JURNAL RISET ILMU EKONOMI
www.jrie.feb.unpas.ac.id
ISSN 2776-4567

Dynamic Responses of Indonesia's Property Stock Index to Macroeconomic Shocks: A VECM Analysis

Vadilla Mutia Zahara[1]*, Azizah Tiara Santi[1], Stannia Cahaya Suci[1], Rah Adi Fahmi Ginanjar[1]

Afiliation [1]Universitas Sultan Ageng Tirtayasa
Email vadillamutia@untirta.ac.id*
DOI https://doi.org/10.23969/jrie.v6i2.450
Citation Zahara, V. M., Santi, A. T., Suci, S. C., & Ginanjar, R. A. F. (2026). Dynamic Responses of Indonesia's Property Stock Index to Macroeconomic Shocks: A VECM Analysis. Jurnal Riset Ilmu Ekonomi, 6(2), 165–179. https://doi.org/10.23969/jrie.v6i2.450

Copyright (c) 2026 Jurnal Riset Ilmu Ekonomi
Creative Commons License
This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

ABSTRACT

This study examines dynamic interactions between macroeconomic fundamentals and Indonesia's property and real estate sector stock index using quarterly observations covering 2014–2023. A vector error correction framework is applied to the sector index, rupiah–US dollar exchange rate, inflation, Bank Indonesia policy rate, gross domestic product (GDP), and foreign direct investment (FDI). Unit-root tests classify the series as integrated of order one, and the Johansen trace test indicates cointegration within the system. The estimated property-index adjustment term is negative, consistent with error-correcting dynamics. Impulse responses indicate predominantly positive reactions to exchange-rate, policy-rate, and FDI innovations and negative reactions to inflation and GDP innovations, although their statistical precision cannot be established without confidence intervals. Forecast error variance decomposition reveals substantial changes across horizons: the index's own innovations dominate at the initial horizon, whereas inflation accounts for the largest share at the tenth quarter. The findings suggest that macroeconomic risk exposure in property equities depends on the forecasting horizon, particularly in relation to inflation. Interpretation remains conditional on the identification of innovations and the comparability of the historical sector-index series.

Keywords: Macroeconomic Shocks; Inflation; Vector Error Correction Model; Impulse Response Function; Forecast Error Variance Decomposition

JEL Classification: C32; E44; G12; R30

INTRODUCTION

Stock prices reflect market assessments of expected future cash flows and the risks attached to those cash flows. Under the efficient market hypothesis, publicly available economic information can be incorporated into equity valuations (Fama, 1970; Hartono, 2021). Consequently, changes in macroeconomic fundamentals may influence equity prices through expected earnings, discount rates, financing conditions, and risk premia (Tandelilin, 2010). The property and real estate sector are especially exposed to macroeconomic conditions because development projects are capital-intensive and investment horizons are relatively long. Higher policy rates may raise developers' borrowing costs and mortgage financing costs for households, while inflation can affect construction expenditure, real purchasing power, and expectations about monetary tightening. Exchange-rate movements can influence imported inputs, foreign-currency liabilities, and international capital flows. GDP developments can shape expected demand, whereas foreign direct investment may support construction activity, infrastructure, and investor sentiment (Endri et al., 2021) (Robith & Wahyudi, 2022) (Maharditya et al., 2018)

The conceptual framework of this study links informational efficiency, asset valuation, and macroeconomic transmission. Portfolio theory relates equity allocation to expected returns and risk, while the efficient market hypothesis highlights the role of information in price formation (Husnan, 2015; Hartono, 2021). Interest-rate increases can raise the discount rate applied to prospective cash flows and constrain debt-financed development. Inflation can simultaneously increase nominal asset values and weaken real demand, making its net relationship with property-company equities theoretically ambiguous (Tandelilin, 2010; Nopirin, 2007). FDI may provide a financing and development channel, but aggregate FDI inflows do not necessarily flow into publicly listed property companies (Hemanona & Suharyono, 2017; Fernandez et al., 2020).

Measurement conventions are also essential for interpreting the relationships examined in this study. EXR denotes rupiah per US dollar, so a positive exchange-rate innovation represents depreciation of the rupiah; INF and RATE are rates expressed in percentage points; GDP is a measure of economic output, not automatically the GDP growth rate; and FDI must be identified as either official realised direct investment or balance-of-payments net inflows. These alternatives are not interchangeable.

Empirical evidence on the relationships between macroeconomic fundamentals and property-sector stock performance remains mixed. Cahya et al. (2018) report relationships between exchange rates, inflation, and Indonesian property-sector stock prices, whereas (Riwayati & Jayantara, 2020) obtain a different pattern of statistical significance. (Hasanah et al., 2021) Chandra and Defla (2018) document further heterogeneity across specifications, and Izazi and Wahyudi (2022) analyse inflation,

FDI, and interest rates in a cointegration framework. Cross-market findings likewise differ: (Ligocká et al., 2017) investigate Swiss real estate firms, while (Garnia et al., 2022) examine Indonesian property-sector stock returns. These differences call for careful attention to the sample period, variables, empirical identification, and forecast horizon rather than the assumption of a universal macroeconomic effect. The 2014–2023 observation window encompasses the COVID-19 pandemic and subsequent recovery. The sector index declined from 504.00 in 2019Q4 to 322.04 in 2020Q2, illustrating the scale of the market disruption. Pandemic restrictions and changes in economic expectations are relevant to equity valuation in this period (Respati & Fitanto, 2022; Noor et al., 2025).

The research gap is defined along two dimensions. First, studies based solely on static regression coefficients cannot fully characterise the timing, persistence, or reversal of responses to macroeconomic innovations. Second, the relative contributions of individual shocks to property-stock forecast uncertainty may differ substantially across horizons. A system-based approach can describe these dynamics, provided the series and cointegrating structure are correctly identified.

To address these gaps, this study offers several contributions to the existing literature. First, it examines the period 2014Q1–2023Q4, covering the pre-pandemic period, the COVID-19 economic disruption, and the subsequent recovery. This observation period provides a more recent perspective on the relationship between macroeconomic conditions and Indonesia's property-sector stock market compared with earlier studies, such as Cahya et al. (2018), which examined the 2011–2013 period, and Chandra and Defla (2018), which focused on 2010–2016. Second, this study applies a Vector Error Correction Model (VECM) to investigate both short-run adjustments and long-run equilibrium relationships among the property-sector stock index and five macroeconomic variables within an integrated multivariate framework. Third, this study combines Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analyses to provide a dynamic assessment of the direction and persistence of the index's responses to macroeconomic innovations, as well as the relative contribution of each innovation to forecast error variance across different forecasting horizons. Thus, this study extends previous empirical investigations by integrating an updated observation period, a multivariate VECM framework, and complementary dynamic response analyses to provide a more comprehensive understanding of macro-financial linkages in Indonesia's property-sector equity market.

Accordingly, this study asks: (i) how does the Indonesian property-sector stock index respond over time to exchange-rate, inflation, policy-rate, GDP, and FDI innovations; and (ii) how much does each shock contribute to the index's forecast error variance at alternative horizons? The contribution sought is a horizon-specific interpretation of macro-financial linkages, not a claim of structural causality from reduced-form innovations.

METHODS

The analysis uses quarterly secondary data covering the period 2014Q1–2023Q4, yielding 40 observations before lag-related losses. The six variables included in the model are the property and real estate sector stock index (P), the rupiah–US dollar exchange rate (EXR), inflation (INF), the Bank Indonesia policy interest rate (RATE), gross domestic product (GDP), and foreign direct investment (FDI). The property-sector stock index is measured in index points, while the exchange rate is expressed in Indonesian rupiah per US dollar. Both variables are transformed into natural logarithms. Inflation and the policy interest rate are measured in percentage points and entered in levels. GDP, FDI is also transformed into its natural logarithm. All variables are obtained from their respective official data sources, with definitions and measurement units maintained consistently throughout the observation period.

The historical series require particular care in interpretation. Changes in the exchange's sector classifications can affect index comparability over time. Likewise, a GDP level cannot be interpreted as a GDP growth rate, and foreign investment realisation differs conceptually from balance-of-payments net FDI inflows. These distinctions matter for the economic interpretation of coefficients and shocks.

To analyze the dynamic relationships between variables, the Vector Autoregression (VAR) and Vector Error Correction Model (VECM) approaches are applied. VAR, introduced by Sims (1972), allows for multivariate modeling without distinguishing between endogenous and exogenous variables, assuming all variables influence each other over time (Hardani et al., 2016). The model is suitable when no cointegration is present among variables. However, when cointegration is detected, the VECM model is used to capture both short-term dynamics and long-term equilibrium relationships (Obayelu & Salau, 2010; Febrianti et al., 2021). The analysis begins with stationarity testing using the Augmented Dickey-Fuller (ADF) test at a 5% significance level. If the data are non-stationary at level, first differencing is applied. Next, optimal lag length is determined using criteria such as the Akaike Information Criterion (AIC), Schwarz Criterion (SC), Final Prediction Error (FPE), and Hannan-Quinn (HQ). The Johansen cointegration test is then conducted to assess the long-run relationship between variables. If cointegration is present, VECM is estimated; otherwise, the study proceeds with VAR.

Subsequently, the Granger causality test is applied to examine the directional influence among variables. The Impulse Response Function (IRF) is used to observe how shocks in one variable affect others over time, while Variance Decomposition (VD) quantifies the contribution of each independent variable to the forecast error variance of the dependent variable (Hendayanti & Nurhidayati, 2017). All analyses are conducted using time-series econometric software to ensure validity and robustness of the results.

The general form of the VAR model is expressed as:

$$Y_t = C + A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_p Y_{t-p} + \varepsilon_t \quad \text{..... (1)}$$

If the results of the cointegration test indicate the existence of a long-term equilibrium relationship among the variables, the analysis proceeds with the application of the Vector Error Correction Model (VECM). This model is suitable for capturing both the short-term dynamics and the long-term relationships between variables. The general specification of the VECM employed in this study follows the formulation presented by Hendayanti and Nurhidayati (2017).

$$\Delta Y_t = C + \Pi Y_{t-1} + \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2} + \cdots + \Gamma_{p-1} \Delta Y_{t-p+1} + \varepsilon_t \quad \text{.....(2)}$$

$$\Delta h_IDXPROPERTI_t = C + \Pi h_IDXPROPERTI_t + \Gamma_1 \Delta h_IDXPROPERTI_{t-1} + \Gamma_2 \Delta h_EXR_{t-1} + \Gamma_3 \Delta INF_{t-1} + \Gamma_4 \Delta BIRATE_{t-1} + \Gamma_5 \Delta h_GDP_{t-1} + \Gamma_6 \Delta h_FDI_{t-1} + \varepsilon_t \quad \text{..(3)}$$

$$\Delta h_{NT_t} = C + \Pi h_{NT_t} + \Gamma_1 \Delta h_{EXR_{t-1}} + \Gamma_2 \Delta h_{IDXPROPERTI_{t-1}} + \Gamma_3 \Delta INF_{t-1} + \Gamma_4 \Delta BIRATE_{t-1} + \Gamma_5 \Delta h_GDP_{t-1} + \Gamma_6 \Delta h_FDI_{t-1} + \varepsilon_t \quad \text{.....(4)}$$

$$\Delta INF_t = C + \Pi INF_{t-1} + \Gamma_1 \Delta INF_{t-1} + \Gamma_2 \Delta h_{IDXPROPERTI_{t-1}} + \Gamma_3 \Delta h_{EXR_{t-1}} + \Gamma_4 \Delta BIRATE_{t-1} + \Gamma_5 \Delta h_GDP_{t-1} + \Gamma_6 \Delta h_FDI_{t-1} + \varepsilon_t \quad \text{.....(5)}$$

$$\Delta BIRATE_t = C + \Pi BIRATE_{t-1} + \Gamma_1 \Delta BIRATE_{t-1} + \Gamma_2 \Delta h_{IDXPROPERTI_{t-1}} + \Gamma_3 \Delta h_{EXR_{t-1}} + \Gamma_4 \Delta INF_{t-1} + \Gamma_5 \Delta h_GDP_{t-1} + \Gamma_6 \Delta h_FDI_{t-1} + \varepsilon_t \quad \text{.....(6)}$$

$$\Delta h_GDP_t = C + \Pi h_GDP_{t-1} + \Gamma_1 \Delta h_GDP_{t-1} + \Gamma_2 \Delta h_IDXPROPERTI_{t-1} + \Gamma_3 \Delta h_EXR_{t-1} + \Gamma_4 \Delta INF_{t-1} + \Gamma_5 \Delta BIRATE_{t-1} + \Gamma_6 \Delta h_FDI_{t-1} + \varepsilon_t \quad \text{.....(7)}$$

$$\Delta h_FDI_t = C + \Pi h_FDI_t + \Gamma_1 \Delta h_FDI_{t-1} + \Gamma_2 \Delta h_IDXPROPERTI_{t-1} + \Gamma_3 \Delta h_EXR_{t-1} + \Gamma_4 \Delta INF_{t-4} + \Gamma_5 \Delta BIRATE_{t-5} + \Gamma_6 \Delta h_GDP_{t-6} + \varepsilon_t \quad \text{.....(8)}$$

The description of each model is as follows, Δ (shows changes from the previous period), C (Intercept vector), $\Gamma_1\ \Gamma_2\ \Gamma_3\ \Gamma_4\ \Gamma_5\ \Gamma_6$ (Coefficient Matriks), $Ln_IDXPROPERTI_t$ (Natural logarithm of the Property and Real Estate Sector Stock Indeks), Ln_EXR_t (Natural logarithm of the exchange rate) (Rupiah/US Dollar), INF_t (Inflation Rate), $BIRATE_t$ (Interest Rate), Ln_GDP_t (Natural logarithm of Gross Domestic Product (GDP), Ln_FDI_t (Natural logarithm of Foreign Direct Investment (FDI) Net Inflow), t (Time Period 2014 Q1 – 2022: Q4), p (Optimal Lag), ε (Error term (residuals)).

RESULTS

The sectoral equity index shows a pronounced decline during the pandemic, from 504.00 in 2019Q4 to 322.04 in 2020Q2, followed by a rebound in 2021. The sample also encompasses heightened exchange-rate pressure in 2020 and a subsequent inflation surge. These developments provide context for the dynamic results without, by themselves, establishing causality.

ADF statistics indicate that the unit-root null is not rejected for any of the six variables in levels at the 5% threshold, whereas each first-differenced series is classified as

stationary. The resulting integration pattern supports consideration of cointegration methods, conditional on the adequacy of deterministic terms and lag specifications.

Table 1. ADF Unit Root Test for Stationary

Variable	ADF in levels	ADF in first differences
Property index	−1,8965	−6,1063
Exchange rate	−2,3857	−9,4254
Inflation	−2,1920	−7,9890
BI Rate	−1,9808	−3,8064
GDP	−0,4605	−9,1555
FDI	−0,3241	−5,6603

Note: IDXPROPERTI: Property and Real Estate Sector Stock Indeks, EXR: exchange rate (Rupiah/US Dollar), INF: Inflation Rate, BIRATE: Interest Rate, GDP: Gross Domestic Product (GDP), FDI: Foreign Direct Investment (FDI) Net Inflow Source: World Bank (2024)

The lag-order criteria do not agree. The likelihood-ratio statistic, final prediction error, and Akaike information criterion favour three lags, whereas the Schwarz and Hannan–Quinn criteria favour one lag. The estimated model uses three lags; the sensitivity of subsequent results to this choice should be considered in interpretation.

Table 2. Lag Order Criteria

Rank hypothesis	Trace statistic	Critical value 5%	Decision
r = 0	236,3875	95,7537	Reject
r ≤ 1	136,3584	69,8189	Reject
r ≤ 2	68,0052	47,8561	Reject
r ≤ 3	39,4087	29,7971	Reject
r ≤ 4	14,2269	15,4947	Fail to reject

Source: Analysis Result, 2026

The Johansen cointegration results indicate the existence of long-run equilibrium relationships among the property and real estate sector stock index and the selected macroeconomic variables. As presented in Table 3, the estimated cointegrating coefficients reflect the long-run relationships between exchange rate movements, inflation, monetary policy, economic activity, foreign direct investment, and Indonesia's property-sector stock market. These relationships provide an overview of how macroeconomic fundamentals are associated with the long-run dynamics of the property sector stock index. The interpretation of the estimated coefficients should also consider the normalization of the cointegrating vector, as this determines the direction and economic meaning of the reported coefficients.

Table 3. Summary of Long-Run VECM Results

Variable	Coefficient	T statistic
LN_EXR(-1)	2.416566	3.21380
INF(-1)	0.252296	9.02218
BI_RATE(-1)	-0.169539	-5.11300
LN_GDP(-1)	6.696069	4.67207
LN_FDI(-1)	-1.329361	-4.43687

Source: Analysis Result, 2026

The long-run coefficients illustrate the relationships between the selected macroeconomic variables and the property sector stock index within the cointegrated system. Their interpretation depends on the normalization of the cointegrating vector, since the estimated coefficients represent a long-run equilibrium relationship rather than independent causal effects. Therefore, the coefficient signs should be interpreted in relation to the specification of the cointegrating equation and the interactions among the variables in the model.

From a theoretical perspective, exchange rate fluctuations may influence property sector valuations through imported construction costs, foreign-currency liabilities, and international capital flows (Sofyani & Wahyudi, 2015; Mahardityा et al., 2018). Inflation and monetary policy may affect corporate profitability and investment decisions through purchasing power, financing costs, and discount-rate adjustments (Tandelilin, 2010; Hasanah et al., 2021). Meanwhile, GDP and FDI may influence property sector performance through aggregate demand, capital formation, and investment activity, although their transmission mechanisms can differ across economic conditions (Fitriyanto et al., 2021; Izazi & Wahyudi, 2022).

The error correction coefficient in the property-index equation is negative (-0.9069), with an absolute t-statistic of 4.6102, indicating an adjustment mechanism toward the estimated long-run equilibrium. This finding suggests that deviations from the long-run relationship are followed by an adjustment in the property sector stock index. Nevertheless, because the Johansen test identifies multiple cointegrating relationships, the adjustment process should be interpreted within the complete VECM system rather than solely through an individual error correction coefficient. Overall, the findings indicate that macroeconomic fundamentals are associated with the long-run dynamics of Indonesia's property sector stock market.

The short-run VECM estimation reveals heterogeneous dynamic relationships between macroeconomic variables and Indonesia's property and real estate sector stock index. The negative error correction coefficient indicates an adjustment mechanism toward the estimated long-run equilibrium. However, given the presence of multiple cointegrating relationships, the adjustment dynamics should be interpreted within the complete VECM specification.

Table 4. Summary of Short-Run VECM Estimation

Variabel	Coefficient	T statistic
CointEq1	-0.906890	-4.61022
D(LN_IDXPROPERTI(-2),2)	-0.057915	-0.24437
D(LN_IDXPROPERTI(-3),2)	0.217811	0.96759
D(LN_EXR(-2),2)	2.437306*	2.18379*
D(LN_EXR(-3),2)	2.588748*	3.01335*
D(INF(-2),2)	0.133040*	3.23145*
D(INF(-3),2)	0.041202**	1.47438**
D(BI_RATE(-2),2)	0.035628**	0.55254**

Variabel	Coefficient	T statistic
D(BI_RATE(-3),2)	0.106053**	1.65813**
D(LN_GDP(-2),2)	3.227534*	3.11082*
D(LN_GDP(-3),2)	1.186376**	0.66358**
D(LN_FDI(-2),2)	-0.332241**	-0.79216**
D(LN_FDI(-3),2)	0.229235**	0.65034**
C	0.031973	1.27374

Source: Analysis Result, 2026

Exchange rate movements exhibit positive coefficients in both reported lag periods, indicating a positive short-run association between rupiah depreciation and property-sector stock index movements. Although this finding contrasts with the conventional argument that depreciation increases imported construction costs and foreign-currency liabilities, it may reflect differences in corporate exchange rate exposure and investor expectations (Sofyani & Wahyudi, 2015; Maharditya et al., 2018). Inflation also displays positive coefficients across the reported lag periods, although the coefficient is smaller in the third lag than in the second lag. This finding suggests that short-run inflationary movements may coincide with higher property sector stock valuations, potentially reflecting changes in nominal asset values and inflation-hedging expectations. Nevertheless, these mechanisms remain interpretative explanations rather than directly identified causal channels (Cahya et al., 2018; Izazi & Wahyudi, 2022).

The BI policy rate exhibits positive coefficients in both reported lag periods, indicating a positive short-run association with property-sector stock index movements within the estimated specification. This pattern differs from the conventional interest rate transmission mechanism, whereby higher borrowing costs and discount rates may weaken property-sector valuations. However, the evidence becomes weaker in later periods, suggesting that the short-run association is sensitive to the lag structure (Tandelilin, 2010; Hasanah et al., 2021). GDP also shows positive coefficients in the reported entries, which is consistent with the role of economic activity in supporting household purchasing power, property demand, and corporate earnings. Meanwhile, FDI shows different coefficients for the two lags. These results suggest that the short-run association between foreign investment and property sector stock performance may vary over time (Fitriyanto et al., 2021; Izazi & Wahyudi, 2022).

Overall, the short-run estimates indicate that exchange rate movements, inflation, and GDP display relatively consistent positive coefficient patterns, whereas policy rate and FDI coefficients vary across lags. These findings illustrate the complexity of short-run macroeconomic interactions with property sector stock performance. Nevertheless, interpretation of the estimated relationships remains conditional on verification of the differencing specification and the complete cointegration structure.

The Impulse Response Function (IRF) analysis examines the dynamic responses of Indonesia's property and real estate sector stock index to one-standard-deviation innovations in macroeconomic variables over a 30-quarter horizon. As illustrated in Figure 1, the responses exhibit distinct patterns, reflecting the varying sensitivity of

property sector stock performance to exchange rate, inflation, monetary policy, economic activity, and foreign direct investment (FDI) shocks.

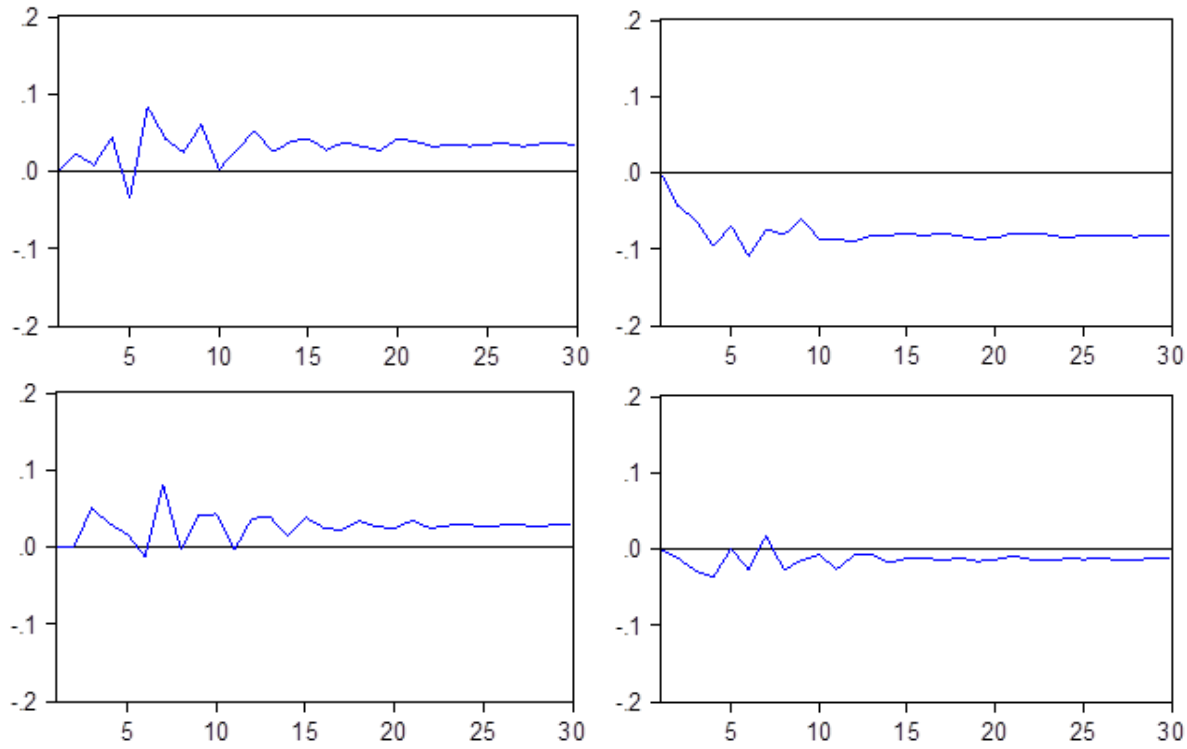


Figure 1. Impulse Response Function

Source: Analysis Result, 2026

The property sector stock index exhibits a predominantly positive response to exchange rate innovations, following some initial fluctuations. Given that the exchange rate is expressed as Indonesian rupiah per US dollar, a positive exchange rate shock represents rupiah depreciation. This response differs from the conventional expectation that depreciation increases imported construction costs and foreign-currency debt burdens. Nevertheless, the observed pattern may reflect differences in firms' foreign exchange exposures, investment expectations, and broader financial market conditions. Previous studies also report heterogeneous relationships between exchange rate movements and Indonesian property stocks (Sofyani & Wahyudi, 2015; Maharditya et al., 2018). In contrast, inflation shocks generate a persistently negative response in the property sector stock index after the initial adjustment period. This pattern is consistent with the potential adverse effects of inflation on construction costs, household purchasing power, and property affordability. Inflationary pressures may also influence equity valuations through changes in expected interest rates and discount rates. These mechanisms align with the theoretical discussion of inflation-related investment risks (Tandelilin, 2010) and empirical evidence on macroeconomic factors affecting property sector stock performance (Cahya et al., 2018). The response to Bank Indonesia's policy rate innovations is initially volatile but becomes moderately positive over subsequent periods. This result contrasts with the conventional monetary transmission mechanism, in which higher interest rates increase financing costs and

reduce the present value of expected corporate earnings. The positive response may reflect simultaneous changes in inflation expectations, investor confidence, or other macroeconomic conditions rather than a direct expansionary effect of monetary tightening. Accordingly, the estimated response should not be interpreted as evidence that higher policy rates necessarily improve property stock performance (Sofyani & Wahyudi, 2015; (Hasanah et al., 2021)

GDP innovations produce a predominantly negative response, although the magnitude gradually diminishes and stabilizes over the forecasting horizon. This finding contrasts with the conventional expectation that stronger economic activity supports property demand and corporate profitability. A possible explanation is that aggregate economic expansion does not immediately translate into improved equity valuations within the property sector, particularly when accompanied by higher financing costs or changes in market expectations. However, these mechanisms require further empirical investigation and cannot be established from the IRF results alone. Finally, FDI innovations generate a relatively modest and fluctuating response, with positive movements in the initial periods and a small positive response over later horizons. This pattern may indicate that foreign investment influences property sector stock performance through gradual capital accumulation, infrastructure development, and indirect spillover effects. The relatively limited magnitude of the response also suggests that aggregate FDI does not necessarily translate directly into increased valuations of listed property companies, consistent with the importance of investment composition and sectoral allocation (Fitriyanto et al., 2021; Robith & Wahyudi, 2022).

Overall, the IRF analysis reveals heterogeneous dynamic responses of the property sector stock index to macroeconomic innovations. Exchange rate, policy rate, and FDI shocks are generally associated with positive responses, whereas inflation and GDP shocks generate predominantly negative responses. These findings suggest that the transmission of macroeconomic disturbances to property sector stock performance is complex and varies across variables and forecasting horizons. Nevertheless, the estimated response patterns should be interpreted cautiously because confidence intervals are not provided and the identification of structural shocks has not been established.

The FEVD results indicate that the relative contribution of macroeconomic shocks to property sector stock index fluctuations varies across forecasting horizons. While own-index innovations dominate in the initial period, their contribution declines over time. Inflation emerges as the largest contributor by the tenth quarter (42.63%), followed by own-index shocks (23.93%), exchange rate (13.20%), and policy rate (11.14%). These findings highlight the increasing importance of inflation and other macroeconomic factors in explaining property sector forecast uncertainty over longer horizons, consistent with the relevance of macroeconomic risks discussed by Cahya et al. (2018) and Maharditya et al. (2018).

Table 5. Variance Decomposition Test

Period	S.E.	D(LN_IDXPROPERTI)	D(LN_EXR)	D(INF)	D(BI_RATE)	D(LN_GDP)	D(LN_FDI)
1	0.141305	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.150449	88.85263	2.290111	8.195117	0.003553	0.622313	0.036276
3	0.180164	64.67283	1.808802	17.57622	7.836920	2.939004	5.166225
4	0.220595	43.86574	5.203186	30.61052	7.158022	4.626327	8.536208
5	0.240568	42.13240	6.425728	33.85591	6.491426	3.891502	7.203039
6	0.283816	32.85472	13.36384	39.09271	4.856162	3.699890	6.132676
7	0.313467	29.62513	12.74955	37.52275	10.79960	3.365472	5.937493
8	0.327012	27.35762	12.29987	40.59823	9.934620	3.787914	6.021741
9	0.342361	25.13557	14.35777	40.11648	10.55942	3.629364	6.201401
10	0.357096	23.93026	13.20294	42.63474	11.13738	3.374862	5.719820

Source: Analysis Result, 2026

DISCUSSION

The most noteworthy, reported result is the shift from own-index shock dominance in the earliest forecast period to inflation dominance by the tenth quarter. Inflation may matter to property-sector equities through construction costs, household purchasing power, financing expectations, and required returns. Nevertheless, the FEVD result alone cannot distinguish these channels. Existing studies provide mixed evidence on inflation and sectoral equities, reinforcing the need to interpret the decomposition alongside dynamic responses and model uncertainty (Cahya et al., 2018)(Robith & Wahyudi, 2022)(Riwayati & Jayantara, 2020).

The reported positive response to rupiah depreciation appears to conflict with the imported-input and foreign-currency-liability channels. Alternative mechanisms might include differences in firms' currency exposures, property demand by overseas investors, or correlations with omitted macroeconomic disturbances. None of these can be confirmed from the present reduced-form evidence. A sensitivity analysis with alternative identification and, where feasible, firm-level exposures would help assess whether the sign is robust (Sofyani & Wahyudi, 2015; Maharditya et al., 2018).

Similarly, the negative property-index response following a GDP innovation should not be read as evidence that economic growth damages the property industry. GDP measures realised economic activity, whereas equity prices discount expectations about future performance. The relationship may therefore be driven by anticipation, changes in discount rates, sectoral composition, or estimation uncertainty. The long-run claim also depends on whether the included GDP series represents a level or a growth rate (Chandra & Defla, 2018; Hasanah et al., 2021).

FDI may support development activity and signal confidence in Indonesia's investment climate (Hemanona & Suharyono, 2017; Fernandez et al., 2020). Yet economy-wide FDI is not equivalent to FDI received by property companies or to foreign portfolio equity investment. Therefore, a reported positive FDI innovation response is compatible with several indirect channels and cannot be interpreted as a direct firm-level capital-injection effect without sectorally disaggregated evidence.

For investors, these results caution against treating an IRF sign as a mechanical trading rule. Instead, inflation, exchange-rate risk, financing conditions, and the chosen investment horizon may be monitored jointly. Publicly known macroeconomic indicators may already be incorporated into stock prices, as emphasized by the efficient market perspective (Fama, 1970; Hartono, 2021). Consequently, any claimed excess-return strategy would require a separate out-of-sample evaluation.

For policymakers, the most defensible implication is that price stability and the transmission of monetary policy are relevant to market expectations in an interest-sensitive sector, consistent with the macroeconomic policy setting discussed by Bank Indonesia (2022). The present estimates do not by themselves justify a recommendation to raise or lower the policy rate; such a prescription requires identification of exogenous monetary policy shocks, policy trade-offs, and broader macroeconomic evidence.

Several limitations affect the scope of inference. The sector-index history may not be fully comparable across exchange classification regimes; the distinction between GDP levels and growth and between alternative FDI definitions is consequential; the quarterly sample is short for a six-variable system; and the high estimated cointegration rank is potentially sensitive to lag and deterministic specifications. In addition, the absence of IRF confidence bands and a fully specified shock-identification approach constrains statements about significance or causality.

CONCLUSION

The empirical results indicate that the six variables are stationary after first differencing and exhibit four cointegrating relationships based on the Johansen trace test. The negative adjustment coefficient in the property-index equation is consistent with an error-correction mechanism within the estimated VECM. The impulse response functions further illustrate the dynamic responses of the property-sector stock index to macroeconomic innovations, while the Forecast Error Variance Decomposition (FEVD) identifies the relative contributions of these innovations to forecast error variance across forecasting horizons. At the tenth quarter, inflation accounts for the largest contribution (42.63%), followed by the index's own innovations (23.93%), exchange rate (13.20%), the BI policy rate (11.14%), FDI (5.72%), and GDP (3.37%). This finding highlights the changing relative importance of macroeconomic innovations over time, particularly the increasing contribution of inflation to property-sector stock index forecast uncertainty. By incorporating both dynamic responses and variance decomposition, this study provides a horizon-dependent perspective that complements previous research focusing primarily on statistical relationships between macroeconomic variables and property-sector stock performance. However, the cointegration results represent long-run statistical relationships, and the IRF results describe conditional responses to model innovations; neither should be interpreted as definitive evidence of structural causality.

The findings have practical implications within the scope of the empirical evidence. For investors, the results suggest the relevance of monitoring inflation, exchange-rate movements, financing conditions, and other macroeconomic developments when assessing property-sector equity risks across different investment horizons. However, these findings do not constitute direct investment signals or guarantee future stock performance. For policymakers, the results indicate that macroeconomic stability, particularly developments in inflation and monetary policy, is relevant to expectations surrounding the property-sector stock market. Nevertheless, the estimated relationships do not establish that specific policy interventions will directly cause particular stock-market responses. Further research using alternative shock-identification schemes, index constructions, and model specifications is therefore needed to provide stronger evidence regarding the structural mechanisms underlying these relationships.

REFERENCE

Astuti, P. W. (2018). Analisis pengaruh investasi terhadap pertumbuhan ekonomi (studi pada 33 provinsi di Indonesia). Jurnal Ilmiah Mahasiswa FEB, 6(2). https://jimfeb.ub.ac.id/index.php/jimfeb/article/view/4629/4058

Bank Indonesia. (2022). Laporan Perekonomian Indonesia 2022. Bank Indonesia.

Cahya, P. F. P., Suwendra, I. W., & Yudiaatmaja, F. (2018). Pengaruh Nilai Tukar Rupiah Dan Inflasi Terhadap Indeks Harga Saham Sektor Properti Dan Real Estate Yang Tercatat Di Bursa Efek Indonesia Tahun 2011-2013. 9.

Chandra, S., & Defla, W. (2018). Analisis pengaruh suku bunga, pertumbuhan ekonomi, dan nilai tukar terhadap harga saham sektor property and real estate yang terdaftar di Bursa Efek Indonesia periode 2010–2016. Kurs, 3(1), 101–110.

Chang, L., Li, J., Cheong, K. C., & Goh, L. T. (2021). Can existing theories explain China's outward foreign direct investment in Belt and Road countries. Sustainability, 13(3), 1389. https://doi.org/10.3390/su13031389

Dwijayanti, N. M. A. (2021). Pengaruh nilai tukar dan inflasi terhadap harga saham perbankan pada masa pandemi COVID-19. Jurnal Bisnis & Kewirausahaan, 17(1), 86–93.

Endri, E., Amrullah, D. F., Suparmun, H., Mary, H., Sova, M., & Indrasari, A. (2021). Determinants of stock return of property and real estate companies in the developing market. Corporate Governance and Organizational Behavior Review, 5(2 Special Issue), 184–193. https://doi.org/10.22495/cgobrv5i2sip6

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. The Journal of Finance, 25(2), 383–417. https://doi.org/10.1111/j.1540-6261.1970.tb00518.x

Febrianti, D. R., Tiro, M. A., & Sudarmin, S. (2021). Metode vector autoregressive (VAR) dalam menganalisis pengaruh kurs mata uang terhadap ekspor dan impor di Indonesia. VARIANSI, 3(1), 23–30. https://doi.org/10.35580/variansiunm14645

Fernandez, M., Almaazmi, M. M., & Joseph, R. (2020). Foreign direct investment in Indonesia: An analysis from investors perspective. International Journal of Economics and Financial Issues, 10(5), 102–112. https://econjournals.com/index.php/ijefi/article/view/10330

Fitriyanto, N., Ardiansyah, M., Wibowo, M. G., & Satibi, I. (2021). Dinamika Hubungan Foreign Direct Investment (Fdi), Makroekonomi Dan Return Indeks Saham Syariah Di Empat Negara Asean. An-Nisbah: Jurnal Ekonomi Syariah, 8(2), 322–365. https://doi.org/10.21274/an.v8i2.4471

Garnia, E., Rizal, D., Tahmat, T., & Ayu Febianti Lebeharia, A. (2022). Impacts of Macroeconomic Factors on Stock Returns in the Property Sector. KnE Social Sciences. https://doi.org/10.18502/kss.v7i6.10609

Hasanah, L. U., Haryadi, H., & Emilia, E. (2021). Studi Variabel Makroekonomi dan Pengaruhnya terhadap Indeks Harga Saham Sektor Properti dan Real Estate di Bursa Efek Indonesia. Jurnal Ekonomi Aktual, 1(2), 85–98. https://doi.org/10.53867/jea.v1i2.21

Ligocká, M., Pražák, T., & Stavárek, D. (2017). The Effect of Macroeconomic Factors on Stock Prices of Swiss Real Estate Companies. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 64(6), 2015–2024.

Maharditya, M. A., Layyinaturrobaniyah, L., & Anwar, M. (2018). Implication of Macroeconomic Factors to Stock Returns of Indonesian Property and Real Estate Companies. Jurnal Dinamika Manajemen, 9(1), 100–113.

Noor, A., Maskur, A., Wulandari, D., Afif, A. S. M., & Azmi, M. F. (2025). Digital Economy Regulation and Consumer Rights Protection: Realizing Security in Financial Technology Transactions. Lex Scientia Law Review, 9(2), 1324–1375. Scopus.

Obayelu, A. E., & Salau, A. S. (2010). Agricultural response to prices and exchange rate in Nigeria: Application of co-integration and vector error correction model. Journal of Agricultural Sciences, 1(2), 73–81.

Prasasti, K. B., & Slamet, E. J. (2020). Pengaruh jumlah uang beredar terhadap inflasi dan suku bunga, serta terhadap investasi dan pertumbuhan ekonomi di Indonesia. Jurnal Ekonomi dan Bisnis Airlangga, 30(1), 39–48. https://doi.org/10.20473/jeba.V30I12020.39-48

Respati, L. L., & Fitanto, B. (2022). Pengaruh pembatasan sosial berskala besar terhadap respon pasar modal dilihat dari harga saham sektor properti dan real estate dalam BEI tahun 2020–2021. Contemporary Studies in Economic, Finance, and Banking, 1(1), 1–12.

Riwayati, H. E., & Jayantara, I. P. (2020). Analisis Faktor-Faktor Yang Memengaruhi Indeks Harga Saham Sektor Properti (Studi Pada Sektor Properti Di Bursa Efek Indonesia). JWM (Jurnal Wawasan Manajemen), 8(2), 114–122. https://doi.org/10.20527/jwmthemanagementinsightjournal.v8i2.42

Robith, Z., & Wahyudi, S. T. (2022). Analisis Pengaruh Inflasi, Foreign Direct Investment Dan Interest Rate Terhadap Harga Saham Sektor Properti. Islamic Economics and finance in Focus, 1(1), 15–28. https://doi.org/10.21776/ieff.2022.01.1.02

Singh, G. (2015). Relationship between exchange rate and stock price in India: An empirical study. The IUP Journal of Financial Risk Management, XII(2), 18–29. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2681958

Sofyani, N. W., & Wahyudi, S. (2015). Analisis pengaruh variabel makro ekonomi global dan makro ekonomi domestik terhadap indeks harga saham sektor properti dan real estate dengan metode GARCH (periode Januari 2004–Desember 2014). Diponegoro Journal of Management, 5(1), 1–14.