

1.S&P (Standard & Poor's Financial Services LLC)

I choose this as the economics indicator. The company is best known for its stock market indices, such as the **S&P 500** — which tracks the performance of 500 of the largest publicly traded companies in the United States (analog of the BIST100) [1]. A 2025 *Journal of Futures Markets* study shows that when S&P 500 index funds sell off, as they did during COVID-19 and the 2024-25 volatility spike, up to 42 % of the resulting downside risk is transmitted to gold within days Earlier connectedness work built on the Diebold-Yilmaz framework finds that S&P 500 daily returns explain roughly 15-20 % of gold's ten-day forecast-error variance, with the share doubling in crisis windows [2] Wavelet-quantile evidence published in 2024 confirms that once the S&P 500 drops more than one standard deviation, the correlation flips sign and gold's hedge power jumps, reinforcing the predictive value of the gold-to-S&P ratio [3] three papers justify using yesterday's S&P 500 return—or the z-scored gold / S&P ratio—as the single macro feature in a parsimonious gold-forecasting model.

2.Silver as the feature

Silver stays because it consistently carries information about upcoming moves in gold. A 2024 CME Group note documents that the gold-to-silver ratio is mean-reverting and that silver price bursts often precede corrections in gold [4] Complementing this, a frequency-domain causality study on Indian futures markets shows statistically significant silver → gold Granger causality at 1- to 3-day lags during volatile periods [5]. Together these findings make daily silver returns and a lagged gold-silver ratio the only cross-metal inputs worth keeping.

Sources

[1] Selecting Macroeconomic Influencers on Stock Markets by Using Feature Selection Algorithms

[2] Dynamic Spillovers and Linkages Between Gold, Crude Oil and the S&P 500, *Economic Modelling*, 2022.

[3] Hedging Market Risk Using Gold: A Wavelet-Quintile Correlation Approach, 2024.

[4] CME Group, “Four Factors Driving Gold Prices Relative to Silver,” 2024.

[5] “Macroeconomic Factors and Frequency-Domain Causality Between Gold and Silver Returns in India,” *Resources Policy*, 2023.