

An Analysis of Overreaction in Global Commodity Markets and Its Impact on Indonesia's Financial Markets: Empirical Evidence from The JCI And The Rupiah Exchange Rate

Master Irfan Ibrahim^{1*}, Masno Marjohan¹, Zulfitra¹

^{1*} Faculty of Economics and Business, Pamulang University, Indonesia

Corresponding author: mastermind@gmail.com^{1*}

Keywords: Overreaction, Price Reversal, Crude Oil, Gold, JCI, Rupiah Exchange Rate.

Abstract: This study empirically examines the overreaction phenomenon in global commodity markets and its transmission to Indonesia's capital market and foreign exchange indicators, specifically the effect of crude oil and gold price overreaction—proxied through price-reversal indicators (abnormal return)—on the Abnormal Return of the Jakarta Composite Index (JCI/IHSG) and the Rupiah exchange rate. Daily time-series data over a five-year formation period (2021-2025) were analyzed using the Wilcoxon Signed-Ranks Test, Ordinary Least Squares (OLS) regression, and the Newey-West HAC Standard Errors and Covariance approach to mitigate structural heteroskedasticity. Findings demonstrate a significant overreaction phenomenon across all winner and loser portfolios for both gold and crude oil. Partial hypothesis testing shows that gold price overreaction has no significant effect on the JCI, yet exerts a negative and significant effect on the Rupiah, supporting Asset Substitution Theory and flight-to-quality behavior. Conversely, crude oil overreaction exerts a positive but marginal effect on the JCI, and a negative and significant effect on the Rupiah, validating the Balance of Payments Structure Theory given Indonesia's status as a net oil importer. Overall, global commodity overreaction transmits more responsively toward exchange-rate stability than toward domestic capital-market performance.

Introduction

Financial markets are an important indicator reflecting a country's economic condition (Rusydiana et al., 2025). In Indonesia, the Jakarta Composite Index (JCI/IHSG) reflects the overall performance of the stock market, while the Rupiah exchange rate against foreign currencies indicates monetary stability. Movements in the JCI and the Rupiah exchange rate are highly sensitive to economic information, government policy, global conditions, and investor sentiment. In practice, however, market responses to information are not always rational or proportionate.

The concept of overreaction, as explained by De Bondt & Thaler (1985), holds that stocks that experienced extreme declines in the previous period (losers) tend to perform better in the subsequent period, whereas stocks that previously performed very well (winners) tend to decline. This finding indicates the existence of price reversal as a result of investors reacting too pessimistically or too optimistically to information. This phenomenon is relevant to

Indonesia's capital market, which frequently experiences sharp fluctuations due to global sentiment such as changes in the Fed's interest rate, geopolitical crises, and economic uncertainty (Denie et al., 2024; Rusydiana et al., 2025). Overreaction behavior is also reflected in movements of the Rupiah exchange rate, where foreign capital flows—heavily influenced by risk perception and global investor expectations—can cause excessive appreciation or depreciation of the Rupiah (Cho et al., 2016).

Although numerous studies have examined the factors influencing the JCI and the Rupiah exchange rate, most have focused on macroeconomic and fundamental variables such as interest rates, inflation, global indices, and commodity prices (Budiarso & Pontoh, 2024; Santosa & Roselli, 2023; Vieri et al., 2024), producing inconclusive results. Meanwhile, the behavioral finance approach—particularly the Overreaction Hypothesis (De Bondt & Thaler, 1985)—remains limited in the context of the Indonesian market and has generally only been applied at the level of individual stocks or winner-loser portfolios. Prior research has rarely used the return reversal of global commodity prices such as gold and oil as an indicator of global market overreaction, even though fluctuations in these two commodities have the potential to trigger excessive shifts in investor sentiment and affect the stock market as well as the exchange rate. It is this research gap that underlies the urgency of the present study.

Based on the above discussion, this study aims to analyze the effect of the global market overreaction phenomenon—measured through the return reversal of gold and crude oil prices—on the performance of Indonesia's financial market, specifically the JCI and the Rupiah exchange rate against the US Dollar. Specifically, this study aims to: (1) analyze the occurrence of overreaction in gold and crude oil commodities during the test period; (2) analyze the effect of gold price overreaction on the JCI and the Rupiah; and (3) analyze the effect of oil price overreaction on the JCI and the Rupiah. Theoretically, this study enriches the behavioral finance literature by providing empirical evidence at the aggregate market level (the JCI and the exchange rate), while practically its results may serve as a consideration for investors, investment managers, and monetary authorities in dealing with market volatility triggered by global commodity sentiment.

Overreaction Hypothesis

The Overreaction Hypothesis proposed by De Bondt & Thaler (1985) explains that investors tend to react excessively to new information, whether positive or negative. This excessive reaction causes asset prices to move away from their fundamental value, followed in the subsequent period by a correction or price reversal. In the stock market, overreaction is reflected when investors respond excessively to global economic news or market sentiment, triggering excessive selling or buying (panic selling/euphoria buying). This phenomenon is also closely related to movements in the exchange rate: negative global sentiment triggers capital outflow that sharply depreciates the Rupiah, before the exchange rate re-appreciates as market panic subsides.

The Jakarta Composite Index (JCI)

The JCI is the main indicator of Indonesia's stock market performance, reflecting the dynamics of stock supply and demand as well as market participants' reactions to economic and non-economic information. A number of studies show that the JCI is influenced by domestic macroeconomic variables such as inflation, interest rates, and money supply (Fauzi & Wijoyo, 2025; Dalimu & Satria, 2025), as well as global factors such as world stock indices and commodity prices (Budhidharma et al., 2022; Prakoso, 2022). The JCI also exhibits high

and persistent volatility, particularly during crisis periods, indicating the strong linkage between Indonesia's capital market and global market dynamics (Yang, 2025).

The Rupiah Exchange Rate against the US Dollar

The exchange rate is an important macroeconomic indicator reflecting a country's fundamental economic condition (Madura, 2021), and its movements are influenced by the supply-and-demand mechanism of foreign currency in the market (Salvatore, 2019). Since the adoption of the managed floating exchange rate system following the 1997/1998 crisis, Bank Indonesia has continued to intervene to maintain exchange-rate stability (Bank Indonesia, 2023). External factors such as the Fed's monetary policy and global commodity prices also contribute to depreciation pressure on the Rupiah (World Bank, 2022; Tambunan, 2020), while high exchange-rate volatility affects domestic inflation and export competitiveness (Mankiw, 2021).

Conceptual Framework

In the global market context, overreaction occurs not only in stocks but also in strategic commodities such as crude oil and gold, which frequently serve as sources of external shocks, especially during periods of economic and geopolitical uncertainty (Borgards et al., 2021). Rising oil prices can increase inflationary pressure and production costs that weigh on the stock market, while gold, as a safe haven, reflects portfolio shifts from risky assets to safe assets during market panic (Denie et al., 2024). In addition to affecting the stock market, commodity overreaction also affects exchange-rate stability: rising world oil prices widen the current-account deficit, weakening the Rupiah, while rising gold prices drive capital outflow from emerging markets. Nevertheless, prior findings have not always been consistent (Kusmayadi et al., 2023; Vieri et al., 2024), indicating that the effect of overreaction is context-dependent, varying with the research period, market conditions, and the variables used. This conceptual framework affirms that Indonesia's financial market is influenced not only by domestic factors but also by external shocks originating from global market behavior.

Based on the conceptual framework and the synthesis of prior research, the hypotheses of this study are formulated as follows:

- H1: There is significant overreaction in the gold commodity during the test period.
- H2: There is significant overreaction in the crude oil commodity during the test period.
- H3: Gold commodity overreaction has a significant effect on the JCI.
- H4: Gold commodity overreaction has a significant effect on the Rupiah.
- H5: Oil commodity overreaction has a significant effect on the JCI.
- H6: Oil commodity overreaction has a significant effect on the Rupiah.

Research Method

Research Approach and Design

This study applies a quantitative approach using daily time-series data analysis over the period January 2021 to December 2025, which encompasses significant events such as the COVID-19 pandemic and various geopolitical conflicts affecting market volatility. The research design integrates an econometric approach with a simple linear regression model to map the causal relationship structure among variables, combined with a non-parametric difference test to detect the overreaction phenomenon in extreme portfolios.

Variables and Data

This study uses four main variables: gold (XAU/USD) and crude oil (WTI/USD) overreaction as independent variables, and the JCI and the Rupiah exchange rate (USD/IDR) as dependent variables. Overreaction is measured through Abnormal Return (AR), i.e., the difference between actual return and expected return, with expected return calculated using a mean-adjusted model based on the historical average of the preceding 250 days (the estimation window):

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) ; \text{ with } R_{i,t} = (P_{i,t} - P_{i,t-1}) / P_{i,t-1}$$

The data used are secondary daily data: gold and crude oil prices were obtained from Investing.com, the Rupiah exchange rate from Bank Indonesia (www.bi.go.id), and the JCI from the Indonesia Stock Exchange (www.idx.co.id). The sample was determined through purposive sampling with the following criteria: (a) daily time-series data with no missing values; (b) an observation period of 2021-2025; (c) active trading days only; and (d) the use of daily closing prices. Overreaction conditions were identified by constructing extreme portfolios using the percentile method: the Winner group consists of observations with Abnormal Return above the 95th percentile, while the Loser group consists of observations below the 5th percentile, with subsequent price reversal tested over the t1 to t6 post-event period as well as its cumulative value (Cumulative Abnormal Return/CAR).

Data Analysis Technique

Data analysis was conducted in three stages (block design). First, the event-identification stage constructs the Winner and Loser portfolios based on the percentile threshold. Second, the non-parametric comparative test stage (Wilcoxon Block) uses the Wilcoxon Signed-Ranks Test, chosen because the abnormal return data did not meet the normal-distribution assumption required for a paired-sample t-test. This test compares abnormal returns in the post-event period (t1-t0 through t6-t0, as well as CAR-t0) to test the significance of price reversal. Third, the cross-market causality transmission test stage (Regression Block) uses simple linear regression (Ordinary Least Squares/OLS):

$$Y = \alpha + \beta X + \varepsilon$$

where Y represents the Abnormal Return of the JCI or the Rupiah, and X represents the Abnormal Return (return reversal) of gold or oil that passed the difference test. Prior to estimation, the model was tested through a series of classical assumption tests (normality, heteroskedasticity, and autocorrelation). A multicollinearity test was not conducted since each regression model involves only one independent variable. For models found to violate the homoskedasticity assumption through the Breusch-Pagan-Godfrey test, standard-error estimates were corrected using the Newey-West HAC (Heteroskedasticity and Autocorrelation Consistent) Standard Errors and Covariance approach with a Bartlett kernel and a fixed bandwidth of 5.0000, in order to ensure that the resulting regression coefficients remain Best Linear Unbiased Estimators (BLUE). Hypothesis testing was conducted through partial (t-) tests at significance levels of 5% and 10%, using EViews 10.

Results and Discussion

Overview and Descriptive Statistics

Through purposive sampling applied to 1,200 daily abnormal-return observations over the 2021-2025 period, 120 daily observations meeting the research criteria were obtained for each variable, consisting of 60 observations in the Winner group (AR above the 95th

percentile) and 60 observations in the Loser group (AR below the 5th percentile), for both the gold and crude oil commodities.

Table 1. Descriptive Statistics of Abnormal Return (Gold, JCI, Rupiah)

Statistic	AR Gold	AR JCI	AR Rupiah
Mean	0.000114	-0.000451	0.000330
Maximum	0.035227	0.046814	0.020619
Minimum	-0.054579	-0.082319	-0.012463
Std. Dev.	0.023365	0.013469	0.004430
Observations	120	120	120

Source: EViews data processing results (2026)

Table 2. Descriptive Statistics of Abnormal Return (Oil, JCI, Rupiah)

Statistic	AR Oil	AR JCI	AR Rupiah
Mean	-0.005239	-0.000719	0.000976
Maximum	0.143001	0.046814	0.018256
Minimum	-0.196885	-0.082319	-0.008077
Std. Dev.	0.057085	0.011922	0.003637
Observations	120	120	120

Source: EViews data processing results (2026)

Both tables show that the commodity variables (gold and oil) have far greater standard deviations than the JCI and the Rupiah exchange rate, indicating a higher level of volatility in global commodity returns during the study period, while the Rupiah exchange rate shows the lowest volatility.

Overreaction Analysis

Applying the percentile method to 1,200 daily abnormal-return observations proved effective in separating market-shock anomalies from regular fluctuations, with the Winner upper bound (95th percentile) at 0.016501 for gold and 0.032553 for oil, and the Loser lower bound (5th percentile) at -0.016234 for gold and -0.037928 for oil. The Wilcoxon Signed-Ranks Test results show that all test pairs (t1-t0 through t6-t0) as well as CAR-t0, for both the Winner and Loser groups of both commodities, produced an Asymp. Sig. (2-tailed) value of 0.000 (Table 3), consistently below the 5% significance threshold.

Table 3. Summary of Wilcoxon Signed-Ranks Test Results for Gold and Oil

Commodity	Group	Z-statistic Range	Asymp. Sig.
Gold	Winner	-6.677 to -6.449	0.000
Gold	Loser	-6.729 to -6.000	0.000
Oil	Winner	-6.714 to -6.544	0.000
Oil	Loser	-6.736 to -6.670	0.000

Source: SPSS data processing results (2026)

Since the probability values are far below 0.05, the Null Hypothesis (H0) is consistently rejected across all groups, so H1 and H2 are accepted. This finding demonstrates that the abnormal returns of the Winner and Loser groups for both gold and crude oil differed significantly in the post-event period compared with the initial point (t0), confirming the occurrence of price reversal—moving negatively for the Winner group and positively for the Loser group—as empirical evidence supporting the Overreaction Hypothesis of De Bondt & Thaler (1985).

Regression Results and Hypothesis Testing

Simple linear regression models were estimated to test the effect of overreaction (return reversal) in gold and oil on the JCI and the Rupiah. For models found to violate the homoskedasticity assumption (tested via Breusch-Pagan-Godfrey), standard-error estimates were corrected using the Newey-West HAC approach. A summary of the estimation results for all four models is presented in Table 4.

Table 4. Summary of Regression Results: Gold and Oil Overreaction on the JCI and the Rupiah

Model	Coefficient of X	t-Statistic	Prob.	R ²
AR Gold → AR JCI	0.065095	1.231164	0.2207	1.27%
AR Gold → AR Rupiah	-0.042229	-2.474952	0.0147	4.93%
AR Oil → AR JCI (HAC)	0.058816	1.783807	0.0770	8.00%
AR Oil → AR Rupiah	-0.011405	-1.981179	0.0499	3.22%

Source: EViews 10 data processing results (2026)

The estimation results show that gold's Abnormal Return has a positive but not statistically significant effect on the JCI's Abnormal Return ($p = 0.2207 > 0.05$), so H3 is rejected. Conversely, gold's Abnormal Return has a negative and significant effect on the Rupiah's Abnormal Return ($p = 0.0147 < 0.05$), so H4 is accepted. Oil's Abnormal Return has a positive effect on the JCI that is marginally significant at the 10% level ($p = 0.0770$), so H5 is accepted at the 10% significance level. Meanwhile, oil's Abnormal Return has a negative and significant effect on the Rupiah ($p = 0.0499 < 0.05$), so H6 is accepted. A summary of the hypothesis-testing decisions is presented in Table 5.

Table 5. Summary of Hypothesis Testing

Hypothesis	Statement	Test Result	Decision
H1	Gold commodity overreaction is significant during the test period	Sig. = 0.000 (Wilcoxon)	Accepted
H2	Oil commodity overreaction is significant during the test period	Sig. = 0.000 (Wilcoxon)	Accepted
H3	Gold overreaction affects the JCI (IHSG)	$p = 0.2207$	Rejected
H4	Gold overreaction affects the Rupiah	$p = 0.0147$	Accepted
H5	Oil overreaction affects the JCI (IHSG)	$p = 0.0770$ (10%)	Accepted ($\alpha=10\%$)
H6	Oil overreaction affects the Rupiah	$p = 0.0499$	Accepted

Source: Data processing results (2026)

Discussion

The overreaction phenomenon in gold and oil commodities. The rejection of H0 across all Winner and Loser groups demonstrates that price fluctuations in gold and oil are not merely random walk movements, but rather a manifestation of investors' cognitive and psychological biases in the form of herding behavior, where the Winner group reflects overoptimism and the Loser group reflects overpessimism. This finding is consistent with the foundational theory of De Bondt & Thaler (1985) and supports Shiller's (2015) study on irrational exuberance in safe-haven assets, as well as Sephton (2022), who affirms that short-term spikes in gold prices are more heavily influenced by transient psychological panic before prices revert to their intrinsic value. A similar pattern in crude oil confirms the studies of Hamilton (2009) and Kilian (2009) on precautionary demand shocks, whereby investors buy excessively out of concern over future supply disruptions.

Transmission of gold overreaction to the JCI and the Rupiah. The insignificant effect of gold overreaction on the JCI indicates that the domestic stock market moves relatively independently of the psychological turmoil among global gold investors, consistent with the dichotomous nature of the two instruments—stocks as risk-on assets driven by domestic issuer performance, versus gold as a safe-haven asset—and is in line with the findings of Darmawan & Saiful Haq (2022). Conversely, the negative and significant effect of gold overreaction on the Rupiah reflects the operation of Asset Substitution Theory and flight-to-quality behavior: a surge in gold's abnormal return drives global investors to withdraw liquidity from Indonesia's financial market to allocate it to gold instruments, thereby pressuring the Rupiah exchange rate, consistent with the findings of Lestari (2025).

Transmission of oil overreaction to the JCI and the Rupiah. The marginally positive effect of oil overreaction on the JCI appears to run counter to Indonesia's position as a net oil importer, which is theoretically disadvantaged by rising oil prices. This condition is presumed to reflect cognitive biases in the form of the anchoring effect (Tversky & Kahneman, 1974) and herding behavior (Chang et al., 2000), whereby domestic investors anchor their investment decisions to the historical association between rising commodity prices and issuer profitability, and follow market trends without in-depth fundamental analysis. This finding is consistent with Kilian (2009) regarding the expansionary impact of global aggregate demand shocks on financial markets, and with Darmawan & Saiful Haq (2022), who found a dynamic effect of world oil prices on the JCI. Meanwhile, the negative and significant effect of oil overreaction on the Rupiah justifies the Balance of Payments Structure Theory: a surge in oil prices increases the burden of energy imports and widens the current-account deficit, thereby pressuring the stability of the domestic exchange rate.

Overall, the relatively low R-squared values across all models (1.27%-8.00%) indicate that the majority of variation in the JCI and the Rupiah is explained by factors outside the model, such as domestic macroeconomic variables, monetary policy, and corporate sentiment. Nevertheless, these findings consistently show that the transmission of global commodity overreaction is more responsive toward the stability of the Rupiah exchange rate than toward the performance of the domestic capital market.

Conclusion

The overreaction phenomenon is proven to occur significantly in the gold commodity during the test period, marked by a genuine price reversal between the Winner and Loser groups. The overreaction phenomenon is also proven to occur significantly in the crude oil commodity, with a similar pattern of price reversal between the Winner and Loser groups.

World gold price overreaction is not proven to have a significant effect on the JCI; the domestic stock market moves relatively independently of the psychological turmoil among gold investors. World gold price overreaction is proven to have a negative and significant effect on the Rupiah exchange rate, consistent with Asset Substitution Theory and flight-to-quality behavior. World crude oil price overreaction is proven to have a positive effect on the JCI, although the strength of this effect is marginal or weak (significant at the 10% level). World crude oil price overreaction is proven to have a negative and significant effect on the Rupiah exchange rate, consistent with the Balance of Payments Structure Theory given Indonesia's position as a net oil importer.

Overall, these findings indicate that the transmission of global commodity overreaction has a stronger effect on the stability of the Rupiah exchange rate than on the performance of the domestic capital market, with both crude oil and gold showing a consistent transmission pattern toward the weakening of the domestic currency whenever excessive reactions occur in world commodity markets.

This study has several limitations: (a) the scope of global commodities is limited to gold and crude oil, and does not cover other strategic commodities such as coal, natural gas, or crude palm oil (CPO); (b) the use of a mean-adjusted model with a 250-day estimation period, which is relative to the number of estimation periods used; (c) the regression models do not incorporate dominant global macroeconomic control variables such as the US Dollar Index (DXY) or the Fed Funds Rate, which contributes to the relatively low R-squared values; and (d) the use of daily data has not been able to capture short-term intraday overreaction phenomena.

For investors and investment managers, it is recommended to take advantage of the independence between the gold market and the JCI for cross-asset-class portfolio diversification, and to apply currency hedging to mitigate exchange-rate risk arising from global commodity turmoil. For the government and monetary authorities, Bank Indonesia needs to strengthen its dual-intervention strategy in the spot market and the Domestic Non-Deliverable Forward (DNDF) market to curb depreciation pressure on the Rupiah, while the government needs to accelerate the energy transition to reduce dependence as a net oil importer. For future research, it is recommended to: (a) explore more comprehensive variations of expected-return models, such as the Market Adjusted Model or non-linear models (GARCH-M, EGARCH, Markov-Switching); (b) develop alternative methodologies for constructing extreme (Winner and Loser) portfolios, such as Value at Risk (VaR); (c) consider VAR/VECM models to capture both short-run and long-run dynamics; and (d) add macroeconomic control variables such as interest rates, inflation, and the DXY index, along with the use of non-linear methods such as Threshold Regression to capture the asymmetric characteristics of financial data more precisely.

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