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A Study on Risk and Return Performance of Selected Cryptocurrencies

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Abstract: ***The present study aims to analyze the return and risk performance of selected cryptocurrencies in order to find out which cryptocurrencies have small risks and large returns. The research time period is 2017 to 2022. The objective of this research is to compute and compare the risk and return performance of the selected cryptos. The findings of this research are that the risk is very high in Bitcoin compared to Ethereum, as shown in the data analysis, and Ethereum has high returns. Before starting an investment, it is better to look at the ability of Cryptocurrency assets to minimize risks and make sure that the investment objectives are for the long and short term.***

Keywords: Risk, Return, Cryptocurrency, Bitcoin, Ethereum, Binance, Ripple, Cardano.

I. INTRODUCTION

Cryptocurrency is a kind of digital money that lets people send and receive payments over the internet without needing a bank or government. In simple terms, it's a way to exchange money online. Most cryptocurrencies are not insured and usually aren't taxed like regular money. They use a special technology called blockchain, which helps people or businesses send money directly to each other without a middleman. The records of these exchanges are stored in blocks of data called coins, which are open for anyone to see and not controlled by any one person or group. Each coin is a unit of digital currency, and it isn't backed by things like the US dollar or gold. In short, cryptocurrency is a new kind of money that only exists online and uses encryption to keep all transactions safe.

A. Objectives of the Study

1) To evaluate the returns and risk levels of the selected cryptocurrencies.
2) To make a comparison of the return and risk performance of the chosen cryptocurrency.
3) To analyze the historical return performance.

B. Scope of the Study

The main aim of cryptocurrency is to reduce the risks of using traditional money. However, it's important to know that investing in cryptocurrencies also comes with risks. The user has full control and responsibility. It is simple to use and can be accessed at any time using a smartphone and an internet connection.

C. Need of the Study

The most trending word used by the media, the young Generation, Investors, and IT Employees is cryptocurrencies.

II. LITERATURE REVIEW

Le Tran and Leirvik [2017] have shown that the level of market efficiency in the five largest cryptocurrencies is highly time-varying. Specifically, before 2017, cryptocurrency markets were mostly inefficient. This corroborates recent results on the matter.

Amsyar et al. [2019] concluded that cryptocurrency has the disadvantage of not having the authority responsible for dealing with all problems that occur in all transactions, and money laundering crimes also often occur, this is a challenge for how to utilize cryptocurrency and blockchain technology in the current era of globalization.

Drożdż et al. [2015] found that A particularly significant result is that the measures applied for detecting cross-correlations between the dynamics of the BTC/ETH and EUR/USD exchange rates do not show any noticeable relationships.

Fang et al. [2011] summarized the existing research papers and results on cryptocurrency trading, including available trading platforms, trading signals, trading strategy research, and risk management

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Whinston, A. B (2019) Cryptocurrencies, along with Bitcoin, were an essential component in some monetary activities. For instance, Bitcoin is the main payment approach for ransomware Attackers and retailers on the Darknet. It is therefore beneficial to understand the functions of cryptocurrencies and their monetary implications.

Kishore Jain, D (2020) the effect of the creation of cryptocurrencies in all economies is discussed right here. The benefits of the usage of cryptocurrencies as well as the drawbacks of conventional digital payments are included.

Vaz de Melo and Fluminense [2020] indicate that the strength of dependence among the crypto-currencies has increased over the recent years in the cointegrated crypto-market. The conclusions reached will help investors to manage risk while identifying opportunities for alternative diversified and profitable investments.

Tu et al. [2017] detected two sudden jumps in the standard deviation, in the second quarter of 2017 and at the beginning of 2018, which could have served as the early warning signals of two major price collapses that happened in the following periods

Mikhaylov, A. [2018] concludes that the cryptocurrency market has entered a new stage of development, which means a reduced possibility to have excess profits when investing in the most liquid cryptocurrencies in the future.

Igoni et al. [2013] concluded that market capitalization and volume of digital currency did not constitute the significant variables of policy to influence the monetary policies in the South African economy, hence they operate independently. A decision to adopt and regulate digital currency operation or not in Nigeria does not affect it.

III. RESEARCH METHODOLOGY

1) Secondary Data: All data is collected through secondary sources, and is purely analytical in Nature.

2) Collection of Data: Data from various years has been compiled from the official websites, and they are as follows.

- www.bitcoinprice.com: A site that monitors current Bitcoin prices and market trends.
- www.investing.com: Offers price charts, technical analysis tools, and market forecasts for cryptocurrencies and other assets.
- www.yahoofinance.com:This site has real-time price data for ETFs, stocks, and cryptocurrencies.

Risk and Return Analysis

It is calculated by using the following formulas for Risk and Return.

$$\text{Return} = (P_{1-} P_0)/P_0 * 100$$

Where,

P1=Current Month price,

P0=Previous Month price.

$$R1 = \Sigma R/n,$$

Where n= number of months

$$\text{Standard Deviation} = \sqrt{\sum}(R-R_1)^2/N,$$

Where

- R return of the stock.
- R_1 is the average (mean) return.
- **N** represents the number of months.

IV. RESULTS

TABLE – I

CALCULATION OF RETURN AND STANDARD DEVIATION OF BITCOIN FOR THE YEAR 2020

DATE	Open	Close	TOTAL	AVG	RETURN In %	$(R-R_1)$	$(R-R_1)^2$
11-30-2019	Null	Null					
12-31-2019	7,546.50	7,196.40	14,742.90	7,371.45			
1-31-2020	7,196.40	9,349.10	16,545.50	8,272.75	12.227%	2.83%	0.08%
2-28-2020	9,349.30	8,543.70	17,893.00	8,946.50	8.144%	-1.25%	0.02%
3-31-2020	8,543.80	6,412.50	14,956.30	7,478.15	-16.413%	-25.81%	6.66%

4-30-2020	6,412.40	8,629.00	15,041.40	7,520.70	0.569%	-8.83%	0.78%
5-31-2020	8,628.60	9,454.80	18,083.40	9,041.70	20.224%	10.83%	1.17%
6-30-2020	9,454.50	9,135.40	18,589.90	9,294.95	2.801%	-6.59%	0.43%
7-31-2020	10,961.10	11,333.40	22,294.50	11,147.25	19.928%	10.53%	1.11%
8-31-2020	11,333.20	11,644.20	22,977.40	11,488.70	3.063%	-6.33%	0.40%
9-30-2020	11,644.20	10,776.10	22,420.30	11,210.15	-2.425%	-11.82%	1.40%
10-31-2020	10,776.60	13,797.30	24,573.90	12,286.95	9.606%	0.21%	0.00%
11-30-2020	18,394.60	19,698.10	38,092.70	19,046.35	55.013%	45.62%	20.81%
TOTAL					112.738%		32.86%
R1					9.395%		
SD							16.55%

Return = $(P_{1-} P_0)/P_0$ *100 Where,

P1=Current Month price,

P0=Previous Month price.

$R_1=\sum R/n$,

Where n= number of months

R_1 = 112.738%/12

=9.395%

SD = $\sqrt{(R-R_1)^2/N}$

= $\sqrt{32.86\%}$ /12

=16.55%

- Bitcoin's return in 2020 was 9.395%.
- The risk, as shown by the standard deviation, is 16.55%.

TABLE – II

CALCULATION OF RETURN AND STANDARD DEVIATION OF BITCOIN FOR THE YEAR 2021

DATE	Open	Close	TOTAL	AVG	RETURN In %	$(R-R_1)$	$(R-R_1)^2$
11-30-2020	Null	Null					
12-31-2020	19,697.80	28,949.40	48,647.20	24,323.60			
1-31-2021	28,951.70	33,108.10	62,059.80	31,029.90	27.571%	18.53%	3.43%
2-28-2021	33,106.80	45,164.00	78,270.80	39,135.40	26.122%	17.08%	2.92%
3-31-2021	45,160.50	58,763.70	1,03,924.20	51,962.10	32.775%	23.73%	5.63%
4-30-2021	58,763.20	57,720.30	1,16,483.50	58,241.75	12.085%	3.04%	0.09%
5-31-2021	57,719.10	37,298.60	95,017.70	47,508.85	-18.428%	-27.47%	7.55%
6-30-2021	37,294.30	35,026.90	72,321.20	36,160.60	-23.887%	-32.93%	10.84%
7-31-2021	35,030.70	41,553.70	76,584.40	38,292.20	5.895%	-3.15%	0.10%
8-31-2021	41,510.0	47,130.4	88,640.4	44,320.2	15.74%	6.7%	0.45%
9-30-2021	47,129.20	43,823.30	90,952.50	45,476.25	2.608%	-6.43%	0.41%
10-31-2021	43,824.40	61,309.60	1,05,134.00	52,567.00	15.592%	6.55%	0.43%
11-30-2021	61,310.10	56,882.90	1,18,193.00	59,096.50	12.421%	3.38%	0.11%
TOTAL					108.497%		31.97%
R1					9.041%		
SD							16.32%

Return = $(P_{1-} P_0)/P_0$ *10 Where,

P1=Current Month price, P0=Previous Month price.

R_1=∑R/n,

Where n= number of months R_1

=108.497% /12

=9.041%

SD = √(R-R₁)²/N

= √ 31.97%/12

=16.32%

- Bitcoin's return in 2021 was 9.041%.
- The risk, based on how much the price went up and down, was 16.32%.

TABLE – III

CALCULATION OF RETURN AND STANDARD DEVIATION OF BITCOIN FOR THE YEAR 2022

Date	Open	Close	TOTAL	AVG	RETURN In %	$(R-R_1)$	$(R-R_1)^2$
11-30-2021	Null	Null					
12-31-2021	56,891.70	46,219.50	1,03,111.20	51555.6			
1-31-2022	46,217.50	38,498.60	84,716.10	42358.05	-17.840%	-8.152%	0.6646%
2-28-2022	38,475.60	43,188.20	81,663.80	40831.9	-3.603%	6.085%	0.3702%
3-31-2022	43,187.20	45,525.00	88,712.20	44356.1	8.631%	18.319%	3.3557%
4-30-2022	45,529.00	37,650.00	83,179.00	41589.5	-6.237%	3.450%	0.1191%
5-31-2022	37,642.00	31,793.40	69,435.40	34717.7	-16.523%	-6.835%	0.4672%
6-30-2022	31,793.10	19,926.60	51,719.70	25859.85	-25.514%	-15.826%	2.5047%
7-31-2022	19,926.60	23,303.40	43,230.00	21615	-16.415%	-6.727%	0.4526%
TOTAL					-77.501%		7.9341%
R1					-9.69%		
SD							9.9600%

Return = $(P_{1-} P_0)/P_0$ *100

Where,

P1=Current Month price, P0=Previous Month price.

R_1=∑R/n,

Where n= number of months R_1 =77.501%/12

=9.69%

SD = √(R-R₁)²/N

= √7.9341%/ 12

=9.9600%

- The return of Bitcoin for the year july 2022 is -9.69%.
- The risk, based on how much the price moved up and down, was 9.96%.

TABLE – IV
CALCULATION OF RETURN AND STANDARD DEVIATION OF BITCOIN FOR THE YEAR 2023

Date	Open	Close	TOTAL	AVG	RETURN In %	$(R-R_1)$	$(R-R_1)^2$
11-30-2022	Null	Null					
12-31-2022	17,168.00	16,547.50	33,715.50	16,857.75	39.98%		
1-31-2023	16,547.91	23,139.28	39,687.19	19,843.59	0.03%	30.97%	0.096%
2-28-2023	23,137.84	23,147.35	46,285.19	23,142.59	22.94%	-9.95%	0.994%
3-31-2023	23,150.93	28,478.48	51,629.41	25,814.70	2.80%	13.96%	1.950%
4-30-2023	28,473.33	29,268.81	57,742.14	28,871.07	-6.91%	-7.18%	0.516%
5-31-2023	29,227.10	27,219.66	56,446.76	28,223.38	11.23%	-13.83%	1.912%
6-30-2023	27,218.41	30,477.25	57,695.66	28,847.83	-4.09%	1.23%	0.015%
7-31-2023	30,471.85	29,230.11	59,701.96	29,850.98	39.98%	-13.07%	1.709%
TOTAL					105.96%		7.192%
R1					13.245%		
SD							1.027%

Return = $(P_{1-} P_0)/P_0$ *100 Where,

P1=Current Month price, P0=Previous Month price.

$R_1=\sum R/n$,

Where n= number of months R_1 = 105.96%/12 = 13.245%

$SD = \sqrt{(R-R_1)^2/N}$

$= \sqrt{7.192\%/ 12} = 1.027\%$

- The return of Bitcoin for the year July 2023 is 13.245%.
- The risk, as calculated using standard deviation, was approximately 1.027%.

TABLE – V
CALCULATION OF RETURN AND STANDARD DEVIATION OF BITCOIN FOR THE YEAR 2024

Date	Open	Close	TOTAL	AVG	RETURN In %	$(R-R_1)$	$(R-R_1)^2$
11-30-2023	Null	Null					
12-31-2023	37,718.01	42,265.19	79983.20	39991.60			
1-31-2024	42,280.23	42,582.61	84862.84	42431.42	6.098%	-2.167%	0.4699%
2-28-2024	42,569.76	61,198.38	103768.14	51884.07	22.263%	13.998%	1.9594%
3-31-2024	61,168.06	71,333.65	132501.71	66250.86	27.693%	19.428%	3.7736%
4-30-2024	71,333.48	60,636.86	131970.34	65985.17	-0.401%	-8.666%	0.7510%
5-31-2024	60,609.50	67,491.41	128100.91	64050.46	-2.936%	-11.201%	1.2547%
6-30-2024	67,489.61	62,678.29	130167.90	65083.95	1.616%	-6.649%	0.4420%
7-31-2024	62,673.61	64,619.25	127292.86	63646.43	-2.209%	-10.474%	1.0970%
TOTAL					52.12%		9.7476
R1					6.515%		
SD							1.21845%

Return = $(P_{1-} P_0)/P_0$ *100

Where,

P1=Current Month price, P0=Previous Month price.

R_1=∑R/n,

Where n= number of months R_1 =52.12%/12

=6.515%

SD = √$(R-R_1)^2/N$

= √9.7476%/ 12

=1.21845%

- Bitcoin's return for July 2024 was 6.515%.
- The risk, based on how much the price changed, was 1.21845%.

V. DISCUSSION

1) Bitcoin's return in 2020 was 9.395%. The risk, as shown by the standard deviation, is 16.55%.
2) Bitcoin's return in 2021 was 9.041%. The risk, based on how much the price went up and down, was 16.32%.
3) The return of Bitcoin for the year july 2022 is -9.69%. The risk, based on how much the price moved up and down, was 9.96%.
4) The return of Bitcoin for the year July 2023 is 13.245%. The risk, as calculated using standard deviation, was approximately 1.027%.
5) Bitcoin's return for July 2024 was 6.515%. The risk, based on how much the price changed, was 1.21845%.

VI. CONCLUSION

This study aims to look at the profits and risks of cryptocurrencies like Bitcoin, Ethereum, Binance, and Ripple. Bitcoin gives a higher return on investment than Ethereum. Cryptocurrency is growing fast in today's digital world. Rules and laws help keep investors safe and help the economy grow. Since cryptocurrencies are global, you can use them in any country without changing money. Blockchain technology is very secure and helps make sure your money goes to or comes from the right person. People receiving Ethereum won't have to pay anything for the transactions, and Ethereum has a lot of support. All of these will help Ethereum get more users, and if everyone uses Ethereum, it could replace official currencies.

VII. LIMITATIONS

This study is limited to selected cryptocurrencies. The future is uncertain, so making decisions based on past information can be risky. In this study, only four specific cryptocurrencies so the findings and suggestions are limited to these. The share prices are based on historical numbers. Therefore, these prices always remain the same even if the performance of the company changes.

VIII. SUGGESTIONS

Cryptocurrency can be a useful tool for managing money. Before starting to invest in cryptocurrencies, it would be nice for investors to see the performance of the cryptocurrencies in order to minimize the risks that will be faced. To determine the investment goal, whether long-term or short-term, so that investors can decide on the desired return and time. For beginners, it is recommended to invest in cryptocurrencies in the top 5 Cryptocurrency rankings. As the study reveals that there are some firms accepting Ethereum, the investigation has begun about the transparency, business model of those firms, and the people who deal with Ethereum. Making cryptocurrency legal can help Indian people and the country grow and move forward.

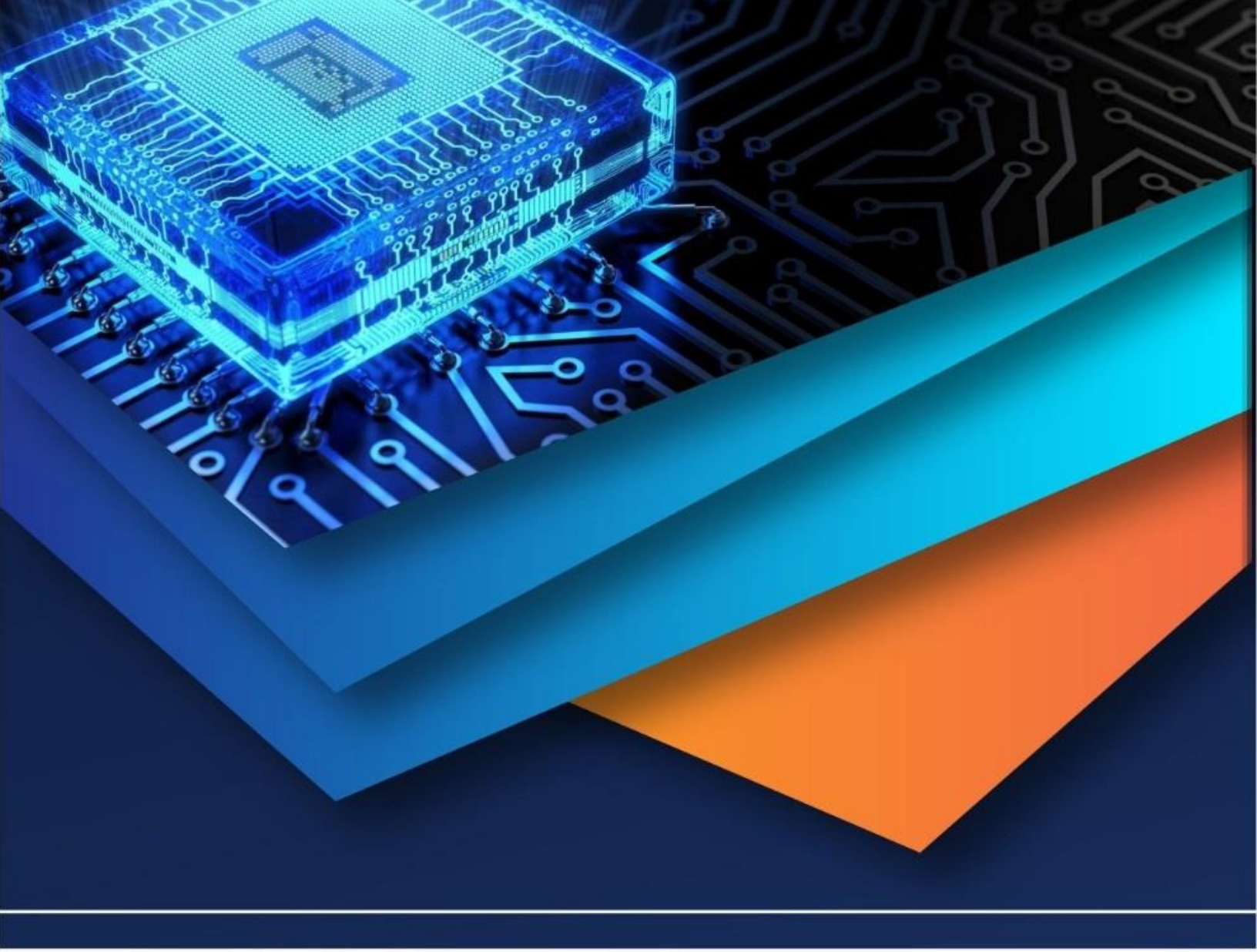
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