Cryptocurrency, which was originally only a means of payment, now tends to be used as an investment tool (Almeida & Gonçalves, 2022; Li et al., 2021). The Financial Services Authority (OJK) noted that the number of crypto investors in Indonesia increased

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to 21.63 million investors as of October 2024. The transaction value of domestic crypto assets has also experienced a significant increase, until October 2024 domestic crypto asset transactions reached IDR 475.13 trillion rupiah or an increase of 352.85 percent on an annual basis (Azzahra, 2024). The market capitalization of all crypto assets in January 2025 was recorded at 3.7 trillion dollars, dominated by the bitcoin market capitalization worth more than 2 trillion dollars.

The surge in the number of investors has not only had a good impact, but also caused problems. In 2024 a group of investors was found to have lost approximately 20 billion rupiah in a securities investment fraud case (Kurnia, 2024b). In the same year, there was a case of investment fund management that cost investors more than 70 billion rupiah (Kurnia, 2024a). In addition, several years earlier there were several cases of investor losses due to not having investment analysis skills and tending to be led by market price movements (Putra, 2021; Putra, 2020). This does not only happen in the stock market, in cryptocurrency investment there are also many cases of investor losses (BBC, 2024; Binekasri, 2022), studies show that the majority of cryptocurrency investors experience losses (Rahmawati, 2023).

This situation raises concerns about consumer protection, microfinancial stability and the urgent need to improve financial literacy, particularly understanding investment risks. Public literacy about risks and investment potential is crucial to prevent financial losses and help investors navigate the complex and volatile cryptocurrency market more effectively (Carbó-Valverde et al., 2025; Jones et al., 2024; Rahyuda & Candradewi, 2023). The thing that needs to be considered in determining investment is to know and consider the potential returns and risks (Hartono, 2022). Investment returns and risks can vary depending on the type of asset (Laksana, 2024; Liu & Tsyvinski, 2021). By analyzing the return and risk, we can evaluate the performance of the asset. Performance evaluation is the main thing that investors must do before determining their investment decisions, the higher the performance of an investment, the more effective the investment is. The Sharpe ratio is a common and widely used method in evaluating investment performance (Abdelmalek, 2024; Huang et al., 2024; Kim et al., 2024; Sornmayura et al., 2024). The sharpe ratio was introduced by William F. Sharpe in 1966 (Sharpe, 1966). The sharpe ratio is a widely used measure in finance to evaluate the risk-adjusted return of an investment portfolio. It is defined as the ratio of the excess return of a portfolio over the risk-free rate to the standard deviation of the portfolio's returns (Landete et al., 2020).

The theory used in this research is prospect theory, Prospect theory was first formulated by Kahneman in his paper entitled “Prospect Theory: An Analysis of Decision under Risk” (Kahneman & Tversky, 1979). Prospect theory explains that the selection of investment assets is evaluated based on profits and losses. Investors must understand the advantages and disadvantages of an investment by seeking as much information as possible to determine their investment decisions. Financial understanding and risk tolerance also play a role in influencing investment intentions (Yang et al., 2021). Based on this theory, investors must consider the benefits and risk factors and investment performance rationally (Andaresta & Purwanto, 2023). Return is the level of profit obtained from an investment asset, while risk is the level of uncertainty or potential loss of an investment asset. Risk can also be said as an opportunity for an unfavorable event to occur (Brigham & Houston, 2019). Return and risk have a close relationship, if an asset has a large potential profit, the level of risk will also be large, or it can be said that the higher the risk, the higher the potential return (Laksana, 2024; Tandelilin, 2017).

There have been many studies that examine investment performance, but the sample in the research only comes from one type of asset such as stocks (Laksana et al., 2025; Nurhayati et al., 2021; Yunita & Rinaldi, 2022; Yunita, 2023). There have also been many studies on cryptocurrency, but the content of the study compares cryptocurrency with gold, or other assets (Andaresta & Purwanto, 2023; Budiartomo & Setiyono, 2023). This study aims to evaluate the performance of cryptocurrency and stock assets from 2020 to 2024 using returns, risk and sharpe ratio. This research refers to previous research that provides insight into the performance of cryptocurrency assets (Laksana & Fauziyah, 2024), the novelty provided in this research is a study with different objects, namely a combination of cryptocurrencies, Indonesian stocks and American stocks with the criteria of 20 cryptocurrencies with the largest market capitalization and 10 Indonesian and American stocks with the largest market capitalization in a longer period of 5 years. The selection of assets, namely stocks and cryptocurrencies, is based on many studies that prove that stocks and cryptocurrencies perform better than other financial assets (Hamdika et al., 2022; Laksana, 2024) , while the largest market capitalization criterion is determined on the grounds that assets with large market capitalization are not easily influenced by market sentiment or have lower risk (Pessa et al., 2023; Vlădoi & Merling, 2022). It is hoped that this research can provide important information for investors to support their investment decisions.

2. RESEARCH METHODS

This study uses a population of financial asset monthly closing price data consisting of cryptocurrencies, Indonesian stocks and American stocks for the period 2020 to 2024. Research variables include rate of return, risk and Sharpe index. The secondary data used in this study were obtained from information provider websites - coingecko.com and investing.com. The data collected consists of numerical values, which can also be referred to as quantitative data. Descriptive analysis is the analytical technique used in this study. To obtain the values of each variable, data processing was done using the Microsoft Excel program. The closing price of each cryptocurrency, Indonesian stocks, American stocks and BI 7 days reverse repo rate data, which serves as the return for risk-free assets, were prepared for processing. The sampling method used in this study employs a purposive sampling approach with specific inclusion criteria. The sample consists of the 20 largest cryptocurrencies based on market capitalization at the beginning of 2025 that have been traded since 2020 and are listed on Coingecko.com. As for stocks, 10 issuers with the largest market capitalization in

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Indonesia and the United States were selected based on early 2025 data, which have been listed on the secondary market since 2020 and indexed on Investing.com. The selection of data sources used platforms that have a high reputation for providing transparent and reliable financial market information. Based on these criteria, 20 cryptocurrencies, 10 Indonesian stocks and 10 American stocks were selected which resulted in 60 data for each asset, with a total observation of 2400 data. The following is a list of financial assets that meet the criteria presented in Table 1:

Table 1. List of Financial Assets 2020-2024

No	Code	Name of Assets	No	Code	Name of Assets
1	BTC	Bitcoin	21	BBCA	PT Bank Central Asia Tbk
2	ETH	Ethereum	22	TPIA	PT Chandra Asri Petrochemical Tbk
3	XRP	Ripple	23	BBRI	PT Bank Rakyat Indonesia Tbk
4	BNB	Binance Coin	24	BMRI	PT Bank Mandiri Tbk
5	DOGE	Doge Coin	25	TLKM	PT Telekomunikasi Indonesia Tbk
6	ADA	Cardano	26	ASII	PT Astra International Tbk
7	TRX	Tron	27	BBNI	PT Bank Negara Indonesia Tbk
8	LINK	Chainlink	28	ICBP	PT Indofood CBP Sukses Makmur Tbk
9	XLM	Stellar	29	BRIS	PT Bank Syariah Indonesia Tbk
10	HBAR	Hedera	30	AMRT	PT Sumber Alfaria Trijaya Tbk
11	WBTC	Wrapped Bitcoin	31	AAPL	Apple Inc
12	WETH	Wrapped ETH	32	NVDA	NVIDIA Corporation
13	LTC	Litecoin	33	MSFT	Microsoft Corporation
14	BCH	Bitcoin Cash	34	GOOG	Alphabet Inc
15	LEO	Leo Token	35	AMZN	Amazon.com, Inc
16	VET	VeChain	36	META	Meta Platforms, Inc
17	ETC	Ethereum Classic	37	TSLA	Tesla, Inc
18	XMR	Monero	38	AVGO	Broadcom Inc
19	ALGO	Algorand	39	BRK-B	Berkshire Hathaway
20	CRO	Cronos	40	WMT	Walmart Inc

Source: coingecko.com and investing.com

Asset performance data analysis is conducted by evaluating performance using the sharpe ratio. The following are the stages of performance evaluation, along with descriptions of the research variables listed in table 2:

a. Determine returns
b. Determine standard deviation
c. Determine risk-free interest rate
d. Calculate the Sharpe ratio

Table 2. Variable Description

Variable	Description	Formula
Return	Monthly asset gain/loss rate	$R = \frac{P_t - P_{t-1}}{P_{t-1}}$
Risk	Monthly asset risk level	$\sigma_i = \sqrt{\sum_{j=1}^{n} (R_{ij} - E(R_i))^2 . P_j}$
Sharpe Performance	Monthly asset performance based on sharpe ratio	$Si = \frac{R_p - R_f}{SD_i}$

Source: (Hartono, 2022; Laksana & Fauziyah, 2024)

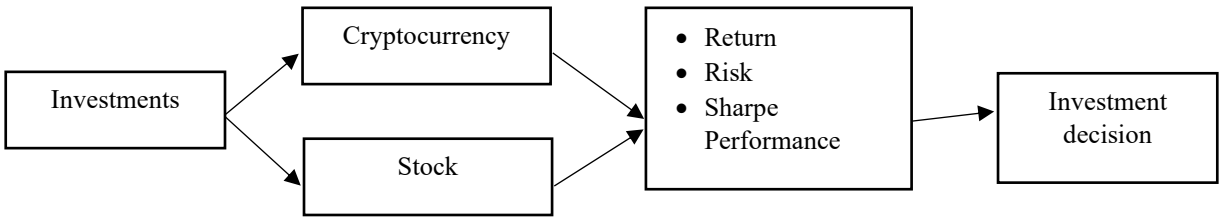

Figure 2. Conceptual Framework

The conceptual framework in Figure 2 illustrates the investment decision flow (cryptocurrency and stocks). Both types of investments are evaluated based on three key metrics: return, risk and sharpe performance. Return measures the profit or loss generated, while risk assesses the level of uncertainty or potential loss. Sharpe performance (sharpe ratio) is an important metric that measures investment returns adjusted for risk, providing an overview of investment efficiency.

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By comprehensively analyzing these three metrics, investors can make rational investment decisions that are in line with their objectives and risk tolerance, whether in asset selection, portfolio allocation or diversification strategies.

3. RESULTS AND DISCUSSION

3.1 Result

The results of the calculation of the rate of return on asset investment are presented in Table 3:

Table 3. Annual Asset Return Ranking 2020-2024

	2020		2021		2022		2023		2024	
Rank	Code	Return	Code	Return	Code	Return	Code	Return	Code	Return
1	TSLA	743.4%	DOGE	3584.8%	AMRT	118.1%	NVDA	238.9%	DOGE	247.7%
2	BRIS	564.8%	BNB	1258.7%	TPIA	42.9%	META	194.1%	XRP	230.8%
3	LINK	519.6%	CRO	838.0%	BMRI	41.3%	BCH	181.4%	HBAR	218.1%
4	ETH	472.7%	HBAR	815.8%	BBRI	20.2%	LINK	178.1%	NVDA	171.2%
5	WETH	472.2%	ADA	636.1%	BBCA	17.1%	WBTC	154.4%	XLM	149.7%
6	ADA	452.3%	ETC	510.1%	ICBP	14.9%	BTC	154.3%	TRX	138.6%
7	BTC	298.3%	ALGO	416.9%	BRK-B	3.3%	ADA	145.2%	LEO	126.8%
8	WBTC	297.8%	WETH	394.1%	ASII	0.0%	HBAR	132.6%	BNB	121.5%
9	VET	274.4%	ETH	393.4%	WMT	-2.0%	VET	128.0%	BTC	119.4%
10	XMR	246.7%	VET	318.6%	TLKM	-7.2%	TPIA	103.5%	WBTC	118.8%
11	LTC	205.1%	XRP	296.3%	LEO	-8.3%	TSLA	101.7%	AVGO	107.7%
12	HBAR	193.8%	TRX	188.9%	AVGO	-16.0%	AVGO	99.7%	WMT	71.9%
13	XLM	189.5%	LEO	173.1%	BRIS	-25.7%	TRX	94.7%	META	65.4%
14	BNB	175.4%	NVDA	125.4%	AAPL	-26.8%	ETH	91.3%	BCH	63.2%
15	DOGE	127.5%	XLM	103.4%	MSFT	-28.7%	WETH	90.8%	TSLA	62.5%
16	NVDA	121.9%	LINK	77.1%	TRX	-30.1%	XLM	83.1%	BRIS	56.9%
17	TRX	102.7%	GOOG	65.2%	BBNI	-31.7%	AMZN	80.9%	ALGO	48.5%
18	AAPL	80.8%	BTC	63.6%	XMR	-35.1%	XRP	80.0%	WETH	47.0%
19	AMZN	76.3%	WBTC	63.6%	GOOG	-38.7%	CRO	76.3%	ETH	46.4%
20	CRO	75.5%	AVGO	52.0%	AMZN	-49.6%	GOOG	58.8%	AMZN	44.4%
21	BCH	72.4%	AMRT	51.9%	NVDA	-50.3%	MSFT	56.8%	CRO	43.1%
22	LEO	71.6%	MSFT	51.2%	BNB	-52.6%	AAPL	48.2%	TPIA	42.9%
23	ALGO	49.8%	TSLA	49.8%	LTC	-54.1%	ETC	43.2%	ADA	42.6%
24	MSFT	41.0%	XMR	41.1%	ETC	-55.1%	BRIS	34.9%	LINK	35.4%
25	AVGO	38.5%	AAPL	33.8%	XRP	-58.9%	DOGE	31.8%	LTC	35.3%
26	META	33.1%	BRK-B	29.0%	DOGE	-60.1%	ALGO	30.9%	GOOG	35.1%
27	GOOG	31.0%	META	23.1%	META	-64.2%	BNB	29.1%	AAPL	30.1%
28	ETC	22.8%	TLKM	22.1%	BTC	-64.8%	BMRI	21.9%	BRK-B	27.1%
29	WMT	21.3%	BCH	20.1%	WBTC	-64.8%	BBNI	16.5%	VET	22.5%
30	XRP	9.8%	LTC	14.5%	TSLA	-65.0%	BBRI	15.9%	XMR	15.0%
31	BRK-B	2.4%	BBNI	9.3%	ETH	-67.7%	BRK-B	15.5%	ETC	13.9%
32	BBCA	1.3%	BBCA	7.8%	WETH	-67.8%	LEO	13.8%	MSFT	12.1%
33	BBRI	-7.5%	AMZN	2.4%	LINK	-72.6%	XMR	13.4%	ICBP	7.6%
34	AMRT	-9.1%	BBRI	1.0%	XLM	-73.0%	WMT	11.2%	BBCA	2.9%
35	TPIA	-10.3%	WMT	0.4%	BCH	-77.6%	AMRT	10.6%	AMRT	-2.7%
36	ASII	-13.0%	ASII	-5.4%	VET	-81.5%	BBCA	9.9%	BMRI	-5.8%
37	ICBP	-14.1%	ICBP	-9.1%	ADA	-81.9%	LTC	7.9%	ASII	-13.3%
38	TLKM	-16.6%	TPIA	-14.9%	HBAR	-87.5%	ICBP	5.8%	BBNI	-19.1%
39	BMRI	-17.6%	BRIS	-20.9%	CRO	-89.9%	TLKM	5.3%	BBRI	-28.7%
40	BBNI	-21.3%	BMRI	-44.5%	ALGO	-90.2%	ASII	-0.9%	TLKM	-31.4%

Table 3 shows that the level of return for each asset varies greatly each year. A positive return value indicates that the investment makes a profit while a negative return means that the investment experiences a loss. The asset return rate for the period 2020 to 2024 was recorded in the range of -90.2% to 3584.8%. The highest return level in 2020 was achieved by TSLA with a value of 743.4%, while the lowest position was BBNI with a value of -21.3%. In 2021, DOGE occupied the top position with a return value of 3584.8%, while BMRI was in the last position with a value of -44.5%. 2022 is the best year for the Indonesian stock market, this is evidenced by the top 5 rankings occupied by Indonesian stocks. The first rank was achieved by AMRT with a return value of 118.1%, followed by TPIA, BMRI, BBRI and BBCA while 32 other assets received negative returns with ALGO in the last rank and experienced the biggest loss with a value of -90.2%. Unlike the previous year, 2023 is the best year for all financial assets such as stocks and cryptocurrencies, this

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can be seen all assets get a positive return except ASII, ASII gets a negative return with a return value of -0.9%. NVDA managed to achieve the highest return value of 238.9% in 2023. In the last observation year, 2024, DOGE again achieved the highest return of 247.7%, while TLKM experienced the biggest loss with a value of -31.4%.

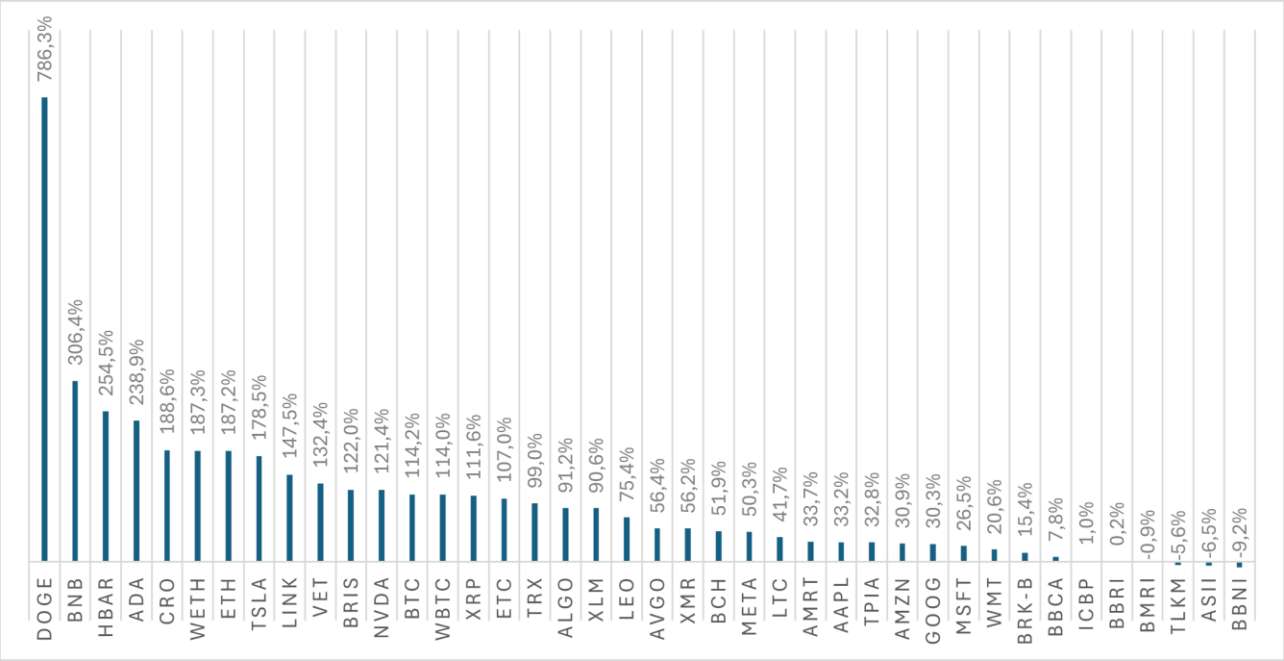

Figure 3. Average Return on Assets Ranking 2020-2024

Figure 3 shows that the average return on assets for the period 2020 to 2024 varies. The average return value in this period was recorded in the range of 786.3% to -9.2%. The three assets with the highest returns are occupied by cryptocurrencies, with DOGE ranked first, BNB ranked second and HBAR ranked third. DOGE gets an average return value of 786.3%, this shows that this asset has provided an average profit of approximately seven times its investment value. BNB and HBAR earned returns of 306.4% and 254.5% respectively. This also shows that these assets have provided significant gains.

In the 2020-2024 period there are 36 assets that provide positive average returns and 4 others have negative average returns. The 4 assets are Indonesian stocks, namely BMRI, TLKM, ASII and BBNI in the last rank, with values of -0.9%, -5.6%, -6.5% and -9.2% respectively. This also shows that not all investments can provide the expected returns. Overall, this table provides a clear picture of the average asset return performance over the past five years, with the dominance of cryptocurrencies showing significant growth potential.

The asset's annual risk rating for the period 2020 to 2024 can be seen in table 4. A higher risk value indicates that the asset has greater volatility, which means the potential for price fluctuations is higher. Conversely, a lower risk value indicates greater price stability. In 2020, the asset with the highest risk is HBAR with a value of 0.56355, while the asset with the lowest risk is LEO with a value of 0.03796. DOGE recorded the highest risk of 1.82117 in 2021, indicating that this asset experienced huge price fluctuations during the year while ICBP was the lowest risk asset in the same year with a value of 0.04437. In 2022, 2023 and 2024, ETC, BCH and XLM recorded the highest risk with values of 0.55776, 0.35540 and 1.35307 respectively. Meanwhile, BBCA has the lowest risk in three consecutive years with a value of 0.05416 in 2022, 0.02253 in 2023 and 0.03404 in 2024.

Overall, we can see that cryptocurrencies have a higher level of risk than stocks, as evidenced by the fact that cryptocurrency assets have always ranked in the top 5 in terms of risk throughout the observation year. This is in line with the highly volatile nature of the cryptocurrency market. The table also provides insight into how risk can change from year to year. As such, this risk analysis is important for investors in formulating investment strategies. Understanding the risks associated with each asset can help investors make better decisions, especially in the context of a highly dynamic and frequently changing market like cryptocurrency.

Table 4. Annual Asset Risk Ranking 2020-2024

	2020		2021		2022		2023		2024	
Rank	Code	Risk	Code	Risk	Code	Risk	Code	Risk	Code	Risk
1	HBAR	0.56355	DOGE	1.82117	ETC	0.55776	BCH	0.35540	XLM	1.35307
2	ETC	0.52071	BNB	1.14105	VET	0.32872	ALGO	0.25372	HBAR	0.78958
3	XLM	0.51913	ADA	0.83087	DOGE	0.32181	ADA	0.24526	ALGO	0.78353
4	XRP	0.50847	HBAR	0.74026	ETH	0.26835	HBAR	0.24063	XRP	0.69496
5	LINK	0.47761	CRO	0.73306	WETH	0.26813	VET	0.23874	ADA	0.59647

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	2020		2021		2022		2023		2024	
Rank	Code	Risk	Code	Risk	Code	Risk	Code	Risk	Code	Risk
6	VET	0.40139	ETC	0.53599	XRP	0.23858	TPIA	0.22760	DOGE	0.50370
7	ADA	0.40059	VET	0.52358	BCH	0.23584	CRO	0.20126	CRO	0.46887
8	BRIS	0.38134	XRP	0.51919	XMR	0.22781	XRP	0.20095	VET	0.38053
9	ALGO	0.35714	XLM	0.45175	LEO	0.22134	LINK	0.19428	BCH	0.33766
10	LTC	0.31758	LINK	0.35575	ALGO	0.21632	XLM	0.18946	ETC	0.22931
11	BCH	0.30203	ALGO	0.35352	CRO	0.21182	TSLA	0.18128	LINK	0.21037
12	CRO	0.29993	TRX	0.32737	LINK	0.20911	BNB	0.15433	LTC	0.18311
13	WETH	0.29382	WETH	0.29902	LTC	0.20607	DOGE	0.14565	ETH	0.18284
14	TSLA	0.29038	ETH	0.29753	ADA	0.19098	NVDA	0.13856	WETH	0.17960
15	ETH	0.29025	XMR	0.28352	HBAR	0.18762	LTC	0.13697	BTC	0.16738
16	XMR	0.24196	BCH	0.25587	BNB	0.18021	ETC	0.13208	WBTC	0.16687
17	TRX	0.23644	BTC	0.22916	TSLA	0.17610	BTC	0.13160	TSLA	0.16446
18	BTC	0.23146	WBTC	0.22811	NVDA	0.17350	WBTC	0.13114	LEO	0.15561
19	WBTC	0.23105	LTC	0.21415	WBTC	0.16975	XMR	0.09855	BNB	0.15513
20	TPIA	0.23017	BMRI	0.15267	BTC	0.16898	AVGO	0.09774	TPIA	0.15472
21	DOGE	0.22307	AMRT	0.14760	XLM	0.16837	ETH	0.09764	BRIS	0.12654
22	BNB	0.21163	TSLA	0.14323	TRX	0.16371	WETH	0.09756	AVGO	0.12645
23	BBNI	0.17519	LEO	0.14270	META	0.15686	META	0.08409	TRX	0.12370
24	ASII	0.14572	BRIS	0.13928	BBNI	0.14381	AMZN	0.08296	NVDA	0.11636
25	BMRI	0.14030	TPIA	0.13070	AMRT	0.13870	GOOG	0.07685	XMR	0.09945
26	BBRI	0.12520	NVDA	0.12208	AMZN	0.12097	TRX	0.07460	META	0.09124
27	AAPL	0.10994	BBNI	0.11109	AVGO	0.10078	BRIS	0.06279	BBRI	0.08090
28	META	0.10170	BBRI	0.06715	AAPL	0.09110	AAPL	0.06215	BBNI	0.07944
29	NVDA	0.09672	GOOG	0.06626	BRIS	0.08734	ICBP	0.05839	BMRI	0.07493
30	AMZN	0.09581	META	0.06615	ASII	0.08325	ASII	0.05758	AMRT	0.06874
31	TLKM	0.09525	ASII	0.06348	ICBP	0.07870	LEO	0.05703	ASII	0.06402
32	AVGO	0.08877	AAPL	0.06242	BRK-B	0.07830	BBNI	0.05693	ICBP	0.06132
33	GOOG	0.08605	TLKM	0.06175	WMT	0.07584	MSFT	0.05678	TLKM	0.06065
34	ICBP	0.08089	AVGO	0.05862	GOOG	0.07387	BBRI	0.05656	AMZN	0.05688
35	BBCA	0.07949	MSFT	0.05780	TPIA	0.07177	TLKM	0.04617	AAPL	0.05373
36	BRK-B	0.07363	AMZN	0.05472	MSFT	0.06619	AMRT	0.04277	BRK-B	0.05370
37	AMRT	0.07362	BBCA	0.04863	BMRI	0.06276	BMRI	0.03806	GOOG	0.05228
38	MSFT	0.06447	BRK-B	0.04525	TLKM	0.05541	BRK-B	0.03324	MSFT	0.04969
39	WMT	0.05476	WMT	0.04483	BBRI	0.05514	WMT	0.02977	WMT	0.04854
40	LEO	0.03796	ICBP	0.04437	BBCA	0.05416	BBCA	0.02253	BBCA	0.03404

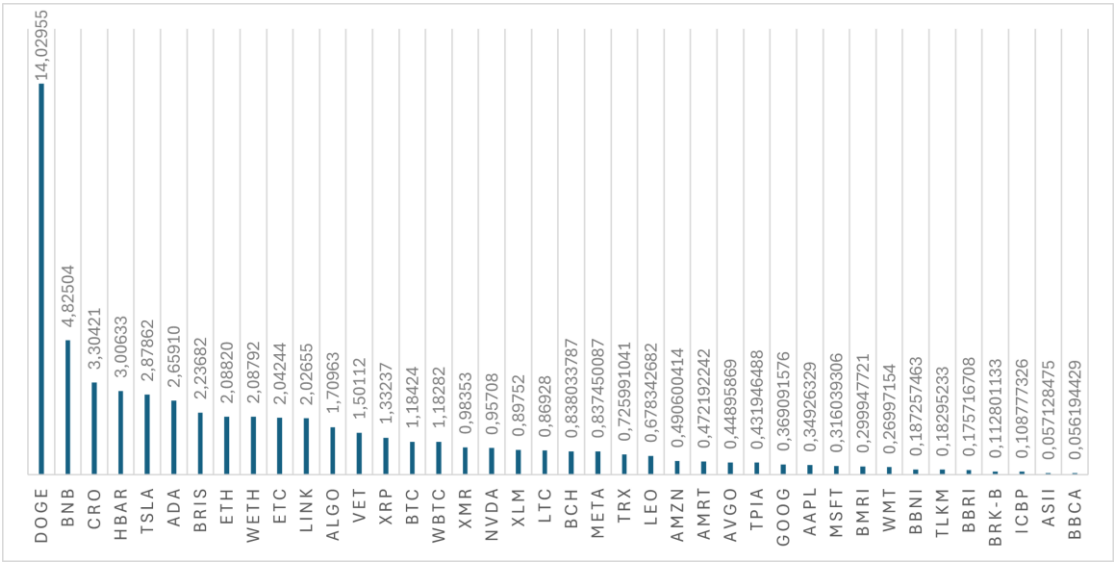

Figure 4. Asset Risk Rankings 2020-2024

Figure 4 presents the asset risk ranking for the period 2020 to 2024, where higher risk values indicate greater volatility in investment returns. From this table, it can be seen that DOGE tops the ranking with a risk value of 14.02955, indicating that this asset experiences very significant price fluctuations over the period. The second rank is occupied by

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BNB with a risk of 4.82504, followed by CRO and HBAR with risks of 3.30421 and 3.00633 respectively. ICBP, ASII and BBCA are the 3 assets that have the lowest risk with values of 0.10878 for ICBP, 0.05713 for ASII and 0.05619 for BBCA respectively. Low risk assets such as BBCA, ASII and ICBP suggest that they may be more suitable for more conservative investors who prioritize stability over high returns.

The asset performance ranking based on the Sharpe ratio for the period 2020 to 2024 is presented in table 5. The Sharpe ratio is a measure used to evaluate investment performance considering the risk taken. A positive value indicates that the asset provides a better return compared to the risk taken, while a negative value indicates that the return is not worth the risk. In 2020, amidst the COVID-19 pandemic, TSLA demonstrated exceptional performance with a Sharpe ratio of 0.64499, driven by rapid electric vehicle adoption and investor confidence. Cryptocurrencies also showed strong early growth, with ETH at 0.53562 and WETH at 0.53186, reflecting the rise of decentralized finance. Conversely, assets like AVGO -0.12412 and META -0.13192 exhibited negative ratios, indicating underperformance due to pandemic-induced uncertainties.

The post-vaccine recovery in 2021 saw ETH lead with a Sharpe ratio of 0.47733, followed by WETH 0.47611 and ALGO at 0.45328, propelled by the expanding Ethereum ecosystem and NFT boom. DOGE also notably surged to 0.44853 owing to social media influence. However, traditional tech giants like AAPL and META experienced corrections, posting negative ratios amid antitrust scrutiny and inflation concerns. The year 2022 was characterized by a "crypto winter" and general bear market conditions, leading to widespread negative Sharpe ratios. AMRT was a notable exception, leading with a modest 0.25869, likely supported by its diversified holdings in a resilient emerging market. Most assets, including TSLA -0.61495 and BTC -0.63926, recorded significant losses, underscoring a period where risk substantially outweighed returns.

A significant recovery occurred in 2023, with META achieving a remarkable turnaround to lead with a Sharpe ratio of 0.46639, attributed to AI integrations and advertising rebounds. NVDA secured second place at 0.41521, benefiting from the soaring demand for AI chips. Despite this, some laggards such as AMRT -1.14083 and BBCA -2.21648 continued to face challenges in specific sectors. By 2024, NVDA dominated at 0.27246, solidifying its position as an AI market leader. Cryptocurrencies like DOGE at 0.26507 and HBAR at 0.23005 also saw a partial resurgence. Traditional tech stalwarts like AAPL -0.69780 and MSFT -1.01110 faced headwinds, while Indonesian assets like AMRT and BBCA continued to exhibit volatility.

Table 5. Annual Asset Performance Ranking 2020-2024

	2020		2021		2022		2023		2024	
Rank	Code	Sharpe	Code	Sharpe	Code	Sharpe	Code	Sharpe	Code	Sharpe
1	TSLA	0.64499	ETH	0.47733	AMRT	0.25869	META	0.46639	NVDA	0.27246
2	ETH	0.53562	WETH	0.47611	ETC	-0.00841	NVDA	0.41521	DOGE	0.26507
3	WETH	0.53186	ALGO	0.45328	TPIA	-0.10260	LINK	0.24773	HBAR	0.23005
4	BRIS	0.49250	DOGE	0.44853	LEO	-0.12533	WBTC	0.23100	XRP	0.21814
5	LINK	0.45761	CRO	0.42746	BMRI	-0.14121	BTC	0.23024	XLM	0.21067
6	BTC	0.44763	LEO	0.42401	XMR	-0.21208	BCH	0.20177	TRX	0.17218
7	WBTC	0.44757	HBAR	0.42266	DOGE	-0.23070	ADA	0.18572	ALGO	0.13793
8	ADA	0.44461	ETC	0.40780	ICBP	-0.32063	HBAR	0.15453	LEO	0.12446
9	XMR	0.38503	BNB	0.39034	TRX	-0.34425	VET	0.15164	BNB	0.11257
10	VET	0.36226	VET	0.37771	ETH	-0.35135	TSLA	0.09690	BTC	0.11148
11	BNB	0.32283	ADA	0.37372	WETH	-0.35228	TPIA	0.09250	WBTC	0.11006
12	LTC	0.31711	NVDA	0.34171	XRP	-0.35237	AVGO	0.05634	ADA	0.09797
13	NVDA	0.31512	XRP	0.33916	VET	-0.38191	XRP	0.04958	CRO	0.07772
14	XLM	0.27117	TRX	0.31786	LTC	-0.39683	XLM	0.04927	BCH	0.06885
15	HBAR	0.23736	XLM	0.20259	BBNI	-0.40038	CRO	0.04061	AVGO	0.06587
16	DOGE	0.22874	LINK	0.17059	BBRI	-0.41766	TRX	0.02217	VET	0.01919
17	TRX	0.18687	GOOG	0.14521	BRK-B	-0.43666	ETH	0.01751	TSLA	-0.04099
18	ALGO	0.16683	BTC	0.13909	ASII	-0.44016	WETH	0.01502	LINK	-0.06950
19	CRO	0.16574	WBTC	0.13896	BNB	-0.46429	ALGO	-0.03355	ETH	-0.07594
20	BCH	0.13364	XMR	0.10301	BBCA	-0.46683	AMZN	-0.05101	WETH	-0.07792
21	XRP	0.13141	AMRT	0.06618	NVDA	-0.46689	ETC	-0.15138	LTC	-0.11475
22	AAPL	0.12702	TSLA	0.05563	AVGO	-0.48885	BNB	-0.16545	ETC	-0.12081
23	ETC	0.11593	BCH	0.03596	WMT	-0.51096	DOGE	-0.17006	BRIS	-0.12195
24	LEO	0.11147	AVGO	0.03164	BCH	-0.53831	GOOG	-0.20747	TPIA	-0.12474
25	AMZN	0.10553	MSFT	0.02472	LINK	-0.57130	LTC	-0.30963	META	-0.15667
26	AVGO	-0.12412	LTC	-0.00049	TSLA	-0.61495	MSFT	-0.32413	WMT	-0.28296
27	TPIA	-0.12475	AAPL	-0.13924	WBTC	-0.63583	AAPL	-0.36874	XMR	-0.44697
28	META	-0.13192	BBNI	-0.19892	BTC	-0.63926	XMR	-0.43503	AMZN	-0.49950
29	MSFT	-0.17701	META	-0.23523	AAPL	-0.67713	BRIS	-0.49315	GOOG	-0.65621
30	GOOG	-0.18608	TLKM	-0.26832	META	-0.69291	BBNI	-0.76821	AAPL	-0.69780

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	2020		2021		2022		2023		2024	
Rank	Code	Sharpe	Code	Sharpe	Code	Sharpe	Code	Sharpe	Code	Sharpe
31	BBNI	-0.24919	BRK-B	-0.28246	BRIS	-0.69680	BBRI	-0.78102	BRK-B	-0.73442
32	ASII	-0.29555	TPIA	-0.30697	AMZN	-0.73091	LEO	-0.80196	BMRI	-0.84264
33	BBRI	-0.32467	BRIS	-0.32178	XLM	-0.76738	ICBP	-0.88704	ICBP	-0.86542
34	BMRI	-0.33621	BMRI	-0.43562	TLKM	-0.80567	ASII	-0.99402	AMRT	-0.88559
35	WMT	-0.45286	BBRI	-0.47866	ADA	-0.81222	BMRI	-1.07121	BBNI	-0.94673
36	BBCA	-0.48081	BBCA	-0.57049	ALGO	-0.87695	AMRT	-1.14083	MSFT	-1.01110
37	BRK-B	-0.51452	AMZN	-0.58082	CRO	-0.87914	TLKM	-1.14162	BBRI	-1.05612
38	TLKM	-0.55928	ASII	-0.59567	HBAR	-0.95388	BRK-B	-1.36963	ASII	-1.10379
39	ICBP	-0.64021	WMT	-0.75582	MSFT	-0.99121	WMT	-1.63925	TLKM	-1.48507
40	AMRT	-0.64776	ICBP	-0.95064	GOOG	-1.04299	BBCA	-2.21648	BBCA	-1.70549

Table 6 presents the asset performance ranking based on the Sharpe ratio for the period 2020 to 2024. In the 2020-2024 period, TRX recorded the highest Sharpe ratio of 1.29783, indicating that this asset provides excellent returns with relatively low risk. NVDA and AVGO followed in second and third place with Sharpe ratios of 1.21917 and 1.15028 respectively, indicating that these tech stocks also delivered excellent performance over the period. LEO and XLM ranked fourth and fifth with Sharpe ratios of 1.04183 and 0.95618 respectively, indicating that despite being cryptocurrencies, they managed to deliver good returns with managed risk. BRK-B and BTC also showed solid performance with Sharpe ratios above 0.9, reflecting stability and good growth potential.

The table also includes assets with negative Sharpe ratios, such as TLKM, BBNI and ASII, indicating that investments in these assets do not provide adequate returns compared to the risk taken. ASII recorded the lowest Sharpe ratio at -1.96853, indicating that investment performance in this asset was extremely unfavorable during the period.

Table 6. Asset Performance Ranking 2020-2024

Rank	Code	Sharpe	Rank	Code	Sharpe
1	TRX	1.29783	21	AMRT	0.61432
2	NVDA	1.21917	22	TSLA	0.60353
3	AVGO	1.15028	23	WMT	0.58605
4	LEO	1.04183	24	BCH	0.56283
5	XLM	0.95618	25	DOGE	0.55711
6	BRK-B	0.94853	26	CRO	0.55652
7	BTC	0.92396	27	BBCA	0.54820
8	WBTC	0.92339	28	META	0.54418
9	ADA	0.88044	29	AMZN	0.53245
10	WETH	0.87416	30	BRIS	0.52429
11	ETH	0.87394	31	XMR	0.52340
12	VET	0.85039	32	ALGO	0.50548
13	HBAR	0.83095	33	ETC	0.50063
14	AAPL	0.81490	34	LTC	0.42561
15	XRP	0.80203	35	BMRI	-0.18899
16	LINK	0.70442	36	BBRI	-0.26006
17	GOOG	0.69254	37	ICBP	-0.34371
18	MSFT	0.68826	38	TLKM	-0.56293
19	TPIA	0.64983	39	BBNI	-0.74682
20	BNB	0.62527	40	ASII	-1.96853

3.2 Discussion

The results of this study indicate that the levels of return, risk and asset performance during the 2020-2024 period vary greatly between asset classes. This finding is in line with previous research which shows that cryptocurrencies and stocks have different characteristics in volatility and potential returns (Budiartomo & Setiyono, 2023; Hamdika et al., 2022; Laksana & Fauziyah, 2024). Cryptocurrency shows dominance in terms of returns, with DOGE recording the highest average return of 786.3%, even reaching 3584.8% in 2021. This phenomenon is driven by several factors: first, the relatively young cryptocurrency market is experiencing a phase of exponential growth due to the adoption of blockchain technology and strong market sentiment (Almeida & Gonçalves, 2022). Second, high liquidity allows for very rapid price movements especially when there are catalysts such as public endorsements or supportive regulatory developments.

However, these extreme returns are accompanied by very high volatility. DOGE recorded the highest risk with a value of 14.0295, indicating extremely extreme price fluctuations (see figure 4). In 2022 when global monetary tightening occurred, almost all cryptocurrencies experienced sharp corrections. ALGO for example, suffered losses of up to -90.2%, showing that the cryptocurrency market is highly vulnerable to changes in macroeconomic conditions (see table 3). These findings are in line with Liu & Tsyvinski (2021), who state that cryptocurrencies have unique risk characteristics that differ from traditional assets. Conversely, several Indonesian stocks showed worrying performance. BMRI, TLKM, BBNI

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and ASII recorded negative returns, with BBNI performing the worst (see figure 3). This negative performance can be attributed to inflationary pressures, rupiah depreciation, sluggish economic growth and fierce competition from digital technology and fintech disruption. Meanwhile large-cap stocks such as BBCA (0.0561) and BRK-B (0.1128) show very low risk, making them a more suitable choice for conservative investors (see figure 4). This confirms the theory that companies with large market capitalization tend to have strong fundamentals and are more resilient to market volatility (Pessa et al., 2023).

Measuring performance using the Sharpe ratio provides a more comprehensive perspective than simply looking at absolute returns. TRX recorded the highest Sharpe ratio of 1.298, indicating that this asset successfully provided excellent returns relative to the risk taken. This finding is particularly significant because it shows that not all cryptocurrencies with high returns perform well when risk is taken into account. Interestingly American technology stocks such as NVDA (1.2191) and AVGO (1.1502) ranked second and third, outperforming the majority of cryptocurrencies (see table 6). This outstanding performance was driven by strong business fundamentals, particularly the boom in AI and semiconductor chips. Unlike cryptocurrencies which are often driven by speculation, technology stock returns are supported by real revenue and profit growth, resulting in superior risk-adjusted returns. These findings highlight the importance of evaluating performance not only based on absolute returns but also considering the risks taken as emphasized in various asset performance comparison studies (Hamdika et al., 2022; Laksana, 2024). Conversely, several Indonesian stocks showed negative Sharpe ratios, with ASII in the worst position (see table 6). This negative value indicates that the returns obtained were not even able to compensate for the risk-free rate, let alone the risks taken. This is a serious red flag for investors, indicating that investing in these assets is statistically inefficient.

In the context of Prospect Theory (Kahneman & Tversky, 1979), these findings provide empirical validation that investors should conduct a comprehensive evaluation of potential profits and losses before making investment decisions. Cryptocurrencies such as DOGE may offer very high gains, but the probability and magnitude of losses are also very high. Investors with high loss aversion should give more consideration to assets with a positive Sharpe ratio and manageable risk.

This study also confirms the importance of financial literacy and risk profiling in cryptocurrency investment (Carbó-Valverde et al., 2025; Jones et al., 2024; Rahyuda & Candradewi, 2023). The numerous cases of investor losses show that a superficial understanding of asset characteristics and inadequate risk assessment can have fatal consequences. Educating investors about the concepts of risk-adjusted return, diversification and portfolio rebalancing is crucial to reducing systematic losses. The 2020-2024 temporal analysis also shows that asset performance is greatly influenced by macroeconomic conditions. The period of liquidity expansion (2020-2021) benefited cryptocurrencies and technology stocks, while monetary tightening (2022) caused a sharp correction in high-risk assets. The recovery in 2023-2024 shows a selective pattern, where only assets with strong fundamentals are able to provide superior returns. This pattern confirms the importance of timing and business cycle awareness in investing.

4. CONCLUSION

Based on the results of the research and discussion, it can be concluded that the level of return from various financial assets during the period 2020 to 2024 varies greatly. Cryptocurrencies particularly DOGE, dominated with the highest average return of 786.3%, followed by BNB and HBAR. Several Indonesian stocks such as BMRI, TLKM, BBNI and ASII recorded negative returns, underscoring that not all investments yield expected positive outcomes. Risk analysis further revealed that cryptocurrencies generally possess higher volatility compared to stocks, with DOGE registering the most substantial risk at 14.02955, indicative of highly significant price fluctuations over the five-year period. In contrast, assets like BBCA, BRK-B and WMT demonstrated lower risk, rendering them more suitable for investors prioritizing investment stability. The Sharpe ratio analysis consistently showed TRX as having the best risk-adjusted performance with a ratio of 1.29783, trailed by NVDA and AVGO, suggesting that certain assets can deliver excellent returns with effectively managed risk. These findings offer crucial insights for investors in formulating more robust investment strategies, especially within dynamic market conditions. The author strongly recommend that regulators implement comprehensive public education programs to deepen understanding of the unique characteristics and heightened risks associated with cryptocurrency investments, emphasizing the critical importance of investor risk profiling. This is in line with Financial Services Authority Regulation (POJK) No. 27 of 2024, which regulates governance, risk management and consumer protection, as well as encouraging the role of service providers in improving consumer literacy. This research aspires to serve as both an academic and practical reference for enhancing investment literacy, particularly by clarifying the trade-offs among returns, risk and the performance of various financial assets, thereby supporting more rational, well-informed investment decisions that are aligned with investors' long-term financial objectives. However, this study has limitations, specifically by analyzing only 40 assets: 20 cryptocurrencies, 10 Indonesian stocks and 10 American stocks. For future research, the author recommend conducting behavioral finance analyses of the psychological factors that influence decisions to hold versus sell assets during periods of high volatility, as well as developing optimal portfolio models that integrate cryptocurrencies, equities and other asset classes.

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