

Interconnectedness of Global and Digital Assets: Cryptocurrencies, Gold, and Exchange Rates During 2021–2024

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Abstract:

Purpose: This study examines whether fluctuations in global assets – cryptocurrencies, gold, and the rupiah exchange rate – provide signals for movements in the Indonesian Composite Stock Price Index (JCI) during 2021–2024. **Research Design and Methodology:** Using 48 monthly time-series observations obtained from official financial data sources, the study applies a quantitative approach with multiple linear regression analysis using EViews 12 to evaluate both partial and simultaneous effects of the variables on the JCI. **Findings and Discussion:** The results show that cryptocurrency has a significant negative relationship with the JCI, while gold exhibits a significant positive relationship. In contrast, the exchange rate does not have a significant effect on the JCI. Simultaneously, the three variables contribute to explaining JCI variations, although with different magnitudes of influence, indicating differing roles of digital and traditional safe-haven assets in capital market dynamics. **Implications:** These findings suggest that investors and policymakers should consider global asset dynamics when interpreting Indonesian capital market conditions. Future research is recommended to include additional macroeconomic indicators and higher-frequency data to capture short-term transmission mechanisms more comprehensively.

Keywords: Jakarta Composite Index (JCI), Cryptocurrency, Gold, Exchange Rate

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INTRODUCTION

The Indonesian economy is not let go from role the importance of capital markets in support activity economy . As player key From the capital market, the Indonesian Stock Exchange (BEI) plays a role in overseeing trading shares that become connector in the middle companies that need capital with investors searching instrument the most profitable investment . The Composite Stock Price Index (IHSG) is reject measuring stock market performance applied by the Indonesian Stock Exchange includes all over traded shares (Prasada & Pangestuti, 2022) .

Improvement number of impact investors positive for economy in Indonesia because of long-term capital long can with easy obtained . In addition , the more openness opportunity work will increase Power buy society where will affect the IHSG (Hidayah & Saidah, 2024) .

Stock Price Index as instrument gauge in development price share own characteristic fluctuations (Laksono et al., 2020) . One of the factor reason his that is existence development digital assets such as cryptocurrencies are changing pattern investment in modern capital markets (Liestyowati et al., 2023) . Then gold as asset mark protected participate influence

IHSG movement and there is one factor macroeconomics namely mark exchange rate (Purnamasari et al., 2025) . Conditions the reflect that IHSG movement is very sensitive to change economy and trends global investment (Azahroh, 2024) .

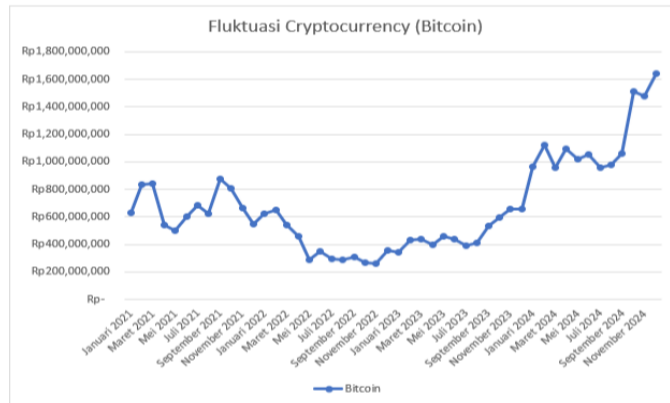


Figure 1: Cryptocurrency (Bitcoin) Fluctuating Movements January 2021 – December 2024

Source : Yahoo Finance

The fluctuating *closing price* of cryptocurrency (bitcoin) in rupiah is evident in the image above, with a stable start to 2021, a drastic decline in mid-2022, and a rise in 2023-2024. This situation demonstrates that changes in crypto assets can impact market risk and investor asset allocation strategies, potentially impacting the broader stock market (Field, 2023).

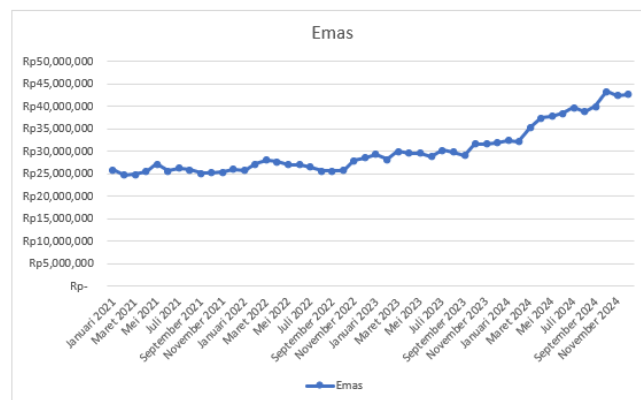


Figure 2: Gold Fluctuation Movement January 2021 – December 2024

Source : Investing.com

Figure 2 shows that the fluctuating *closing price* of gold in rupiah terms in 2021-2022 experienced relatively stable fluctuations with insignificant fluctuations. However, a significant increase occurred in 2023 and 2024. In the literature, gold is viewed as both *a hedge* and *a safe haven asset* , depending on market conditions (Shakil et al., 2018).

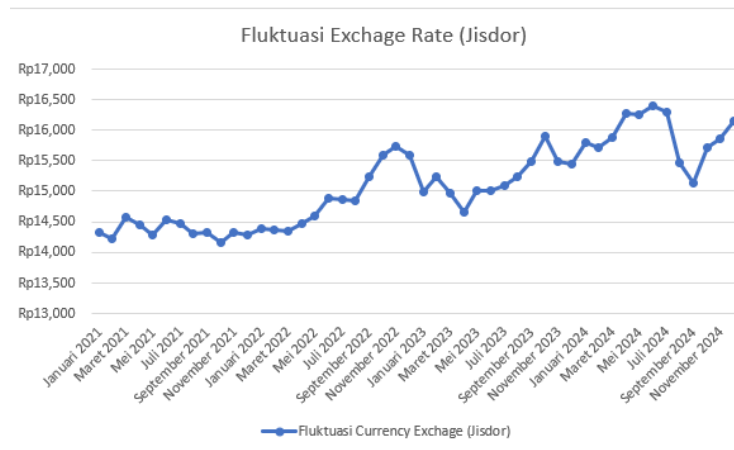


Figure 3: Fluctuating Exchange Rate (JISDOR) Movements January 2021 – December 2024

Source : Bank Indonesia

The fluctuating closing price exchange rate (JISDOR) movement in the figure above indicates significant instability from 2021 to 2024. In mid-2022, it weakened significantly, then strengthened slightly and remained relatively stable in 2023. However, it weakened significantly again in 2024. The rupiah exchange rate plays a crucial role in shaping risk perception and financial market stability, thus influencing stock price index dynamics (Pranata, 2024).

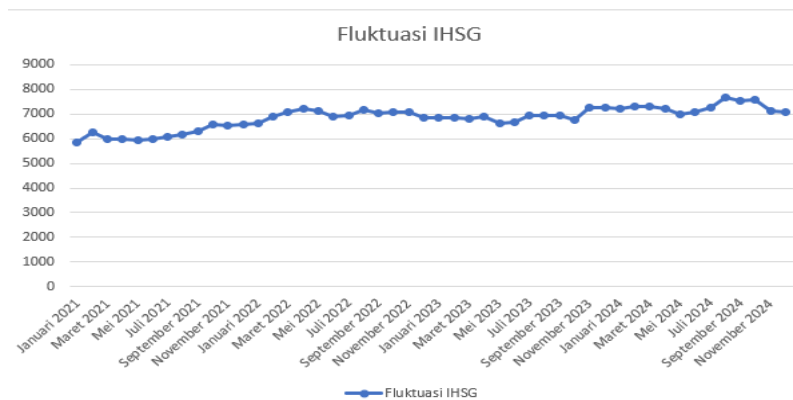


Figure 4: Fluctuating Movement of the Jakarta Composite Index (JCI) from January 2021 to December 2024

Source : Central Statistics Agency (BPS)

Figure 4 shows that the fluctuating movement of the Jakarta Composite Index (JCI) for the 2021-2024 period tended to be stable and did not experience a significant crisis. Judging from the four figures above, the extremely high and volatile Bitcoin price does not show a directional pattern with the JCI, thus its influence on the JCI is weak. Furthermore, the stable gold price at the beginning of the period and a significant increase at the end tend to indicate a negative relationship with the JCI, with investors turning to gold when the stock market weakens. Meanwhile, the unstable and significantly fluctuating Rupiah exchange

rate (JISDOR) indicates a potential impact on the JCI, as rupiah depreciation is generally followed by a decline in the stock index.

Several previous studies have examined the influence of cryptocurrency, gold, and exchange rates on stock market index movements. However, their findings remain inconsistent regarding the significance and strength of these relationships. Hidayah and Saidah (2024) and Prastyatini and Tiarah (2024) found that cryptocurrency has a positive effect on the Jakarta Composite Index (JCI). In contrast, Sarumaha (2023) reported that during the 2019–2021 period cryptocurrency did not significantly affect stock prices in Indonesia, indicating time-varying relationships. Regarding gold, Cahyo and Witono (2021) concluded that gold prices negatively affect the JCI, whereas Sasono (2023) found a positive and significant relationship. Similarly, Berliano et al. (2024) stated that the JISDOR exchange rate had no effect on the JCI for 2017–2022, while Purnamasari et al. (2025) found a positive but insignificant impact.

Cryptocurrency is characterized by high volatility that can influence investor behavior and stock market activity. Bitcoin, introduced in 2009, operates outside the traditional financial system and allows global digital transactions, with prices strongly influenced by economic and political events (Gueddes & Rejeb, 2025). Therefore, understanding cryptocurrency movements is important because fluctuations may affect the JCI.

Gold is widely considered a safe-haven asset with stable value and strong liquidity, making it attractive during uncertainty (Basit, 2020; Rahma & Hurriyaturrohman, 2025). Meanwhile, exchange rate depreciation increases import costs and production expenses, negatively affecting firm performance and stock prices (Purnamasari et al., 2025).

The urgency of this research lies in the need to understand how these three indicators, namely cryptocurrency, gold, and exchange rates, influence the movement of the IHSG. This is important because the movement of the IHSG not only reflects the condition of companies listed on the exchange, but also illustrates investors' perceptions of economic stability and market risk.

Although many studies examine macroeconomic effects on the JCI, research analyzing cryptocurrency, gold prices, and the exchange rate simultaneously – particularly during 2021–2024 – remains limited. This period reflects shifts in investor behavior driven by financial technology development and global economic instability. Therefore, this study investigates: (1) the effect of cryptocurrency on the JCI, (2) the effect of gold on the JCI, (3) the effect of the exchange rate on the JCI, and (4) the simultaneous influence of all variables on the JC

Signaling Theory

Signal Theory as described by (Brigham & Houston, 2019) explain How company communicate information to the market through decision managerial that reflects condition base company . For example , when A company announce improvement benefits , later send sign positive to investors about future prospects . On the other hand , the signal negative signals like declining profits or increasing debt can indicates poor future performance .

Composite Stock Price Index (IHSG)

Composite Stock Price Index (IHSG) as indicator development price shares by the IDX, starting from share normal until preferred stock exchange become tool in capital formation and collection cost duration long with objective develop role as well as community mobilization source Power For support financing development national (Sumaryoto et al., 2021) . The capital market is place diverse instrument finance futures long

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DOI : [10.37531/ecotal.v7i1.3603](https://doi.org/10.37531/ecotal.v7i1.3603)

time including savings , letters valuable , shares , mutual funds, instruments derivatives , and others . The capital market as tool financing company or agency other like institution government , as well as become tool invest (Zulkarnaeni et al., 2024) . Counting method through market weighted average index with formula base calculation :

$$\text{Indeks} = \frac{\text{Market Value}}{\text{Base Value}} \cdot 100$$

For measuring the IHSG is use mark index closing monthly (*closing price*) sourced from *the website* legitimate from the Indonesia Stock Exchange (BEI) (www.idx.co.id) 2021-2024 .

Cryptocurrency

Based on theory signal from Ross (1977) explains If an investor needs A signal , signal positive or signal negative used For take decision . If cryptocurrency experience increase , then share company will also rise . Investors invest in cryptocurrencies Because the underlying assets and even the number of investors will increase in a way dramatic , so that result in risk price volatile cryptocurrencies (Lee et al., 2018) .

According to study Sami & Abdullah (2020) and Prastyatini & Tiarah (2024) stated that that cryptocurrency is influential positive on the JCI. Other studies from Jimoh & Benjamin (2020) suggest that cryptocurrency is influential positive against the JCI. Based on on theory and results analysis before his , formulated hypothesis like following :

H 1 : Cryptocurrency has influence positive against the JCI

Gold

Signal theory can used by investors for predict whether product investment the safe For made into choice investment . Investment gold considered as safe choice with risk low Because its value dominant consistent and almost No Once down , even experience improvement in time short (Ahsanah, 2022) . When the value gold increasing , often there is also an increase in investor concerns about risk in the stock market (Sopiyah et al., 2025) . This is cause every movement gold Can become indicator For observe tall low his Composite Stock Price Index (IHSG).

Sasono (2023), Fadhilah & Susanti (2024) and Prasada & Pangestuti (2022) said that price gold influential positive towards the JCI. It can be concluded If mark If gold rises , the IHSG will also rise increased . Likewise on the contrary , when mark gold experience the decline in the IHSG also occurred experience the same thing .

H 2 : Gold has influence positive against the JCI

Exchange Rate

Signal Theory explains how macroeconomic information becomes a signal for investors in determining whether to buy or sell (Baihaqqy, 2022). An exchange rate is the conversion ratio between one currency and another. When the rupiah weakens during a period of economic growth, banks and companies are also likely to suffer losses. Jisdor is used in this study as an exchange rate indicator because it reflects the conditions of the Indonesian foreign exchange market during the study period. Such changes subsequently affect the Composite Stock Price Index.

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According to Budiman et al.'s research (2025) Exchange Rate influences positive against the IHSG. then Purnamasari et al, (2023) and Aftab et al, (2024) said that the Exchange Rate has an effect positive However No significant to Composite Stock Price Index . From theory and research results before nya , so that formulated hypothesis like following.

H 3 : Exchange Rate has influence positive against the JCI

RESEARCH DESIGN AND METHODOLOGY

This study employs a systematic research methodology to understand and analyze the relationship between global assets and the stock market. The research uses a quantitative approach aimed at testing hypotheses through statistical analysis. Secondary data were obtained from official institutions, including the Central Statistics Agency (BPS), Bank Indonesia, Yahoo Finance, and Investing.com. Monthly time-series data from 2021 to 2024 were utilized.

The population consists of monthly closing price data covering Bitcoin cryptocurrency prices, gold prices in rupiah, the rupiah exchange rate, and the Indonesian Composite Stock Price Index (JCI) over a four-year period, resulting in 48 observations. The conceptual framework of the study is presented in Figure 5.

The analysis model uses multiple linear regression to ensure that the estimated model is accurate and unbiased. Descriptive statistics, classical assumption tests, and hypothesis testing were conducted using EViews 12 software. Hypothesis testing includes the coefficient of determination (R^2), partial tests (t-test), and simultaneous tests (F-test) to evaluate the influence of cryptocurrency, gold, and exchange rate variables on the JCI.

The regression equation used in this study is:

$$JCI = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where:

JCI = Jakarta Composite Index

α = constant

β_1 - β_3 = regression coefficients

X_1 = Cryptocurrency (Bitcoin)

X_2 = Gold price

X_3 = Exchange rate

ε = error term

RESULTS AND DISCUSSION

Statistical Test

Here researchers process the data that has been obtained namely Cryptocurrency, Gold, and Exchange Rate data against Composite Stock Price Index on the Indonesia Stock Exchange (IDX) for 2021-2024 period . Variables in studies This is : Cryptocurrency (X_1), Gold (X_2), and Exchange Rate (X_3) as variables independent (X), and the Composite Stock Price Index (IHSG) variable dependent (Y).

Descriptive Test

It is known every variables have the number of data is 48, the number the obtained from monthly data every period January 2021 – December 2024, then obtained results analysis descriptive :

Table 1. Descriptive Test Results

Statistics	IHSG	Cryptocurrency	Gold (Emas)	Exchange Rate
Mean	6842.646	6.76E+08	30,252,311	15,097.15
Median	6935.500	6.12E+08	28,459,858	15,001.50
Maximum	7671.000	1.64E+09	43,320,090	16,394.00
Minimum	5862.000	2.60E+08	24,606,720	14,171.00
Std. Dev	456.8653	3.38E+08	5,396,437.0	667.3551
Observations	48	48	48	48

Source : Eviews12 (processed data)

1. Composite Stock Price Index (IHSG) with *mean* 6,842.646. Then mark maximum 7,671,000 and value *median* 5,862,000. Standard value deviation 456.8653 means that fluctuations in the IHSG during period study relatively stable , because *mean* more big compared to standard deviation his ,
2. Cryptocurrency has *mean* 676,000 (In Millions), value maximum 1,640 (in billions) and minimum 260,000 (in millions). Standard value deviation 338,000 (In Million) indicates existence quite a fluctuation high on movement cryptocurrency prices .
3. Gold Price has mark *mean* 3.0252311, with mark *maximum* 4.3320090 and minimum 2.4606720. Standard value deviation 5.396437 indicates change price moderate gold , no too fluctuating .
4. Exchange Rate (value exchange) have *mean* 15,097.15 with mark maximum 16,394.00 and minimum 14,171.00. Standard value deviation 667.3551 means movement mark swap relatively stable during period study .

Assumption Test Classic

Table 2. Normality Test

Statistics	Residuals
Observations	48
Mean	-1.37E-13
Median	36.47017
Maximum	556.1011
Minimum	-687.0131
Std. Dev	303.8143
Skewness	-0.248405
Kurtosis	2.234223
Jarque-Bera	1.666470
Probability	0.434641

Source : Eviews12 (processed data)

the Normality Test Figure 2, concluded all data is normal with a probability of 0.434641, the value $\alpha = 0.05$. So the probability is greater than the value α (0.434641 > 0.05).

Table 3. Multicollinearity

Variance Inflation Factors			
Date: 11/04/25 Time: 00:32			
Sample: 20211M01 2024M12			
Included observations: 48			
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1923020	936.1887	NA
CRYPTOCURRENCY	5.18E-14	14.35156	2.816918
GOLD	4.03E-10	185.1740	5.595115
JISDOR	0.013463	1496.708	2.858168

Source :

Eviews12 (processed data)

The multicollinearity test was carried out using the Variance Inflation Factor (VIF). A VIF value greater than 10 indicates a strong correlation among independent variables. The testing results show that all independent variables have VIF values below the threshold of 10. This condition confirms that no high correlation exists among the explanatory variables, meaning the regression model is free from multicollinearity and appropriate for further estimation.

Table 3. Heteroscedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	1.289162	Prob. F(3,44)	0.2900
Obs*R-squared	3.878192	Prob. Chi-Square(3)	0.2749
Scaled explained SS	2.011018	Prob. F(3,44)	0.2900

Source : *Eviews12 (processed data)*

The heteroscedasticity test was conducted using the Obs*R-squared (Chi-Square) probability value. The obtained probability value is 0.5701, which is greater than the significance level of 0.05. Therefore, the regression model does not experience heteroscedasticity, indicating that the variance of the residuals is constant across observations.

Table 4. Autocorrelation

Breusch-Godfrey Serial Correlation LM Test			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.039923	Prob. F(2,41)	0.9609
Obs*R-squared	0.091353	Prob. Chi-Square(2)	0.9554

Source : *Eviews12 (processed data)*

The autocorrelation test also uses the Obs*R-squared (Chi-Square) probability value. The result shows a probability value of 0.9554, which exceeds 0.05. This indicates that there is no correlation among residuals across time, meaning the regression model is free from autocorrelation problems.

Overall, the classical assumption tests demonstrate that the regression model satisfies the requirements of BLUE (Best Linear Unbiased Estimator), allowing the regression analysis to be interpreted reliably.

The Impact of Cryptocurrency on Composite Stock Price Index (IHSG)

Findings show Cryptocurrency influential negative and significant towards the JCI. Findings this is different from part big study previously said existence connection positive. Research by Sami & Abdullah (2020) and Prastyatini & Tiarah (2024) found that cryptocurrency provides influence positive towards the JCI, while Jimoh & Benjamin (2020) also stated that increase Bitcoin price tends to push improvement index shares. Difference results This contain understanding connection between cryptocurrency and the stock market Indonesia nature inconsistent interperiod, as well as indicates that findings study This including in relative categories seldom found in study previously.

Explanation on difference findings the can associated with perspective *Signaling Theory*. In theory this, change price something asset viewed as signals that influence investor perceptions and behavior. In the period 2021-2024 research, increase Bitcoin price gives signal about prospects more benefits attractive in the crypto market compared to the stock market. Signals This potential encourage investors to do reallocation portfolio from share to asset crypto, so that improvement Bitcoin price actually followed by a decline in the IHSG. The signals that emerged of the cryptocurrency market includes increase price, increase liquidity, and activity network can form investor tendency to entering the crypto market. Because considered own prospects future profits. So, the results study still in line to framework theoretical *Signaling Theory*.

The Influence of Gold on Composite Stock Price Index (IHSG)

Through Table 6, the variables price gold (X2) refers to the influence positive and significant against the IHSG (Y). The probability value ($0.0005 < 0.05$) proves that that gold influential positive with IHSG movement. If price gold increased in the period running, then the JCI will also increases, as well as when Gold prices fell, IHSG followed suit decreased which indicates existence connection positive significant will the Gold Price against the IHSG during period study.

Global market volatility increases consequence tension trading between countries economy main, and investors divert their funds to more assets safe like gold. Gold price soaring Because increasing request as safe haven assets, which affects Investors' views and reactions in the Indonesian stock market (Sopiyah et al., 2025).

In other words, gold Keep going give impact big to stock market performance national as asset safe, especially in busy times uncertainty like war global trade. Higher gold prices tall can give impact positive for Composite Stock Price Index (IHSG) and increase stock market confidence in the middle condition economy that is not stable (Prawirosaputro et al., 2017). Findings This in line with findings (Sasono, 2023), (Fadhilah & Susanti, 2025), (Balqis & Slasabila (2025). However, not yet support the results study from (Cahyo & Witono, 2021) and (Basit, 2020) state that price gold No influential against the JCI.

The Influence of Exchange Rates on Composite Stock Price Index (IHSG)

The results of the hypothesis testing in Table 6 show that the exchange rate variable does not have a significant effect on the IHSG. This means that the appreciation of the rupiah exchange rate during the research period did not have a significant correlation with the

movement of the Composite Stock Price Index (IHSG). The stability of the rupiah exchange rate is very important for companies. Depreciation of the rupiah has the potential to increase the price of imported raw materials, which in turn drives up production costs and can disrupt companies' ability to achieve their financial performance targets (Lobo, 2025). This condition can reduce consumer purchasing power and ultimately have an impact on investor interest in company shares, causing share prices to weaken (Liantanu et al., 2023). However, the results of this study indicate that the effect of the rupiah exchange rate on the IHSG is indirect, so that changes in the rupiah exchange rate do not necessarily significantly affect the movement of the IHSG during the observation period.

Study this is supported results study from Purnamasari et al, (2025), Junaid et al, (2024) and Aftab et al, (2024) However , not yet support the results study from (Qonita R. F, 2019) and (Prasetyo et al, 2025) stated that the Exchange Rate does not influential to price Composite Stock Price Index (IHSG).

CONCLUSION

Through results analysis study In this case , the variables Cryptocurrency, Gold, and Exchange Rate show different influences to Composite Stock Price Index (IHSG) during 2021-2024 period . Cryptocurrency has an influence negative and significant which confirms that its upward movement Bitcoin price tends to followed with IHSG decline . Gold has an impact positive and significant against the JCI. The increase mark gold No suppress the IHSG but move in the same direction . This is signify that during period research , gold give signal positive that increases investor confidence in the capital market. The Exchange Rate does not influential significant against the JCI. Although the exchange rate fluctuates Enough sharp during 2021-2024 changes the No proven affect the stock market in a way directly . The stability of the Indonesian capital market shows influence mark swap towards the IHSG tends to weak in the period time short . Third variables This in a way simultaneous give contribution significance to IHSG movement , even though properties and strengths its influence different . Period 2021-2024 research is also marked with recovery economy post-pandemic , fluctuations price global commodities , as well as increase interest to digital assets . Conditions This explain Why dynamics between variables show patterns that are not completely linear.

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