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DYNAMICS OF THE COMPOSITE STOCK PRICE INDEX, INTEREST RATES, AND EXCHANGE RATES AMID GLOBAL VOLATILITY (2021–2025)

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ABSTRACT

This study analyzes the dynamics of the relationship between the Jakarta Composite Index (JCI), the benchmark interest rate (BI-7DRR), and the rupiah exchange rate (IDR/USD) with global volatility (VIX), the US stock market (S&P 500), and world gold prices in the period January 2021– December 2025. Using the Vector Autoregression (VAR)/Vector Error Correction Model (VECM) approach with monthly data , this study applies the Johansen cointegration test , Impulse Response Function (IRF), and Forecast Error Variance Decomposition (FEVD). The results of the study found six cointegration vectors that confirmed a strong long -term equilibrium relationship between all variables . The IRF analysis shows that a positive shock to the VIX produces a persistent negative response to the JCI (reaching -58.60 in the 10th period), while the shock to the S&P 500 produces a positive response that continues to strengthen (101.39 in the 10th period). An interesting finding shows that positive shocks to gold prices and the BI-7DRR actually generate a positive response to the JCI, contrary to conventional theoretical predictions . Exchange rate depreciation generates a persistent negative response to the JCI. The FEVD results reveal that the JCI's own-shock contributes 84.10% to its variation , followed by the S&P 500 (8.91%), gold prices (8.92%), and the JCI's own-shock (8.91%). (4.57%) , VIX (1.65%), exchange rate (0.50%), and BI-7DRR (0.27%). Global factors collectively contributed 15.13% to the JCI's fluctuations , far exceeding domestic policy variables (0.77%), confirming that the Indonesian capital market in the post-pandemic period was largely driven by the dynamics of the global financial cycle .

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INTRODUCTION

The capital market is a key pillar of the national financial system, serving as a means of raising long-term funds and as an indicator of investor confidence in the economic outlook. The Indonesia Stock Exchange (IDX) has grown into one of the largest capital markets in Southeast Asia, with a market capitalization of IDR 12,336 trillion by the end of 2024 and a surge in the number of investors from 3.9 million (2020) to over 14.2 million (2024) (IDX, 2024; KSEI, 2024). However, the market's openness to foreign capital inflows makes the JCI vulnerable to external volatility—foreign investors recorded a net sell of IDR 47.64 trillion in 2022, coinciding with the Federal Reserve's aggressive monetary tightening and the Russia-Ukraine conflict.

Deepening global financial integration has given rise to the concept of the global financial cycle, a shared cycle that simultaneously influences asset prices, capital flows, and credit conditions worldwide and is largely driven by United States monetary policy and the risk perceptions of international institutional investors (Rey, 2015). The implications are significant for Indonesia, a small open economy: the movement of the JCI is not solely determined by domestic economic fundamentals but also by the dynamics of the global financial cycle, which are beyond the control of domestic monetary authorities (Miranda-Agrippino & Rey, 2020).

Three main external variables relevant to the performance of the JCI are: (1) the CBOE Volatility Index (VIX) as a barometer of global uncertainty and risk aversion, commonly known as the financial market fear gauge; (2) the S&P 500 index as a proxy for US stock market performance, which covers more than 40% of global stock market capitalization; and (3) the world gold price as a safe haven instrument whose demand increases in risk-off conditions. Pressure from these three global factors is transmitted to the Indonesian economy through two domestic macroeconomic variables, namely the rupiah exchange rate and Bank Indonesia's benchmark interest rate (BI-7DRR).

Previous research in Indonesia has generally only partially included a single external variable. None has simultaneously integrated the VIX, S&P 500, and gold prices with domestic macroeconomic variables into a single multivariate system for the 2021–2025 period, encompassing various volatility regimes. This gap motivates this study, which utilizes a VAR/VECM approach capable of capturing dynamic interactions, two-way causality, and shock transmission mechanisms through the Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD).

LITERATURE REVIEW AND HYPOTHESES

Theoretical Framework

This research is built on four main theoretical foundations. First, the International Capital Asset Pricing Model (ICAPM) developed by Solnik (1974) states that in an era of financial market integration, asset returns are determined by exposure to global systematic risk, not just domestic—the implication being that a decline in the S&P 500 creates simultaneous downward pressure on the JCI through repricing global systematic risk. Second, the Global Financial Cycle (Rey, 2015) defines a shared cycle driven by US monetary policy with the VIX as the primary barometer—when the VIX is high, the cycle enters a contractionary phase that triggers capital outflow from emerging markets. Third, the safe haven theory (Baur & Lucey, 2010) proves that gold functions as an effective safe haven during periods of extreme market stress through the

mechanism of portfolio substitution. Fourth, the Interest Rate Channel (Bernanke & Blinder, 1988; Mishkin, 2016) explains that rising interest rates increase the discount rate and cost of capital, which lowers stock valuations.

Research Hypothesis

Based on theoretical and empirical reviews, the research hypotheses are formulated as follows: (H1) VIX shocks produce a negative response on the JCI; (H2) S&P 500 shocks produce a positive response on the JCI; (H3) Gold price shocks produce a negative response on the JCI; (H4) BI-7DRR shocks produce a negative response on the JCI; and (H5) Exchange rate shocks (rupiah depreciation) produce a negative response on the JCI.

RESEARCH METHODOLOGY

Data and Variables

This study uses monthly secondary data from January 2021 to December 2025 (60 observations) sourced from Bank Indonesia, the Indonesia Stock Exchange, the Chicago Board Options Exchange (CBOE), the Federal Reserve Economic Data (FRED), and Investing.com. The six endogenous variables used are: the Jakarta Composite Index (JCI) (point index, IDX), the BI-7DRR (%, Bank Indonesia), the IDR/USD exchange rate (rupiah/dollar, Bank Indonesia), the VIX Index (point index, CBOE), the S&P 500 (point index, FRED), and the world gold price (USD/troy ounce, Investing.com).

Analysis Procedure

The analysis was conducted through five systematic stages: (1) Augmented Dickey-Fuller (ADF) stationarity test at the level and first difference levels; (2) Determination of optimal lag based on the Akaike Information Criterion (AIC); (3) VAR stability test through the roots of characteristic polynomial; (4) Johansen cointegration test to identify long-term relationships and determine model specifications (VAR in level vs. VECM); and (5) VECM estimation with IRF and FEVD analysis. All data processing was performed using EViews 13 software.

RESULTS AND DISCUSSION

Stationarity Test

The ADF test results show that not all variables are stationary at the level level: VIX is stationary in the intercept specification (ADF = -2.857; significant at $\alpha = 10\%$) and KURS is stationary in the trend and intercept specification (ADF = -4.087; significant at $\alpha = 5\%$), while SP500, GOLD, IHSG, and BIRATE are not stationary at the level level. At the first difference level, all variables are significantly stationary at $\alpha = 1\%$ in all specifications, confirming that the six variables are integrated at degree one, I(1). This uniformity of the degree of integration is a valid prerequisite for the Johansen cointegration test.

Optimal Lag and Model Stability

Based on the AIC criteria, the optimal lag selected is lag 1 (AIC = 56.78259), which is smaller than lag 2 to lag 5. The stability test shows that all roots of the characteristic polynomial have

a modulus of less than one (the highest value is 0.627144), which confirms that the VAR system is stable and the resulting IRF and FEVD analyses are valid for interpretation.

Johansen Cointegration Test

Based on the AIC criteria recommendation with the assumption of a quadratic intercept trend, the Johansen cointegration test shows very strong results. Both the trace statistic and the maximum eigenvalue statistic consistently exceed the critical value at the 5% significance level for all hypothesis levels, from none to at most 5. Specifically, the trace statistic for the none hypothesis is recorded at 179.58 (critical value 95.75; p = 0.000), and even for the at most 5 hypothesis, the trace statistic of 6.26 still exceeds the critical value of 3.84 (p = 0.012). This finding confirms the existence of six cointegration vectors (rank = 6), which means that all linear combinations between variables are stationary and the system is in a very robust long-term equilibrium condition. The existence of this cointegration is a strong justification for the use of VECM.

Table 1. Summary of IHSG Impulse Response Function Results

Shock Variable	Response Period 1	Response Period 10	Dominant Direction
VIX	-10,80	-58,60	Negative (Persistent)
S&P 500	+45,35	+101,39	Positive (Strengthening)
GOLD	+60,65	+41,34	Positive (Weakening)
BI-7DRR	0,00	+13,10	Positive (Not According to H4)
EXCHANGE (depreciation)	0,00	-9,23	Negative (Improving)

The influence of the VIX on the JCI. A positive VIX shock produces a persistent and worsening negative response throughout the entire time horizon , from -10.80 in the first period to -58.60 in the tenth period , with no signs of recovery . This pattern confirms the first hypothesis and is in line with the global financial cycle framework (Rey, 2015): an increase in the VIX triggers a flight to quality that draws capital out of emerging market stock markets . Bhattarai et al. (2020) empirically prove that a rise in the VIX lowers stock returns in developing countries through the asset price and capital flow channels . Altinkeski et al. (2024) add that the VIX spillover is asymmetric — the negative impact increases disproportionately under high VIX conditions , which explains why the JCI response continues to deteriorate monotonically .

The influence of the S&P 500 on the JCI. Positive shocks to the S&P 500 generate a consistent and strengthening positive response , from 45.35 in the first period to 101.39 in the tenth period. The second hypothesis is accepted . Within the ICAPM framework (Solnik , 1974), a decline or strengthening of the S&P 500 simultaneously drives systematic risk revaluation across the integrated market . Hamao et al. (1990) confirmed the dominance of the US stock market as the main source of global return spillover and volatility spillover. Riyadh et al. (2024) further proved that the S&P 500 has a more significant impact on large-cap stocks in developing countries than the VIX , suggesting that Indonesian investors are more responsive to signals of the actual performance of the US market.

The Effect of Gold Prices on the Jakarta Composite Index (JCI). A positive shock to the gold price resulted in a positive response from 60.65 in the first period, which gradually weakened to 41.34 in the tenth period. This finding rejects the third hypothesis and contradicts the inverse relationship predicted by the safe haven theory. Three mechanisms explain this finding in the Indonesian context. First, a co-movement driven by global liquidity conditions and expectations of a Federal Reserve interest rate cut in 2024–2025: when US real interest rates decline, gold prices and risk assets, including emerging market stocks, rise simultaneously.

Second, a windfall profit effect through increased profitability of gold mining issuers listed on the IDX, which in aggregate boosts the JCI. Third, a wealth effect mediated by rupiah depreciation increases the value of rupiah-denominated gold, encouraging the reallocation of some profits to the stock market. This finding is consistent with Saparuddin (2025), Prasada & Pangestuti (2022), and Halim et al. (2024), who found a positive effect of gold prices on the JCI in the Indonesian market.

The Impact of the BI-7DRR on the JCI. A positive shock from the BI-7DRR resulted in a positive response in the JCI, which peaked at 18.48 in the fourth period before weakening to 13.10 in the tenth period, rejecting the fourth hypothesis. Three mechanisms explain this unconventional response. First, the monetary policy credibility signaling effect: the market interprets the increase in the BI-7DRR as a signal of Bank Indonesia's commitment to macroeconomic stability, rather than as a threat to growth—a pattern confirmed by Kalemli-Özcan & Unsal (2023) for emerging markets with high monetary credibility. Second, the interest rate differential channel: the widening of the spread between the BI-7DRR and developed countries' interest rates increases the attractiveness of Indonesian assets to foreign investors, encouraging capital inflows that support the JCI. Third, the macroeconomic stabilization effect, through exchange rate stabilization, prevents issuers with foreign currency debt from inflating interest expenses.

The Effect of the IDR/USD Exchange Rate on the JCI. A positive exchange rate shock (rupiah depreciation) resulted in a negative response that reached its deepest point in the third period (-26.55) and gradually improved to -9.23 in the tenth period, confirming the fifth hypothesis. Two main transmission channels work synergistically: the balance sheet channel (Krugman, 1999), which increases the foreign exchange debt burden of issuers, thereby depressing profitability and stock valuations; and the imported inflation channel, which forces Bank Indonesia to tighten monetary policy and creates a multi-layered chain effect on the JCI. The overshoot pattern, which reached its deepest point in the third period before gradually improving, is consistent with the overshooting model of Dornbusch (1976) and is confirmed by Nurwanto & Suryati (2023) and Amelia et al. (2025).

Table 2. Results of Forecast Error Variance Decomposition of IHSG (%)

Period	IHSG	S&P 500	GOLD	VIX	COURSE	BI-7DRR
1	89.73	3.61	6.46	0.20	0.00	0.00
3	86.60	6.65	5.00	0.78	0.77	0.19
5	83.93	9.10	4.47	1.53	0.63	0.35
7	82.10	10.72	4.05	2.24	0.51	0.37
10	80.21	12.29	3.64	3.12	0.39	0.35
Rate-rate	84.10	8.91	4.57	1.65	0.50	0.27

The FEVD results reveal a clear dominance structure in the formation of JCI fluctuations . JCI own-shock dominates with an average contribution of 84.10% over ten periods , although it gradually decreases from 89.73 % (period 1) to 80.21% (period 10). The high persistence of own-shock reflects the presence of momentum and positive autocorrelation in JCI movements , which implicitly indicates imperfect information efficiency in the Indonesian capital market in the short term — consistent with the findings of Riyadh et al. (2024).

Among external variables , the S&P 500 provides the highest average contribution (8.91%) with an increasing trend over the horizon. Gold prices are in second place (4.57%) but with a decreasing trend , indicating its influence is more short -term . The VIX contributes an average of 1.65% with an increasing trend from 0.20% to 3.12%, reflecting the accumulative effect of global volatility shocks. Domestic variables—the exchange rate (0.50%) and the BI-7DRR (0.27%)—contribute very little, confirming the limitations of domestic monetary policy instruments in isolating capital markets from global influences.

A crucial finding to highlight is that variables derived from global financial conditions collectively contribute an average of 15.13% to explaining variations in the JCI, while domestic policy variables contribute only 0.77%. This nearly 20:1 dominance ratio provides strong empirical evidence that the JCI's dynamics in the post-pandemic period were driven more by the global financial cycle than by monetary policy and domestic exchange rate stability—in line with the findings of Miranda-Agrippino & Rey (2020) in their Factor-Augmented VAR framework.

CONCLUSION

This study yields two main findings. First, the IRF analysis shows that VIX shocks produce a persistent negative response to the JCI (H1 is accepted), and S&P 500 shocks produce a steadily strengthening positive response (H2 is accepted). Conversely, gold price and BI-7DRR shocks produce a positive response to the JCI, contrary to conventional theoretical predictions (H3 and H4 are rejected). Exchange rate depreciation produces a persistent but improving negative response over time (H5 is accepted).

Second, the FEVD analysis confirms that global factors (S&P 500, gold prices, VIX) collectively outweigh domestic policy variables in explaining variations in the JCI (15.13% vs. 0.77%). This finding has significant policy implications: Indonesia's monetary and fiscal authorities need to design instruments that are not only responsive to domestic conditions but also proactive in anticipating changes in the global financial cycle. For investors, monitoring the VIX and S&P 500 as leading indicators of JCI performance is an integral part of a portfolio risk management strategy.

Future research is recommended to add the Federal Funds Rate, oil prices, and the Economic Policy Uncertainty (EPU) index variables, as well as explore higher frequency data to capture very short-term transmission dynamics.

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