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# Performances of Crypto, Market Indexes, and Gold Before and During the COVID-19 Pandemic: A Comparative Analysis

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## Abstract:

**Research aims:** This study aims to investigate empirical evidence of a comparison of investment instruments, including Bitcoin, Indonesia Composite Index (ICI), and gold, before and during the COVID-19 pandemic.

**Design/Methodology/Approach:** Analytical methods employed comparison study using secondary data. The Microsoft Excel program was utilized to calculate formulas for each variable. Then, data were statistically processed using the SPSS application, i.e., independent sample test, testing for differences. The sample used in this study was the closing price of Bitcoin, the price of the ICI, and the price of gold, with monthly data from the beginning of January 2018 to the end of December 2021, to demonstrate a significant difference between the risks of Bitcoin, ICI, and gold before and during the COVID-19 pandemic.

**Research findings:** The hypothesis test results revealed that before the COVID-19 pandemic, the investment risk of ICI and gold was the lowest, with a significance level of 0.000 ( $0.000 < 0.05$ ) on a different t-test at a 5% significance level. Thus, there was a significant difference in investment risk between ICI and gold.

Meanwhile, during the COVID-19 pandemic, the risk of investing between Bitcoin and the ICI was the lowest, with a significance level of risk of was 0.000 ( $0.000 < 0.05$ ) on different tests at the significance levels of 5%. In short, there was a big difference in investment risk between Bitcoin and the ICI.

**Theoretical contribution/Originality:** This study provides additional literature on decision-making, especially on risk.

**Keywords:** Investment; Bitcoins; Indonesia Composite Index; Gold; Return; Risk

## Introduction

Amid the increasing number of COVID-19 cases, data from [www.idxchannel.com](http://www.idxchannel.com) uncovered that the Delta variant is the latest COVID-19 pandemic, with the genetic code B1617.2. It is widespread in India, which previously experienced an outbreak of cases. Further, the COVID-19 pandemic impacts the economy, such as decreased sales, lower production levels, changes in consumer behavior, limited liability company financing, and an increase in the number of unemployed (Astuti & Alfie, 2021). On the other hand, the development of today's era requires every individual to have income other than wages outside of work. Because life will continue, the need for goods and services must still be met and financially stable. If there is an economic crisis one day, one way is to prepare capital for the future by investing.

Investment has become a necessity of today's modern society, making it a source of income. Investment is money saved for future use (Shabbir et al., 2020). In addition, many individuals are aware of the importance of investing, but few know the purpose. Worse still, some still cannot distinguish the meaning between saving and investment because investment encourages a good income distribution in society.

For investment decision of investors, it needs to understand the basic investment concepts, which are the basic principles in making decisions. Several things need to be considered in investment decisions, including the risk and expected rate of return. Return is the ratio between the profit or loss of an investment or the amount invested (Tambunan, 2020). Because both are in the same direction, the higher the expected return, the greater the investor's risk and vice versa (Aulia, 2019). Meanwhile, extraordinary returns differ between realized and expected returns (Nawangarsi & Iswajuni, 2019).

Moreover, an investor's success is determined by the decisions taken and investors' ability to determine the type and timing of their investment. However, the current uncertainties of the COVID 19 pandemic have forced investors to be more cautious in their investment decisions, starting from choosing the right investment tools to balance their investment (Aristiwati & Hidayatullah, 2021) because investing has become part of the lifestyle of the people of Indonesia. Investment selection can be made by considering the risk and return of investment (Afriyeni & Marlius, 2019). When potential investors want to invest, they must understand the return they will receive and know a high level of financial literacy (Romadona & Setiyono, 2021).

Investing is now an interesting thing and is increasingly in demand by investors. It is evidenced by the many alternative investment instruments available and is very easy to understand. There are many ways for investors to invest money, for example, Bitcoin, Composite Stock Price Index, and gold. The most demanded, popular, and valuable is the Bitcoin instrument. Bitcoin is the first blockchain-based cryptocurrency (Ullah et al., 2021). It is because Bitcoin is considered relatively attractive enough to be used as a modern, sophisticated currency and investment instrument. Bitcoin is also the best cryptocurrency that enhances optimal portfolio characteristics (Inci & Lagasse, 2019). Some important characteristics of Bitcoin distinguish it from paper money and other assets. First, Bitcoin's decentralized network is not controlled by a single party. Every bitcoin miner and processor transaction becomes part of the Bitcoin network. Second, it is unknown and can be used and traded without personal information. The third is transparency; Bitcoin stores details of every transaction that has ever occurred in the network in numbers in a ledger called Modern Technology Integrated Transaction Recording Technology. The fourth is minimal transaction fees; Bitcoin has no transaction fees between Bitcoin wallets. The fifth is non-revocable; after Bitcoin is sent, it cannot be returned (Mahessara & Kartawinata, 2018).

In general, investors use guidelines to invest and unify trends in stock price movements, especially through the Indonesia Composite Index (ICI). A composite stock price index is a value used to measure the aggregate performance of all stocks traded on an exchange.

(Kumalasari et al., 2016). According to Astuti and Alfie (2021), since the announcement of the first COVID-19 case in Indonesia last March, the ICI has decreased. The ICI, which was initially above 6,300, continued to weaken until it reached the lowest level of 3,937 at the end of April. This continued decline has raised concerns that various policies have encouraged share prices.

On the other hand, the characteristics of the ICI influence macroeconomic factors through stock trading volume, exchange rates, and interest rates in Indonesia (Triani, 2013). From the perspective of potential investors, this factor is a crucial issue; therefore, potential investors pay close attention to this issue. The attention of potential investors to these factors will encourage them to increase their knowledge in investing by getting as much profit as possible. The research (Hidayat et al., 2019) supports those statements, stating that investing in capital markets requires enough knowledge, experience, and entrepreneurship to analyze which instrument to buy because complete knowledge is required to avoid losses when investing in capital markets, such as Bitcoin, ICI, and gold instruments.

However, Zainuri et al. (2021) showed different results regarding the risks experienced by investors in choosing which instruments are the best, including Bitcoin, ICI, and gold. Due to differences of opinion, investment risk has a negative effect because potential investors want to get much profit regardless of the risk (Adil et al., 2021). Meanwhile, Udayani and Suaryana (2013) states that profitability has a terrible impact, while the funding possibility set greatly impacts capital structure. As for different instruments, gold is presently trending.

Gold has always been a trusted investment with many good financial benefits for investors (Driptyanto & Wahyuati, 2017). Gold is a simple form of investment. Gold is also used as a reserve in the monetary stabilization system of each country. The value of gold can be used as a portfolio tool for managing a country's foreign exchange reserve. When foreign exchange reserves have fluctuated several times, the price of gold remains stable, although it reduces government losses due to fluctuations in foreign exchange reserves and financial values. Investments with gold instruments are also considered by investors the safest investment in alternative investments (Selvaraj & Sudha, 2020).

Based on the problems, inconsistent results in previous studies, and little research on the knowledge of choosing Bitcoin, ICI, and gold instruments as an alternative investment before and during the COVID-19 pandemic, this research is crucial. Therefore, this study aims to compare the returns and abnormal returns of Bitcoin, ICI, and gold so that investors can choose to invest by choosing which instrument is an alternative investment, between bitcoin, ICI, and gold, in the hope of getting financial benefits in the future. For analysis, a different test (independent sample t-test) was used. In addition, this research is interesting to study because, on the one hand, the price of gold is currently trending and experiencing a significant increase, but on the other hand, the interest of investors who see it is still low. Thus, this research becomes important for investors to know from the financial side in making investment decisions.

Besides, this research has several contributions to readers. First, the results of this study contribute to expanding knowledge about investment risks before and during the COVID-19 pandemic. Second, on a practical level, this study can be used by potential investors to make decisions when choosing profitable investment instruments in Indonesia. The remainder of this study is structured as follows: literary studies and hypothesis development, research methodologies, results and discussions, and conclusion.

## **Literature Review and Hypotheses Development**

### **Theoretical Framework**

According to Corvo et al. (2022), investing is basically putting much money in the present to make a profit in the future. In addition, investment can be understood as a commitment to invest in one or more investment objects to make a profit in the future. Thus, it can be said that investment is the allocation of current capital to the object of investment for a certain period to make a profit in the future. When investing, investors also face many different investment risks. Masuku and Gopane (2022) claim that Bitcoin price behavior is predictable across sectors, implying that investors can predict future earnings. Besides, one of the criteria for investors to determine their investment strategy is the ICI because it describes the trend of the capital market, so whether the capital market is strong or weak can be known.

Moreover, Radianto and Ayuningtyas (2010) stated that gold is one of the precious metals with relatively high value in terms of both price and use. Gold is used as a financial standard in many countries and a relatively permanent medium of exchange and is accepted in every country in the world. The use of gold in the financial and monetary sector is based on the absolute monetary value of gold relative to various global currencies, although officially, on global commodity exchanges, the price of gold is denominated in US dollars (Kurniawan, 2019).

On the other hand, according to Kusnandar and Bintari (2020), returns are divided into two. The realized profit is the profit that has already been generated, while the expected return is the profit that the investor expects in the future. In addition, return is the income from the initial capital at the investment time. This investment income consists of profits from buying and selling; if there is a profit, it is called capital gains, whereas if there is a loss, it is called capital losses (Driptyanto & Wahyuati, 2017). Besides, the expected return is the average expected return of the shares selected for investment; its contribution, of course, for each share depends on the expected return of the invested shares.

Research (Sukmawati & Haryono, 2021) supports this statement, indicating that potential investors had a significant positive influence on investment risk. Also, Selvaraj and Sudha (2020) researched banking in India, showing significant positive results for potential investors in choosing alternative investments during the COVID-19 pandemic. The results of this study agree with the results of a study (Sukmawati & Haryono, 2021) and

(Romadona & Setiyono, 2021), which found that potential investors had a positive effect on decision-making in choosing which instrument has a small risk but gets much profit. Based on theory and previous research, the researchers developed the following hypothesis:

***H<sub>1</sub>: There is a difference between Bitcoin and the ICI in terms of investment risk before and during the COVID-19 pandemic.***

Moreover, Bitcoin is the first cryptocurrency in the world. Bitcoin (BTC) is the number one choice for crypto investors (Chania et al., 2021). Although Bitcoin was originally defined as an alternative currency, it is also considered a speculative asset due to the extremely high demand from users and is in the top position in cryptocurrency capitalization. Meanwhile, according to Sukmawati and Haryono (2021), the ICI is historical information that describes the movement of stock prices in a company during a certain period listed on the Indonesia Stock Exchange. Still, compared to other investments, Bitcoin is the most influential instrument in decision-making (Putra & Robiyanto, 2021). Research (T. Tambunan, 2019) on financial companies in Indonesia supports this statement, which revealed that Bitcoin and the ICI had a positive effect on alternative investments. In addition, Dynand & Kartawinata (2018) reported a significant positive result between Bitcoin and the ICI on investment risk before and during the COVID-19 pandemic. Based on the theory and results of previous research, the hypothesis of this study is:

***H<sub>2</sub>: There is a difference between Bitcoin and gold in terms of investment risk before and during the COVID-19 pandemic.***

However, cryptocurrencies are unstable since they have strong price fluctuations. Corvo et al. (2022) asserted that Bitcoin and gold price fluctuations are caused by trading volume and market capitalization. The right investment requires taking into account the risk and the desired return to avoid making the wrong investment. High-return investments also carry high risks (Chania et al., 2021). According to Meiyura and Azib (2020), the risk is the possibility that deviations from expectations may result in losses. Research (Shabbir et al., 2020) on the banking sector in Pakistan also supports the theoretical claim, finding that Bitcoin and gold risks positively impacted investment decision-making. Mahessara and Kartawinata (2018) also reported consistent results, showing that gold positively impacted alternative investments before and during the COVID-19 pandemic. Based on theory and previous research results, the authors put forward the following hypothesis:

***H<sub>3</sub>: There is a difference between the ICI and the gold in terms of investment risk before and during the COVID-19 pandemic.***

Further, the use of gold inside the economic and economic region is primarily based on the absolute economic cost of gold relative to diverse international currencies, even though formally, on international commodity exchanges, the rate of gold is denominated

in US dollars (Selvaraj & Sudha, 2020). The gold used in the monetary field is usually gold bars, with many different weight units from grams to kilograms. Research (Romadona & Setiyono, 2021) in the Indian market also supports the theoretical claim, finding that the ICI and gold positively affected investment before and during the COVID-19 pandemic. Kurniawan (2019) also reported consistent results, showing that risk positively influenced the choice of alternative investment instruments. Besides, through the stock market, investors seek to achieve actual returns higher than expected returns due to the risk factors that may exist in alternative securities. With this level of investment risk, whether the initial public offering of shares shows too high or too low value can be seen.

## Research Method

The data method used in this study was quantitative. Quantitative research can be understood as a method based on a positivist philosophy and is used to survey specific populations or samples, collect data using survey tools, and analyze data. Quantitative data also test the hypotheses (Warsidi et al., 2019). This study compared the risks of three investment instruments: Bitcoin, ICI, and gold. The template employed in this survey was the closing price data based on the closing price data from the beginning of 2018 to the end of 2021 on Bitcoin, ICI, and gold. In addition, the data used in this study were sourced from the [www.investing.com](http://www.investing.com) and [www.finance.yahoo.com](http://www.finance.yahoo.com) sites, meaning that this study used secondary data to calculate actual returns, expected returns, and risk.

Moreover, the nature of this data was time-series data because the data used were the volume and closing price of each instrument processed by the Microsoft Excel program to obtain the value of each variable. Furthermore, each variable's value was then processed using the SPSS application. Before conducting the test, the researchers first changed the daily closing price data from Bitcoin, the ICI, and gold into return data using the following formula:

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Where:  $R_t$  = Return;  $P_t$  = Price in period  $t$ ;  $P_{t-1}$  = Price in period  $t-1$

To measure the risk of a single asset, the method used to calculate risk was the standard deviation, measuring the absolute deviation of the values from the expected value (Meiyura & Azib, 2020).

$$\sigma = \sqrt{\frac{\sum_{i=1}^n [R_i - E(R_i)]^2}{n - 1}}$$

Where:  $\sigma$  = Standard deviation;  $R_i$  = Return in period  $i$ ;  $E(R_i)^2$  = Expected return;  $N$  = Number of observations

The technique used was the analysis of the difference test (independent sample t-test) with the help of the SPSS 23 program. The criteria used were to compare the sig. obtained with a predetermined significance level of 5%. If sig. > 0.05, the data are normally distributed, and vice versa, if sig. <0.05, the data are not normally distributed. In this study, the significance level for rejecting H<sub>0</sub> was 0.05 or 5%, and the test criteria are: H<sub>0</sub> is accepted if t-count < t-table. Likewise, H<sub>0</sub> is rejected if t-count > t-table. Another alternative, when sig. > 0.05, H<sub>0</sub> is accepted. It means that there is no significant difference in risk between Bitcoin, ICI, and gold investment instruments before and during the COVID-19 pandemic. In contrast, when sig. < 0.05, H<sub>0</sub> is rejected. It means that there are significant differences in risk from Bitcoin, ICI, and gold investment instruments before and during the COVID-19 pandemic.

## Result and Discussion

### Descriptive Statistics

The statistical analysis describes data on bitcoin, ICI, and gold. Based on Table 1, the minimum Bitcoin value was 0.0441, while the maximum value of Bitcoin was 0.0250. The mean of Bitcoin was 0.0038, with a standard deviation of 0.0955. Then, the minimum value of the ICI was 0.0132, while the maximum value of the ICI was 0.0054. The mean of ICI was 0.0024, with a standard deviation of 0.0246. Meanwhile, the minimum value of gold was 0.0267, while the maximum value of gold was 0.0174. The mean of gold was 0.0012, with a standard deviation of 0.7001.

**Table 1** Descriptive statistics before the COVID-19 pandemic

	Mean	Std. Deviation	Minimum	Maximum
Bitcoin	.0038	.0955	.0441	.0250
ICI	.0024	.0246	.0132	.0054
Gold	.0012	.0701	.0267	.0174

N: 24

In Table 2, during the COVID-19 pandemic, the minimum bitcoin value was 0.0420, while the maximum Bitcoin value was 0.0278. The mean of Bitcoin was 0.0011, with a standard deviation of 0.1164.

**Table 2** Descriptive statistics during the COVID-19 pandemic

	Mean	Std. Deviation	Minimum	Maximum
Bitcoin	.0011	.1164	.0420	.0278
ICI	.0012	.0363	.0186	.0090
Gold	.0004	.1510	.0519	.0408

N: 24

In addition, the minimum value of the ICI was 0.0186, while the maximum value of the ICI was 0.0090. The mean of ICI was 0.0012, with a standard deviation of 0.0363. Moreover, the minimum value of gold was 0.0519, while the maximum value of gold was 0.0408. The mean of gold was 0.0004, with a standard deviation of 0.1510.

**Table 3** The Difference Between Bitcoin and ICI Risk Before the COVID-19 Pandemic

		Independent Samples Test									
		Equality of Variances			T-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
Risk	Equal variances assumed	24.204	.000	5.933	46	.000	.030973	.005220	.020465	.041481	
	Equal variances not assumed			5.933	25.117	.000	.030973	.005220	.020224	.041722	

From Table 3, the above SPSS independent sample t-test output can be considered a test result, with the independent sample t-test showing a statistically significant value. It can be seen that the sig. (2-tailed) risk for Bitcoin and ICI for the 2018-2019 period showed a t-count of 5.933, with a significance of 0.000. Since the risk significance value was smaller than the probability value ( $0.000 < 0.05$ ), based on decision-making on an independent sample t-test, it can be concluded that  $H_0$  was rejected.

**Table 4** The Difference Between Bitcoin and ICI Risk During the COVID-19 Pandemic

		Independent Samples Test									
		Equality of Variances			t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
Risk	Equal variances assumed	15.469	.000	4.190	46	.000	.024940	.005952	.012959	.036922	
	Equal variances not assumed			4.190	27.804	.000	.024940	.005952	.012744	.037137	

In Table 4, the above SPSS independent sample t-test revealed a statistically significant value. The sig. (2-tailed) risk for Bitcoin and ICI for the 2020-2021 period had a t-count of 4.190, with a significance of 0.000. Since the significance value of risk was lower than the value of probability ( $0.000 < 0.05$ ), based on the decision made for an independent sample t-test, it can be concluded that  $H_0$  was rejected.

It indicates that investors are interested in investing during the pandemic. The market reaction shows investors' interest, which results in a significant difference between Bitcoin and the ICI towards risk in making investment decisions. In this study, investors assume that during the COVID-19 pandemic, financial market reactions dominate investors' decisions to invest shortly or sell them as soon as possible to gain profits and minimize losses. Financial market reactions with a significant impact on investors'

decisions are positive. In addition, it is undeniable that people prefer certain profitable things. Positive financial market reactions or good news also apply. The good news entering the financial market makes investors willing to release their capital or sell their invested capital soon to other countries' financial markets. Based on calculations, the risk of bitcoin and ICI for 2018-2019 was 4% and 1%. Meanwhile, the risk of bitcoin and ICI for 2020-2021 was 4% and 2%. It denotes that the investors believed they could not raise stock prices in the future and made investors less confident that the COVID-19 pandemic situation would bring good performance for future companies.

This study's results agree with the study (Kusnandar & Bintari, 2020), saying there were unusual profit changes before and during the pandemic. This market reaction was indicated by the extraordinary returns that capital market participants, especially investors, made decisions. The recent COVID-19 pandemic has also awakened distrust in Indonesian society (Darmayanti et al., 2021).

**Table 5** The Difference Between Bitcoin and Gold Risk Before the COVID-19 Pandemic

		Independent Samples Test									
		Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
Risk	Equal variances assumed	2.662	.110	2.809	46	.007	.017478	.006221	.004955	.030001	
	Equal variances not assumed			2.809	41.080	.008	.017478	.006221	.004915	.030042	

From Table 5, the above SPSS independent sample t-test output showed a statistically significant value. The significance or sig. (2-tailed) risk for Bitcoin and gold for 2018-2019 showed a t-count of 2.809, with a mean of 0.007. Since the significance value of risk was lower than the value of probability ( $0.007 < 0.05$ ), based on the decision made for an independent sample test, it can be concluded that  $H_0$  was disqualified.

Meanwhile, in Table 6, the above SPSS independent sample t-test uncovered a statistically significant value. The sig. (2-tailed) risk for Bitcoin and gold for 2020-2021 revealed the t-count of -0.890, with a significance of 0.378. As the significance value of risk was greater than the value of probability ( $0.378 > 0.05$ ), based on the independent sample test decision, it can be concluded that  $H_a$  was accepted.

**Table 6** The Difference Between Bitcoin and Gold Risk During the COVID-19 Pandemic

		Independent Samples Test									
		Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
Risk	Equal variances assumed	3.624	.063	-.890	46	.378	-.008870	.009969	-.028937	.011197	
	Equal variances not assumed			-.890	40.850	.379	-.008870	.009969	-.029005	.011265	

This condition signifies that the risk for the period 2018 to 2021 during the COVID-19 pandemic did not contain information affecting market reactions. It was based on pilot test results showing no significant difference. It means that the financial market did not react to investment decisions during a pandemic, or it can be said that the period 2018 to 2021 did not affect abnormal returns of Bitcoin with bold. Based on calculations, the risk of Bitcoin and gold for 2018-2019 was 4% and 3%. In comparison, the risk of Bitcoin and gold for 2020-2021 was 4% and 5%. Therefore, the demand for bitcoin increases, resulting in a price increase where the determination of bitcoin prices is based on supply and demand. These results reinforce the idea that information about capital gains is predictable, leading to differences in investor preferences, at least over a small period of observation, leading to insignificant changes (Mulatsih et al., 2012).

This study's results also agree with a study (Kusdarmawan & Abundanti, 2018) that asserted that there would be no complete distinction between pre-and post-pandemic conventional luck on Bitcoin and gold instruments. The calculation of the mean risk of gold showed that even though it is positive, the mean risk of gold tended to move stable at this time because gold is still an investment choice (Radianto & Ayuningtyas, 2010).

**Table 7** The Difference Between ICI and Gold Risk Before the COVID-19 Pandemic

		Independent Samples Test									
		Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
Risk	Equal variances assumed	16.439	.000	-3.625	46	.001	-.013495	.003722	-.020988	-.006002	
	Equal variances not assumed			-3.625	27.328	.001	-.013495	.003722	-.021129	-.005861	

From Table 7, the above independent sample test results from SPSS revealed a statistically significant value. The sig. of the risk of ICI and gold in the period 2018-2019 showed -3.625, with a significance of 0.001. Since the significance value of risk was lower than the value of probability ( $0.001 < 0.05$ ), based on the decision for an independent sample test, it can be concluded that  $H_0$  was rejected.

Meanwhile, in Table 8, the output of the above SPSS independent sample t-test showed a statistically significant value. The sig. (2-tailed) ICI and gold risk for the 2020-2021 period had a t-count of -4.020, with a significance of 0.000. Since the significance value of risk was lower than the value of probability ( $0.000 < 0.05$ ), based on the decision of an independent sample test, it can be concluded that  $H_0$  was rejected.

**Table 8** The Difference Between ICI and Gold Risk During the COVID-19 Pandemic

		Independent Samples Test								
		Equality of Variances			t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Risk	Equal variances assumed	28.537	.000	-4.020	46	.000	-.033810	.008409	-.050738	-.016883
	Equal variances not assumed			-4.020	25.306	.000	-.033810	.008409	-.051120	-.016501

It indicates that investors are interested in investing during the pandemic. The interest of investors is displayed in the market reaction, which results in a significant difference between the ICI and gold risks in making investment decisions. In this study, investors assume that during the COVID-19 pandemic, financial market reactions dominate investors' decisions to invest shortly or sell them as soon as possible to gain profits and minimize losses. Financial market reactions with a significant impact on investors' decisions are positive. Also, it is undeniable that people prefer certain profitable things. The good news entering the financial market makes investors willing to release their capital or sell their invested capital soon to other countries' financial markets. Based on calculations, the risk of ICI and gold for the 2018-2019 period was 1% and 3%. Meanwhile, the ICI and gold risks for 2020-2021 were 2% and 5%. In other words, the lower the price, the better investment decisions on the ICI and gold.

This study's results align with a study (Kusnandar & Bintari, 2020), stating that risk changes occur before and during the pandemic. It indicates that the lower it is, the better it is in making investment decisions in gold. Although Indonesia's financial market conditions are not as good as in developed Southeast Asian countries, Indonesia can provide certainty about the state of its financial markets (Zainuri et al., 2021). The ICI movement proves that it tended to increase and was stable during the COVID-19 pandemic.

## Conclusion

The highest gold risk for the 2018-2021 period was 0.052441 or 5%, with the lowest risk of 0.0035575 or 0.03%. The mean risk before the COVID-19 pandemic was 0.0012 or 0.01%, with a standard deviation of 0.0701. Meanwhile, the average risk during the COVID-19 pandemic was 0.0004 or 0.004%, with a standard deviation of 0.1510. Thus, testing the investment risk hypothesis in Bitcoin, ICI, and gold for 2018-2021 showed a significant difference. It can be seen from before the COVID-19 pandemic, in which ICI and gold investment risks were the lowest with significant different t-tests of 5%, obtaining a risk significance of 0.000 ( $0.000 < 0.05$ ). It means a significant difference in investment risk between ICI and gold. Then, both variables had a significance of 0.000; therefore,  $H_0$  was rejected, and  $H_a$  was accepted, indicating a significant difference in investment risk of Bitcoin, ICI, and gold over 2018-2019. Meanwhile, during the COVID-19 pandemic, the risk of investing in Bitcoin and ICI was the lowest, with a risk significance of 0.000 ( $0.000 < 0.05$ ) at the significance of 5%. It denotes a significant difference between investment risk between Bitcoin and ICI. In addition, both variables had a mean of 0.000, so the hypothesis  $H_0$  was rejected, and  $H_a$  was accepted. In short, there was a significant difference in investment risk in Bitcoin, ICI, and gold from 2020 to 2021.

The results of this study have contributed as an additional reference for alternative investment theories that can be used for potential investors to choose to invest between Bitcoin, ICI, and gold in the 2018-2021 period. In addition, practitioners can use this research as an evaluation of the risk in investment. To the authors' knowledge, this research is the first to use instruments, including Bitcoin, ICI, and gold, to measure risk in making decisions when choosing profitable investment instruments. Therefore, the authors could only compare the results of previous studies that used guidelines. This study also had weaknesses related to other variables in analyzing the comparison of return and risk. Hence, for further research, the authors hope that some readers can conduct research using one of the investment instruments studied by the current researchers with investment instruments different from the research done this time.

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