



DETERMINANTS OF GOLD RETURN IN INDONESIA: EMPIRICAL EVIDENCE OF INFLATION, EXCHANGE RATES, OIL PRICES, CAPITAL MARKET PERFORMANCE, AND WORLD GOLD PRICES

Fikri Budi Aulia¹, Sutrisno², Zaenal Arifin³

¹Faculty of Economics and Business, Janabadra University, Yogyakarta

^{2,3}Faculty of Business and Economics, Islamic University of Indonesia, Yogyakarta

E-mail: ¹fikri.aulia@janabadra.ac.id, ²sutrisno@uii.ac.id, ³zaenalarifin.fe@uii.ac.id

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ABSTRACT

This study aims to analyze the determinants of gold return in Indonesia using the static approach of Ordinary Least Squares (OLS) and the dynamic approach of Vector Autoregression (VAR) equipped with the Impulse Response Function (IRF). The research variables include inflation (INF), USD/IDR (KURS), world oil prices (OIL), capital market performance proxied by JCI (CMP), and world gold prices (XAUUSD). The data used is in the form of monthly data for the period January 2009-December 2025. Domestic gold returns are measured using Antam gold. The findings show the difference in results between static and dynamic models. In the OLS model, inflation has a significant negative effect on gold returns at a significance level of 10%, while other variables are insignificant. In the VAR model with an optimal lag of 2, the exchange rate has a significant positive effect on lag-2 and oil prices have a significant positive effect on lag-1 on gold returns. IRF analysis shows that capital market performance shocks produce strong but relatively brief negative responses, while exchange rate shocks and XAUUSD produce more persistent positive responses. Inflation shows the relatively longest duration of the response before returning to the initial condition. These results indicate a time-lagged transmission and a response mechanism that is not entirely in line with the view of contemporary direct relationships. The implications of the study confirm the importance of considering market dynamics and transmission channels when evaluating gold as a safe haven and inflation hedge.

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Corresponding Author:

Fikri Budi Aulia

Faculty of Economics and Business, Janabadra University, Yogyakarta

E-mail: fikri.aulia@janabadra.ac.id

1. INTRODUCTION

Gold is seen as a relatively stable asset compared to other financial instruments and is often positioned as a safe haven asset and inflation hedge. In the context of an open economy such as Indonesia, gold returns are influenced by domestic and global factors. Theoretically, inflation could affect the demand for real assets including gold through the mechanism of wealth value preservation. Exchange rates also play a role because international gold prices are generally transacted in US dollar denominations; changes in USD/IDR may affect conversion costs and investors' perception of domestic gold assets. In addition, oil prices are often used as a proxy for macro conditions and global risks, while capital market performance reflects investor sentiment and risk levels in financial instruments. The world gold price proxied by XAUUSD is also relevant to test whether there is a strong transmission from the global market to the domestic gold price.

However, empirical evidence regarding the determinants of gold return shows heterogeneity. Differences in sample periods, variable sizes, and modeling approaches can lead to different conclusions, especially when the relationships between variables are dynamic and indirect (lagged). Therefore, this study emphasizes the contribution of methods by comparing static models (OLS) and dynamic models (VAR) and reinforcing interpretation through IRF to see the golden return response to the shocks of each variable on a given time horizon.

This study aims to: (i) examine the influence of inflation, exchange rates, world oil prices, capital market performance, and world gold prices on domestic gold returns at the contemporary level (OLS), (ii) assess its dynamic relationship with VAR at optimal lag, and (iii) evaluate the response of gold returns to variable shocks using IRF.

2. METHODS

Data and Variable Definitions

The research uses monthly data for the period January 2009 to December 2025. The variables used are:

- GOLD: Antam's gold return (dependent), calculated as a monthly percentage change.
- INF: monthly inflation (percentage change).
- EXCHANGE RATE: the monthly USD/IDR rate (percentage change).
- OIL: world oil prices (percentage change monthly).
- CMP: JCI return (monthly percentage change).
- XAUUSD: return / change in world gold price (monthly percentage change).

All variables are processed into returns/changes (when relevant) to capture monthly dynamics.

Model Specifications

The research applied two main approaches.

(a) Model OLS (statis)

The estimation model is formed:

$$\text{Goldt} = \beta_0 + \beta_1 \text{INFt} + \beta_2 \text{KURSt} + \beta_3 \text{OILt} + \beta_4 \text{CMPt} + \beta_5 \text{XAUUSDt} + \varepsilon$$

OLS is used to test the contemporary relationship between macro/financial variables and gold returns.

(b) Model VAR (dynamis)

To capture the dynamics between variables, VAR is used with the amount of lag determined using information criteria. Research states that optimal lag = 2. The stability of the model is verified through a VAR stability test (the root is inside the circle unit).

Impulse Response Function (IRF)

IRF is used to assess the response of gold's return to the one-standard deviation shock on each variable over a given time horizon. The interpretation of the IRF is focused on the direction of the response (positive/negative), the size of the response, and the duration of the response until it returns to equilibrium.

Diagnostic Tests

In the OLS model, a classical assumption test was carried out which included residual normality, heteroscedasticity, and autocorrelation. In the VAR model, a stability test is performed. Results are analyzed to ensure reliable estimates.

3. RESULTS AND DISCUSSION

Results

OLS Estimated Results

In the OLS model, the results show that:

- Inflation (INF) has a significant negative effect on gold returns at a significant level of 10%.
- KURS, OIL, CMP, XAUUSD do not show a significant influence on gold returns at contemporary specifications.

The relatively low R^2 value of OLS indicates that contemporary relationships do not adequately explain the fluctuations in gold returns, so a dynamic approach is needed.

VAR Estimation Results (Lag-2)

In the VAR model with optimal lag 2, the main results are:

- KURS has a significant positive effect on gold returns at lag-2.
- OIL has a significant positive effect on gold returns at lag-1.
- Other variables, including INF, CMP, and XAUUSD, are not significant to the horizon lag tested in the relevant VAR equation.

IRF Results

Based on the IRF, the pattern of response of gold returns to shocks is as follows:

1. Exchange rate shocks (KURS) generate a relatively strong positive response and tend to be stable over a longer horizon.
2. The XAUUSD shock evoked a very strong and relatively persistent positive response, which indicated a global to domestic transmission especially within the shock framework.
3. The CMP (JCI) shock caused a strong negative response but tended to be reactive-momentarily, indicating that market volatility affected quickly but did not last.
4. INF shocks show a relatively weak response but have the longest duration before returning to the initial state.
5. OIL shocks provide a moderate positive response but are less likely to last significantly in the longer term.

Discussion

The results show that the determinants of domestic gold return do not fully reflect contemporary relationships. The difference in findings between OLS and VAR indicates the importance of transmission channels working through time mechanisms.

First, inflation has a significant negative influence on OLS, but in dynamic analysis its influence is weak and does not show consistently in VAR. This phenomenon can be interpreted as the presence of a time-lag in the response to gold demand to inflationary pressures, or the presence of a dampening factor (e.g. policy rigidity/distribution channels of domestic gold prices) so that transmission is indirect.

Secondly, the rate has a significant positive influence on lag-2, and the IRF shows a strong positive response. These findings reinforce the interpretation that gold can act as a shadow currency in the domestic market: when the rupiah weakens (which is reflected in exchange rate dynamics), the return of domestic gold increases on a certain horizon. In other words, Antam's gold price is more responsive to exchange rate shocks than other macro variables.

Third, the influence of oil prices only appears at lag-1 in VAR and is moderate in IRF. This indicates that world oil plays a more role through the transmission of global risks and indirect cost-based inflation, but its effect on domestic gold returns is not long-lasting.

Fourth, CMP shows an interesting pattern: in the IRF, JCI shocks cause a strong negative response but quickly subside. This corresponds to gold's role as a hedge asset when capital markets are under pressure, but gold does not always show a stable long-term response to market performance.

Fifth, XAUUSD is not significant in neither static nor VAR approaches on average, but the IRF shows a relatively strong and persistent positive response to global shocks. This is consistent with the view that the transmission of global to domestic gold prices is more visible in shock dynamics than in contemporary average relationships. This means that domestic barriers—such as price adjustments, distribution costs, or retail policy adjustments—can cause delayed pass-through.

CONCLUSION

This study concludes that the determinants of gold return in Indonesia are dynamic and depend on the time horizon.

1. According to the OLS, inflation has a significant negative effect on gold returns at contemporary levels, but these results are not entirely consistent in a dynamic framework.
2. In VAR (optimal lag 2), the exchange rate has a significant positive effect on lag-2, while the price of oil has a significant positive effect on lag-1.
3. IRF analysis shows that:
 - exchange rate shocks and XAUUSD are driving a positive and relatively persistent response to gold's returns,
 - the CMP (JCI) shock caused a strong but brief negative response,
 - inflationary shocks of the longest response duration even though the strength is not dominant,
 - Oil shocks provide a moderate positive response that is less likely to last long.
4. Thus, domestic gold behaves according to the characteristics of a safe haven and time-lagged, and transmissions from global markets appear more pronounced through the response to shocks.

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