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Bitcoin vs. the Fed: Which Has a Greater Influence on the Indonesia Composite Index

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A R T I C L E I N F O

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A B S T R A C T

This study aims to analyze the effect of Bitcoin prices and the Federal Reserve (The Fed) interest rate on the Indonesia Composite Stock Price Index (IHSG) over the period January 2010 to December 2025. A descriptive quantitative approach is employed using the Vector Error Correction Model (VECM) to capture short-run and long-run dynamics among variables. Monthly secondary data were obtained from The Federal Reserve, Tradingview, and Investing.com. VECM estimation reveals that Bitcoin prices have a negative and significant effect on IHSG in the long run, while in the short run the effect remains negative but statistically insignificant. The Fed interest rate exhibits a negative and insignificant effect on IHSG in both the long and short run. These findings support the characterization of Bitcoin as a complementary asset to IHSG and imply that market participants should consider the dynamics of digital assets and global monetary policy in portfolio allocation strategies.

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INTRODUCTION

The development of the global financial system has expanded access for market participants and investors in Indonesia to various alternative investment instruments, particularly digital-based assets such as Bitcoin. The existence of these investment instruments reflects the availability of relevant investment alternatives for domestic market participants while emphasizing that investment decisions cannot be made arbitrarily. Instead, investors must consider differences in characteristics, expected returns, and risk levels associated with each asset in making rational investment decisions (Tunnisa & Darmawan, 2023).

The emergence of various alternative investment instruments has created new dynamics in investor portfolio allocation strategies, where decisions to allocate funds to the domestic stock market are no longer independent but are also influenced by the movement and attractiveness of other investment assets. Investor preferences in determining fund allocation are not solely based on the prospects and performance of the domestic stock market but also consider the relative attractiveness of alternative assets as instruments for portfolio diversification and investment risk management (Wulan et al., 2024). Within the context of Indonesia's capital market, these alternative investment instruments may create both substitution and complementary effects on the IHSG. Investors also consider the movement of alternative assets such as crypto assets when making investment decisions, creating the possibility of substitution and complementary relationships between these assets and IHSG (Hidayah & Nur Saidah, 2024).

As a relatively new digital asset, Bitcoin has experienced rapid price growth accompanied by high volatility. These characteristics make Bitcoin an investment instrument with substantial return potential while simultaneously carrying significant risks. Bitcoin exhibits considerably higher volatility compared to stocks and gold and is more frequently utilized by investors for speculative purposes and capital gain opportunities (Wulan et al., 2024). This condition indicates that when Bitcoin experiences significant price rallies, investors tend to respond by increasing their exposure to the cryptocurrency market. The movement of Bitcoin prices is associated with the dynamics of IHSG, suggesting that the cryptocurrency market has become an important consideration in stock market investment decisions. Therefore, during periods of strong Bitcoin price appreciation, there is potential for a shift in fund allocation (substitution effect) from domestic equities to crypto assets, driven by increasing investor interest in higher short-term return opportunities in digital asset markets (Fadhilah & Susanti, 2025).

The ease of conducting Bitcoin transactions in Indonesia has provided Indonesian investors with greater flexibility in portfolio allocation. Information regarding Bitcoin has expanded rapidly as influencers and public figures on social media increasingly discuss Bitcoin technology, the role of energy as the underlying foundation of digital assets, and the convenience of both domestic and international transactions. Bitcoin is increasingly perceived as a substitute investment instrument for traditional assets such as gold and stocks, which may contribute to liquidity shifts from IHSG to the Bitcoin market.

Based on Figure 1 , during periods of rising Bitcoin prices, IHSG tends to experience lagging movements. In many cases, IHSG only begins to rise after Bitcoin's upward trend has ended. Bitcoin has demonstrated exceptionally high percentage gains, attracting investors seeking to capitalize on its volatility-driven profit opportunities. In addition, several empirical studies have found that cryptocurrency asset movements, particularly Bitcoin, are associated with IHSG dynamics. Research conducted by Hidayah and Nur Saidah (2024) found that overall crypto asset returns have a positive effect on IHSG, reflecting interactions between digital asset markets and domestic capital markets. In contrast, research by Fadhilah and Susanti (2025) found that Bitcoin volatility is not sufficiently strong to significantly influence IHSG.

Figure. 1 periods of rising Bitcoin prices

United States monetary policy, as reflected in the benchmark interest rate set by the Federal Reserve System (The Fed), plays a crucial role in shaping the global investment landscape. Changes in the Federal Reserve interest rate affect the cost of capital and cross-border capital flows, meaning that international investors' decisions in allocating capital are influenced not only by domestic conditions but also by U.S. monetary policy. Increases in the Federal Reserve interest rate significantly contribute to the depreciation of the Indonesian Rupiah and selling pressure on the IHSG, indicating that higher interest rates may reflect foreign capital outflows from the Indonesian stock market (Safitri, 2025). Furthermore, Ambarwati and Saprudin (2025) stated that increases in the Federal Reserve interest rate encourage capital outflows from Indonesia's capital market, resulting in declining stability of IHSG. Historical analysis of IHSG movements and the Federal Reserve benchmark interest rate suggests a contextual relationship between U.S. monetary policy and the dynamics of Indonesia's capital market.

Figure. 2 the period of 2010–2015 and in 2021

Based on figure 2, during the period of 2010–2015 and in 2021, when the Federal Reserve interest rate remained low, IHSG recorded stronger growth, reflecting capital inflows into emerging markets due to lower costs of capital and investor preferences for high-risk assets with higher return potential. In contrast, the monetary tightening phase during 2022–2024 exerted greater pressure on IHSG, consistent with tighter global liquidity conditions and rising capital costs. This finding is consistent with Putra (2019), who found that the Federal Reserve benchmark interest rate has a negative effect on IHSG in both the short and long term. However, Taha and Bento (2023) identified a weak relationship between U.S. interest rate policy and IHSG.

The fundamental question underlying this study is: between Bitcoin and United States monetary policy represented by the Federal Reserve, which exerts a greater influence on IHSG movements? Both are inseparable components of the modern financial ecosystem and are actively considered by market participants when making investment decisions. Bitcoin represents a decentralized digital asset that offers a technology-based investment alternative with high return potential, while Federal Reserve interest rate policy is a U.S. monetary instrument that has historically shaped the direction of global capital flows. However, both variables share an important fundamental characteristic: neither can be controlled by Indonesia. The Indonesian government and Bank Indonesia have no authority to regulate Bitcoin prices, as Bitcoin operates in a decentralized system that is not tied to any central authority. Similarly, Indonesia cannot influence decisions made by the Federal Open Market Committee (FOMC) in determining the direction of Federal Reserve interest rate policy. This condition places IHSG in a vulnerable position against two external forces that operate independently of domestic control. Therefore, understanding the relative influence of these two variables on IHSG becomes strategically important for both market participants and policymakers in Indonesia.

This paper used in-note in referencing articles. You could write it as follows: (Diener, 2000), as for an article with more than one author (Haerani, Parmitasari, Aponno, & Aunalal, 2019). Should you want to cite more than several papers, arrange them alphabetically from A-Z, not the year of publishing as follows (Caprara & Zimbardo, 2004; Lusardi, Mitchell, & Curto, 2010; Sabri &

MacDonald, 2010). The use of a reference tool, such as Mendeley, is also mandatory.

THEORETICAL REVIEW

Efficient Market Hypothesis

The Efficient Market Hypothesis (EMH) explains that capital markets operate efficiently when financial asset prices fully reflect all available information at a given point in time. The simplified equation of the Efficient Market Hypothesis is presented as follows:

Expected value Price of asset (j) in period (t+1) Rate of return of asset in period (t+1) Information set available at time t

EMH states that financial asset prices at any given time reflect all available information, implying that no investor can consistently generate abnormal returns by utilizing the same information. In an efficient market, stock price movements are entirely determined by new information that is random and unpredictable in nature (Malini, 2021). Under such conditions, stock prices adjust rapidly to new information, leaving limited opportunities for investors to gain excess returns through either fundamental or technical analysis.

The Efficient Market Hypothesis consists of three forms of market efficiency. Based on Figure 2.2, the strong form represents the highest level of market efficiency, where unpublished information, publicly available information, and historical price data are all immediately reflected in current asset prices. The semi-strong form refers to a condition in which previously unpublished information becomes publicly available, after which stock prices react to the newly disclosed information. The weak form suggests that available information is limited to historical asset-related information, such as financial reports, company information, and past asset price movements (Remesh & Gaba, 2023).

If your work is quantitative, please provide the previous studies concurring or rejecting your proposed hypothesis. H1: Hypothesis one and so on here

Investor Sentiment

Behavioral finance emerged as a critique of the assumption of perfect rationality embedded in the Efficient Market Hypothesis. This approach emphasizes that investor decisions are often influenced by psychological factors such as sentiment, cognitive biases, and risk preferences, which may cause asset prices to deviate from their fundamental values (Widhiarti, Anggraeni, & Pasaribu, 2018).

Investor sentiment reflects the collective optimism or pessimism of market participants toward economic conditions and financial markets. When global sentiment is in a risk-on condition, investors tend to increase their exposure to risky assets such as stocks, including the IHSG. Conversely, during risk-off conditions, investors tend to shift their funds toward assets perceived as safer or those that offer relatively more stable returns, such as Gold. The simplified behavioral finance equation is presented as follows:

Asset return at time t Investor sentiment index Return sensitivity to investor sentiment Other factors outside the model

Investor preferences regarding risk and return play an important role in determining portfolio allocation decisions. When alternative assets such as Bitcoin or S&P 500 offer higher expected returns, investors may rebalance their portfolios by shifting liquidity away from the domestic stock market. This liquidity shift does not necessarily indicate market inefficiency but may instead reflect both rational and psychological responses to changing investor preferences and market sentiment.

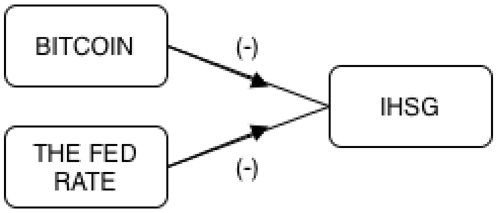

Figure 3. Conceptual Framework (The image has to be in good quality)

METHODOLOGY

This study adopts a descriptive quantitative approach. The Econometrics approach of the Vector Error Correction Model (VECM) is employed to measure the effect of Bitcoin prices and the Federal Reserve System interest rate on the movement of the IHSG during the 2010–2025 period. The data used in this study consist of secondary time-series data. The dataset includes monthly market closing prices from January 2010 to December 2025. Data were obtained from the Federal Reserve, TradingView, and Investing.com.

The stationarity test aims to determine whether time-series data have constant mean and variance over time. If the ADF test statistic is lower than the critical value (or the p-value is less than 0.05), H1 is accepted, indicating that the series is stationary. Conversely, if the ADF test statistic is greater than the critical value (or the p-value is greater than 0.05), H0 is accepted, indicating that the series is non-stationary (Rosadi, 2015; Soetjipto & Wuryaningsih, 2022).

The optimal lag selection test is conducted to determine the best lag length capable of capturing the dynamic relationships among variables without causing a loss of degrees of freedom. Optimal lag determination is carried out by comparing information criteria values such as LR, FPE, AIC, SC, and HQ. The optimal lag is selected based on the smallest criterion value, as it reflects a balance between model accuracy and parameter efficiency (Rosadi, 2015).

The stability test serves as a methodological requirement before conducting further analysis, as instability in the estimation system may cause the results of the Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) to become invalid and difficult to interpret accurately (Basuki & Prawoto, 2016).

The cointegration test is conducted to identify the existence of long-run equilibrium relationships among variables that are individually non-stationary. If the variables are cointegrated, fluctuations may occur in the short run, but the variables tend to move toward the same long-run equilibrium, allowing the construction of a VECM model (Soetjipto & Wuryaningsih, 2022). If the t-statistic exceeds the critical value at a 5% significance level, H1 is accepted, indicating the existence of cointegration. If the cointegration test identifies at least one cointegration vector ($r \geq 1$), it confirms that the variables have a long-run equilibrium relationship, and the VECM model can be estimated.

The causality test is used to determine the direction of causal relationships among variables in a dynamic system. If the coefficient β is simultaneously significant, variable X is considered to Granger-cause variable Y (Rosadi, 2015).

The Vector Error Correction Model (VECM) is an extension of the Vector Autoregression (VAR) model that is applied when the variables within a system are cointegrated. This model integrates short-run dynamics with an adjustment mechanism toward long-run equilibrium through the error correction term (ECT) component. Therefore, VECM is capable of capturing both short-term responses and long-term relationships among variables (Soetjipto & Wuryaningsih, 2022). The VECM model estimates three main components. First, the cointegration relationship (β), which represents the long-run equilibrium relationship among variables. Second, the adjustment coefficient (α), which indicates the speed at which each variable returns to long-run equilibrium after deviations occur, where a negative and statistically significant α value indicates a valid error correction mechanism. Third, the short-run relationship (Γ), which reflects the short-term impact of changes in independent variables on changes in the IHSG.

The Impulse Response Function (IRF) is an analytical tool within the VECM framework used to examine the dynamic impact of a one standard error shock in one variable on other variables within the system, both in the short run and long run (Basuki & Prawoto, 2016). The interpretation of IRF results is conducted by analyzing the response graph, where a graph positioned above the horizontal line indicates a positive response, a graph positioned below the horizontal line indicates a negative response, and a graph that gradually flattens toward the horizontal line indicates the absence of a meaningful response among variables (Basuki & Prawoto, 2016).

Forecast Error Variance Decomposition (FEVD) is used to measure the relative contribution of each variable in explaining the forecast error variance of other variables within the VECM system (Basuki & Prawoto, 2016). Unlike IRF, FEVD does not focus on the direction or pattern of responses. Instead, it decomposes the proportion of a variable's variance into innovation (shock) components.

RESULTS

Stationarity Test Results

The stationarity test was conducted using the Augmented Dickey-Fuller (ADF) test with the following hypotheses: H0: The data are non-stationary, indicated by a probability value greater than 0.05 or an ADF t-statistic lower than the MacKinnon critical value. H1: The data are stationary, indicated by a probability value lower than 0.05 or an ADF t-statistic greater than the MacKinnon critical value.

Table. 1 the stationarity test results using the ADF test

Variabel	*Level*			
	***t-Statistic* ADF**	**MacKinnon 5%**	***Probability***	**Hasil**
IHSG	-1,003216	-2.876515	0,7520	Tidak stasioner
BITCOIN	-0,010656	-2.876515	0,9557	Tidak stasioner
FED	-1,479355	-2.876759	0,5421	Tidak stasioner

Based on the stationarity test results using the ADF test presented in Table X, all research variables, namely IHSG, Bitcoin, and the Federal Reserve System interest rate, were found to be non-stationary at the level form. The probability values for each variable were 0.7520, 0.9557, and 0.5421, respectively, which are greater than 0.05. In addition, the ADF statistical values of -1.003216, -0.010656, and -1.479355 were lower than the MacKinnon critical values at the 5% significance level. Therefore, H0 is accepted at the level form.

Table. 2 data differencing to the first difference was required for all variables

Variabel	*First Difference*			
	***t-Statistic* ADF**	**MacKinnon 5%**	***Probability***	**Hasil**
IHSG	-12,72793	-2.876595	0,0000	Stasioner
BITCOIN	-11,88131	-2.876595	0,0000	Stasioner
FED	-4,44811	-2.876759	0,0003	Stasioner

As a result, data differencing to the first difference was required for all variables in order to achieve stationarity at the same degree of integration. The ADF test results at the first difference presented in Table X indicate that all research variables became stationary. The probability values for IHSG and Bitcoin were 0.0000, while the probability value for the Federal Reserve interest rate was 0.0003, all of which are lower than 0.05. Furthermore, the ADF statistical values of -12.72793, -11.88131, and -4.44811 were higher than the MacKinnon critical values at the 5% significance level. Therefore, H1 is accepted, indicating that the data are stationary at the first difference.

Optimal Lag Test Results

The optimal lag length was determined based on several information criteria, including the Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Criterion (HQ). In determining the optimal lag, the criterion with the smallest value was selected, indicated by an asterisk (*) in the optimal lag test results.

Table. 3 the results of the optimal lag test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3007.530	NA	3.91e+10	32.90197	32.95459*	32.92330*
1	-2999.077	16.53659	3.93e+10	32.90795	33.11841	32.99326
2	-2990.608	16.29155	3.95e+10	32.91374	33.28205	33.06304
3	-2979.293	21.39322	3.85e+10*	32.88845*	33.41459	33.10172

Lag	LogL	LR	FPE	AIC	SC	HQ
4	-2978.212	2.007499	4.20e+10	32.97500	33.65899	33.25225
5	-2973.069	9.386236	4.39e+10	33.01715	33.85898	33.35839
6	-2959.574	24.18915	4.18e+10	32.96802	33.96769	33.37324
7	-2955.964	6.351868	4.44e+10	33.02693	34.18445	33.49613
8	-2943.711	21.15826*	4.29e+10	32.99137	34.30674	33.52456

Based on the results of the optimal lag test presented in Table X, lag 3 was identified as the optimal lag for this research model. This finding is indicated by the presence of an asterisk (*) in the majority of the information criteria, particularly the Akaike Information Criterion (AIC) at lag 3, which reflects the smallest value among the available criteria at the 5% significance level. Therefore, lag 3 was selected as the optimal lag length and was subsequently used in the model to predict variables based on both their own past values and the past values of other variables in the model. This selection aims to improve model stability and eliminate autocorrelation issues.

Stability Test Results

A VAR/VECM model is considered stable when the root values in the AR Roots Table have modulus values of less than 1. This condition can be confirmed when all roots and polynomial functions are located within the unit circle in the root diagram generated from the stability test results.

Table. 4 Stability Test Results

Root	Modulus
0.802084	0.802084
-0.339288 - 0.496620i	0.601455
-0.339288 + 0.496620i	0.601455
0.237185 - 0.470035i	0.526488
0.237185 + 0.470035i	0.526488
-0.451978 - 0.125453i	0.469065
-0.451978 + 0.125453i	0.469065
0.304877 - 0.310480i	0.435142
0.304877 + 0.310480i	0.435142

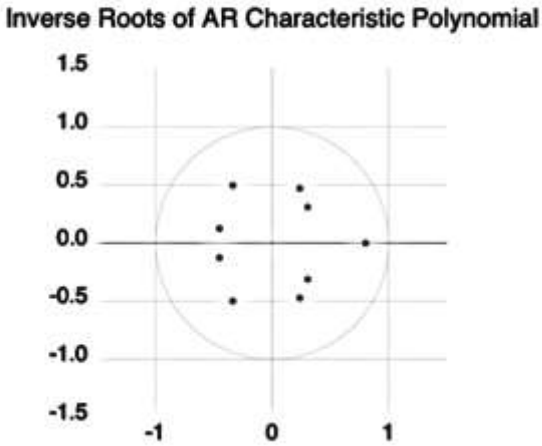

Figure. 4 the stability test results

Based on the stability test results of the VAR/VECM model presented in Table X and Figure X, all obtained roots have modulus values below 1 and are located within the unit circle. Therefore, the VAR/VECM model satisfies the stability requirements. Thus, the model can be considered stable and valid for further analysis, including the Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD). Model stability is essential to ensure that the analytical results are not affected by unstable or excessively volatile behavior, thereby providing a more accurate representation of the dynamic relationships among variables in this study.

Cointegration Test Results

The cointegration test was conducted using the Johansen Cointegration Test method with a critical value of 0.05 and was measured using both the Trace Statistic and Maximum Eigenvalue Statistic. The hypotheses are defined as follows: H0: There is no cointegration relationship (statistical value < critical value) H1: There is a cointegration relationship (statistical value > critical value)

Table. 5 Cointegration Test Results

Hypnotized No. of CE(s)	*Eigenvalue*	*Trace Statistic*	*0,05 Critical Value*	*Prob.***
None *	0,466112	319,4059	29,79707	0,0000
At most 1 *	0,440608	200,1678	15,49471	0,0000
At most 2 *	0,376628	89,79610	3,841465	0,0000

Hypnotized No. of CE(s)	*Eigenvalue*	*Max-Eigen Statistic*	*0,05 Critical Value*	*Prob.***
None *	3,841465	119,2381	21,13162	0,0000
At most 1 *	0,440608	110,3717	14,26460	0,0000
At most 2 *	0,376628	89,79610	3,841465	0,0000

Based on the results of the Johansen cointegration test using both the Trace Statistic and Maximum Eigenvalue methods at a 5% significance level, as presented in Table X and Table X, five cointegration relationships were identified among the variables. The column labeled "Hypothesized No. of CE(s)" in the Johansen cointegration test output refers to the hypothesized number of cointegration equations assumed in the model, where each hypothesis level represents the assumed number of long-run relationships among the variables. The rejection of H0 at each hypothesis level indicates the minimum number of cointegration relationships detected among the tested variables.

In this study, the rejection of hypotheses from "None" to "At most 2" indicates the existence of five cointegration relationships, as evidenced by the Trace Statistic and Maximum Eigenvalue Statistic values being greater than the critical values at the 5% significance level. Therefore, it can be concluded that a long-run equilibrium relationship exists among the variables, leading to the selection of the Vector Error Correction Model (VECM) for further analysis. This model is appropriate because it captures short-run dynamics while simultaneously accounting for long-run equilibrium relationships among the variables examined in this study.

Granger Causality Test Results

If the probability value is greater than 0.05 (5%), it can be concluded that no causal relationship exists between variables. Conversely, if the probability value is less than 0.05 (5%), a causal relationship exists. The following are the results of the Granger Causality Test.

Table. 6 Granger Causality Test Results

Null Hypothesis:	*Obs*	*F-Statistic*	**Prob.**	**Hasil**
FED – BITCOIN	189	2,89804	0,0365	Mempengaruhi
BITCOIN – FED		0,34412	0,7934	Tidak mempengaruhi
IHSG – BITCOIN	189	0,25138	0,8603	Tidak mempengaruhi
BITCOIN – IHSG		2,75207	0,0441	Mempengaruhi
IHSG – FED	189	1,32750	0,2669	Tidak Mempengaruhi
FED – IHSG		0,60745	0,6110	Tidak mempengaruhi

Causality Test. Based on Table 4.8, the significant relationships identified from the Granger causality test are as follows: Source: EViews 12 Output (Processed Data, 2026) Based on the table results, the effect of the Federal Reserve System interest rate on Bitcoin has a probability value of 0.0365, while the effect of Bitcoin on IHSG has a probability value of 0.0441, both of which are below the 5% significance threshold. However, the remaining tested variables do not exhibit causal relationships, as indicated by probability values greater than 0.05.

VECM Estimation Results

In VECM testing, one of the primary criteria used to determine whether an independent variable (X) significantly affects a dependent variable (Y) is by comparing the t-statistic value with the t-table value. A variable is considered to have a significant effect when the t-statistic exceeds the t-table value, and vice versa. The t-table value is determined based on the significance level (0.05) and the number of degrees of freedom (df), which is calculated from the number of observations minus the number of estimated parameters. This study includes 192 observations and 3 variables, resulting in: Based on the t-distribution table, the t-table value for df = 189 at a significance level of 0.05 is 1.972595079. Therefore, the t-table value used in this study is 1.97259. The hypotheses used in the VECM estimation are as follows: H0: The variable has an insignificant effect (t-statistic < t-table) H1: The variable has a significant effect (t-statistic > t-table). Based on these estimation results, the long-run VECM equation model is formulated as follows:

Table. 7 VECM Estimation Results

Cointegrating Eq:	CointEq1		Hasil
	Koefisien	*t-Statistic*	
D(IHSG(-1))	1,000000		
D(BITCOIN(-1))	-0,010145	[-2,91309]	Signifikan
D(FED(-1))	-66,75722	[-0,73672]	Tidak Signifikan
C	-24,89856		

Based on Table X, the Bitcoin variable has a t-statistic value of -2.91309, which is greater than the t-table value of 1.97259. This indicates that changes in Bitcoin prices in the previous month have a significant effect on IHSG in the long run. Therefore, H0 is rejected and H1 is accepted. The coefficient value of -0.010145 indicates that an increase of one U.S. dollar in Bitcoin price during the previous month will reduce the current IHSG by 0.010145 points, assuming other independent variables remain constant (ceteris paribus). This finding indicates a negative long-run relationship between Bitcoin and IHSG during the period from January 2010 to December 2025.

Meanwhile, the Federal Reserve System interest rate variable has a t-statistic value of -0.73672, which is lower than the t-table value of 1.97259. This indicates that changes in the Federal Reserve interest rate in the previous month have an insignificant effect on IHSG in the long run. Therefore, H0 is rejected and H1 is accepted. The coefficient value of -66.75722 indicates that a one basis point increase in the Federal Reserve interest rate during the previous month will reduce the current IHSG by 66.75722 points, assuming other independent variables remain constant (ceteris paribus). This finding suggests a negative long-run relationship between the Federal Reserve interest rate and IHSG during the period from January 2010 to December 2025. Based on these estimation results, the short-run VECM equation model is formulated as follows:

Table. 8 the short-run VECM equation model

Error Correction	D(IHSG,2)		Hasil
	Koefisien	*t-Statistic*	
CointEq1	-0.899180	[-12.04841]	
D(IHSG(-1))	-0.029175	[-0.22883]	Tidak Signifikan
D(BITCOIN(-1))	-0.005452	[-1.75703]	Tidak Signifikan
D(FED(-1))	-75.52529	[-0.80997]	Tidak Signifikan
C	-0.019399	[-0.00121]	

The Bitcoin variable has a t-statistic value of -1.75703, which is lower than the t-table value of 1.97259. This indicates that changes in Bitcoin prices during the previous three months do not have a significant effect on IHSG in the short run. Therefore, H0 is rejected and H1 is accepted.The coefficient value of -0.005452 indicates that an increase of one U.S. dollar in Bitcoin prices during the previous month would reduce the current IHSG by 0.005452 points, assuming other independent variables remain constant (ceteris paribus). This finding suggests that changes in Bitcoin prices in the previous month have a negative short-run relationship with IHSG during the period from January 2010 to December 2025.

The Federal Reserve System interest rate variable has a t-statistic value of -0.80997, which is lower than the t-table value of 1.97259. This indicates that changes in the Federal Reserve interest rate during the previous three months do not have a significant effect on IHSG in the short run. Therefore, H0 is rejected and H1 is accepted.The coefficient value of -75.52529 indicates that a one basis point increase in the Federal Reserve interest rate during the previous month would reduce the current IHSG by 75.52529 points, assuming other independent variables remain constant (ceteris paribus). This finding suggests that changes in the Federal Reserve interest rate in the previous month have a negative short-run relationship with IHSG during the period from January 2010 to December 2025. Based on these estimation results, the short-run VECM equation model is formulated as follows:

Impulse Response Function (IRF) Results

The Impulse Response Function (IRF) analysis evaluates the response of IHSG to shocks originating from endogenous variables, namely Bitcoin and the Federal Reserve System interest rate. The IRF test results are presented as follows:

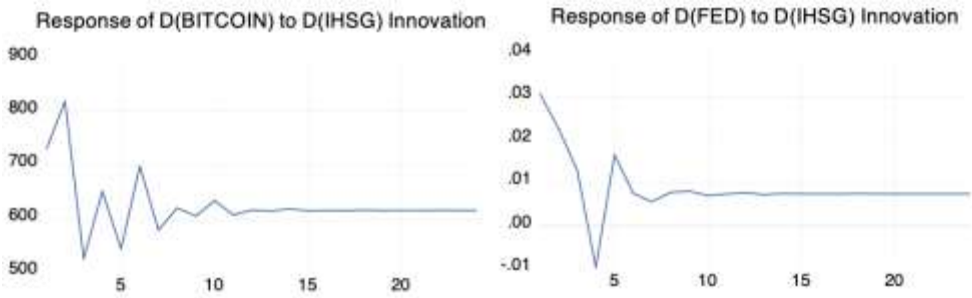

Figure. 5 the IRF results

Based on the IRF results shown in Figure , shocks in the Bitcoin variable cause IHSG to experience a significant increase in period 2, followed by a downward trend, with the lowest point occurring at approximately 525 until period 7. In period 8 and beyond, the response of IHSG tends to stabilize at a level above 600. Although the IRF graph shows fluctuations and a declining trend, it remains above the horizontal line. This indicates that shocks in the Bitcoin variable have a positive effect on IHSG. Based on the IRF results shown in Figure (2), shocks in the Federal Reserve interest rate cause IHSG to experience two-way fluctuations, both negative and positive, from the initial period until period 5. In period 6 and beyond, the response of IHSG tends to stabilize above the horizontal line. This indicates that shocks in the Federal Reserve interest rate also have a positive effect on IHSG.

Forecast Error Variance Decomposition (FEVD) Results

Forecast Error Variance Decomposition (FEVD) is used to determine the extent of variation that occurs before and after shocks, whether originating from the variable itself or from other variables within the model. The FEVD results are presented as follows:

Table. 9 Forecast Error Variance Decomposition (FEVD) Results

Period	S.E.	D(IHSG)	D(BITCOIN)	D(FED)
1	219,7330	100,0000	0,000000	0,000000
2	221,4115	99,14649	0,838485	0,015022
3	223,7668	97,56445	1,628680	0,806874
4	223,8992	97,45041	1,627273	0,922316
5	226,9798	95,02912	3,984775	0,986105
6	228,2572	94,03287	4,923602	1,043532
7	229,7723	92,94116	6,016285	1,042553
8	230,4277	92,48941	6,456934	1,053654
9	231,9050	91,38408	7,529022	1,086902
10	233,1472	90,51072	8,384786	1,104493
11	234,4023	89,62470	9,260898	1,114400
12	235,4635	88,90063	9,965067	1,134300
13	236,6757	88,07066	10,77846	1,150874
14	237,8717	87,27119	11,56198	1,166834
15	239,0508	86,49023	12,32817	1,181604
16	240,1900	85,75130	13,05135	1,197352
17	241,3484	85,00750	13,78030	1,212208
18	242,5072	84,27490	14,49795	1,227148
19	243,6553	83,55895	15,19963	1,241416
20	244,7918	82,86089	15,88352	1,255589
21	245,9266	82,17304	16,55744	1,269518
22	247,0587	81,49623	17,22055	1,283224
23	248,1843	80,83251	17,87090	1,296589
24	249,3036	80,18151	18,50874	1,309755
Average		**89,04346**	**9,91062**	**1,04593**

Based on the FEVD results shown in Table X, the variable contributing the largest proportion in explaining movements in IHSG is IHSG itself. From the second period onward, shocks originating from IHSG remain the most dominant contributor, with an average monthly contribution of 89.04%. This is followed by contributions from Bitcoin at 9.91% and the Federal Reserve interest rate at 1.04%.The composition of IHSG from the second period onward indicates that variance changes in the Bitcoin and Federal Reserve variables tend to show increasing fluctuations, while the IHSG variable demonstrates a declining fluctuation trend.

DISCUSSION

In the long run, Bitcoin prices have a significant effect on the IHSG, as indicated by a t-statistic value of -2.91309, which is greater than the t-table value of 1.97259. The coefficient value of -0.010145 indicates that Bitcoin prices have a negative effect on IHSG. In the short run, Bitcoin prices have an insignificant effect on IHSG, as indicated by a t-statistic value of -1.75703, which is lower than the t-table value of 1.97259. The coefficient value of -0.005452 indicates that Bitcoin prices also have a negative effect on IHSG in the short term.

The long-run and short-run VECM results are consistent with Investor Sentiment Theory. Bitcoin price movements reflect high risk and the highest return potential among the variables examined in this study. As a result, during risk-on conditions, market participants tend to allocate investment funds toward Bitcoin assets. In addition, Bitcoin has a halving mechanism designed to maintain limited supply. From the perspective of the Efficient Market Hypothesis (EMH), halving events can be interpreted as information that contributes to increases in Bitcoin prices. Therefore, rising Bitcoin prices may generate a negative effect on IHSG, although the short-run effect remains statistically insignificant. This finding is consistent with previous research conducted by Fadhilah and Susanti (2025), which found that Bitcoin prices do not significantly affect IHSG. The insignificant effect of Bitcoin prices on IHSG may be explained by the fact that Bitcoin is still considered a relatively new asset, resulting in limited investment allocation among Indonesian investors.

These findings have important implications for understanding the role of Bitcoin within Indonesia's investment ecosystem. The significant negative long-run relationship between Bitcoin prices and IHSG indicates that Bitcoin functions as a complementary asset, rather than a direct substitute for domestic stocks. When Bitcoin enters a strong upward trend, market sentiment tends to shift toward digital assets, creating a lagging effect on IHSG. This condition is reinforced by FEVD results, which show that Bitcoin's contribution to IHSG variance increases continuously from 0.84% in period two to 18.51% in period twenty-four, reflecting Bitcoin's increasingly significant role in shaping the dynamics of Indonesia's stock market over the medium and long term. Furthermore, the IRF results demonstrate that IHSG responds to Bitcoin shocks with a positive long-run trend above the horizontal line, indicating that the relationship between these two assets is not destructive but rather complementary within modern investor portfolios. The practical implication is that Indonesian investors should consider Bitcoin price movements as an important indicator of global market sentiment when making portfolio allocation decisions.

In the long run, the interest rate of the Federal Reserve System has an insignificant effect on the IHSG, as indicated by a t-statistic value of -0.73672, which is lower than the t-table value of 1.97259. The coefficient value of -66.75722 indicates that the Federal Reserve interest rate has a negative effect on IHSG. In the short run, the Federal Reserve interest rate also has an insignificant effect on IHSG, as indicated by a t-statistic value of -0.80997, which is lower than the t-table value of 1.97259. The coefficient value of -75.52529 indicates that the Federal Reserve interest rate has a negative short-run effect on IHSG.

These findings are consistent with the Efficient Market Hypothesis, where interest rate increases are interpreted as new information that triggers immediate negative reactions in IHSG. The movement of investment funds can also be explained through Financial Market Integration Theory, which suggests that global financial markets are interconnected, allowing capital flows, asset prices, and monetary policies in one country to influence other countries. In this study, increases in Federal Reserve interest rates during the periods of 2017–2019 and 2021–2022 were interpreted as signals of market instability. Based on Investor Sentiment Theory, during unstable market conditions, investors tend to behave more cautiously in making investment decisions. This behavior creates a time lag, which explains why changes in Federal Reserve interest rates do not always produce significant effects on IHSG in either the short or long run. These findings are consistent with previous research by Prawoto and Ardyan Putra (2018), which found that Federal Reserve interest rates have a significant negative effect on IHSG.

However, statistical insignificance does not imply that Federal Reserve interest rates are irrelevant to Indonesia's capital market. FEVD results show that the contribution of the Federal Reserve variable to IHSG variance increases consistently from 0.00% in period one to 1.30% in period twenty-four, indicating that its influence becomes stronger over the medium and long term. Furthermore, the Granger causality test reveals that the Federal Reserve System significantly affects Bitcoin (probability = 0.0365), while Bitcoin subsequently affects IHSG (probability = 0.0441). This suggests the existence of an indirect transmission mechanism from Federal Reserve monetary policy to IHSG through the cryptocurrency market channel. Changes in Federal Reserve interest rates are first absorbed by Bitcoin prices as a global asset that is highly sensitive to international liquidity conditions, and the effects subsequently spread to the domestic stock market. These findings strengthen the argument that within the modern financial ecosystem, Bitcoin and Federal Reserve policy represent two interconnected external forces that cannot be controlled by Indonesia. Nevertheless, both remain critical variables considered by market participants when making investment decisions.

CONCLUSIONS AND RECOMMENDATIONS

Based on the data and research findings, Bitcoin prices have a negative effect in both the long run and short run. Therefore, it can be concluded that Bitcoin demonstrates the characteristics of a complementary asset toward the IHSG. Market participants in Indonesia may adopt and consider allocating investment funds to alternative investment instruments beyond the Indonesian stock market. Based on the risk and return characteristics of investments, Bitcoin offers higher risk and higher return potential compared to IHSG. Therefore, Indonesian investors with higher risk preferences may proportionally allocate their investment funds to Bitcoin assets. Market participants in Indonesia may also utilize the interest rate policy of the Federal Reserve System as an indicator of global risk conditions. During periods of rising or declining Federal Reserve interest rates, investors may adjust portfolio allocations accordingly and protect their investments from potential capital losses.

Since Bitcoin prices have a negative long-run effect on the IHSG, the government, through the Indonesia Stock Exchange and other relevant stakeholders, should strengthen the domestic stock investment ecosystem within

IHSG. Through pension fund management institutions, both private and state-owned, the government may implement minimum investment allocation policies toward stocks listed on IHSG. This policy could help maintain consistent investment demand in IHSG and reduce negative impacts when Bitcoin prices experience significant shocks. The interest rate of the Federal Reserve System also has a negative effect in both the long run and short run on the IHSG. Therefore, the government should implement mitigation strategies when Federal Reserve interest rates increase. Through Bank Indonesia, the government may optimize the use of bond instruments denominated in both Indonesian Rupiah and U.S. dollars to attract capital inflows from foreign investors. By doing so, foreign investor liquidity can remain within Indonesia, thereby minimizing the

FURTHER STUDY

Future research is recommended to expand the model by incorporating additional global market variables, particularly the S&P 500 and Gold prices, in order to provide a broader understanding of external factors influencing the IHSG. The inclusion of the S&P 500 may better capture the influence of global equity market sentiment, while gold prices may represent safe-haven investment behavior during periods of economic uncertainty. These additional variables are expected to enrich future empirical findings and provide a more comprehensive analysis of portfolio allocation dynamics in Indonesia's capital market.

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