

# Statistical Arbitrage: Pairs Trading Backtest

Top 1% Quant Project — Demo Report

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## **Abstract:**

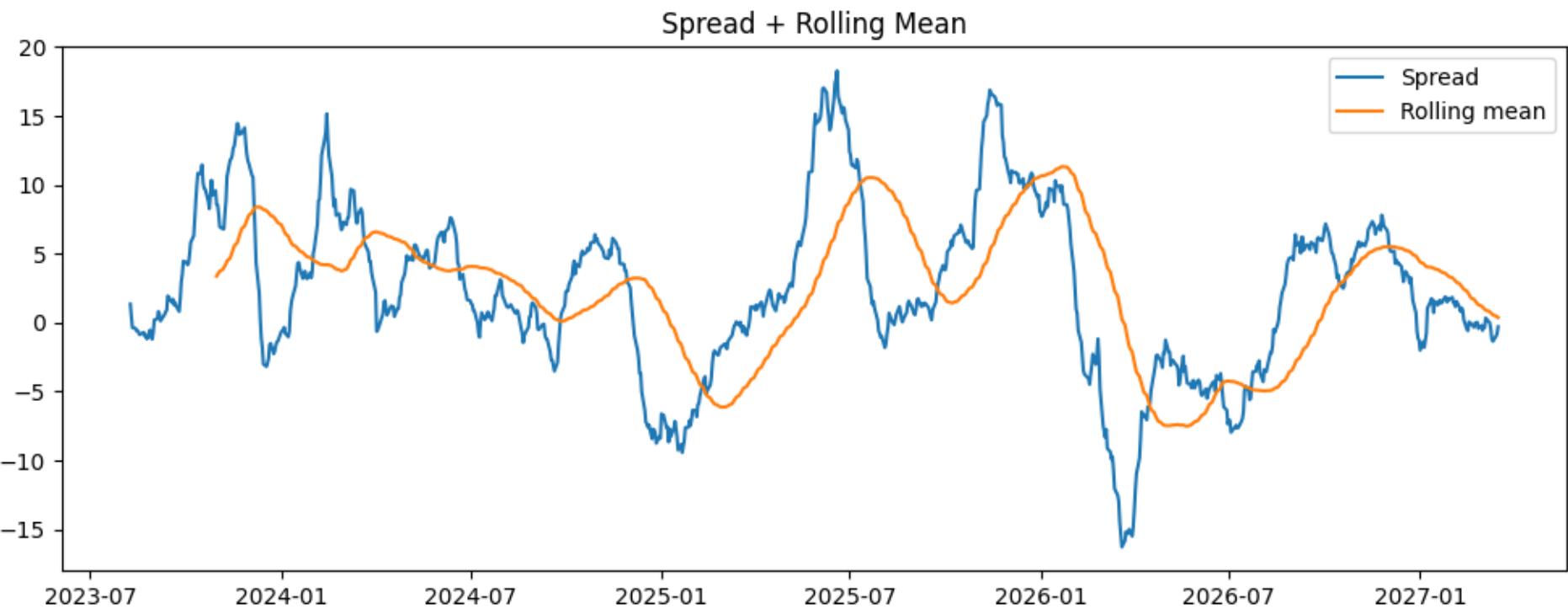
This report documents a reproducible pairs trading strategy. We test for cointegration, compute a rolling hedge ratio, define spread and z-score thresholds, and calculate daily returns.

## 1) Statistical Tests & Hedge Ratio

Cointegration test p-value = 0.0003658

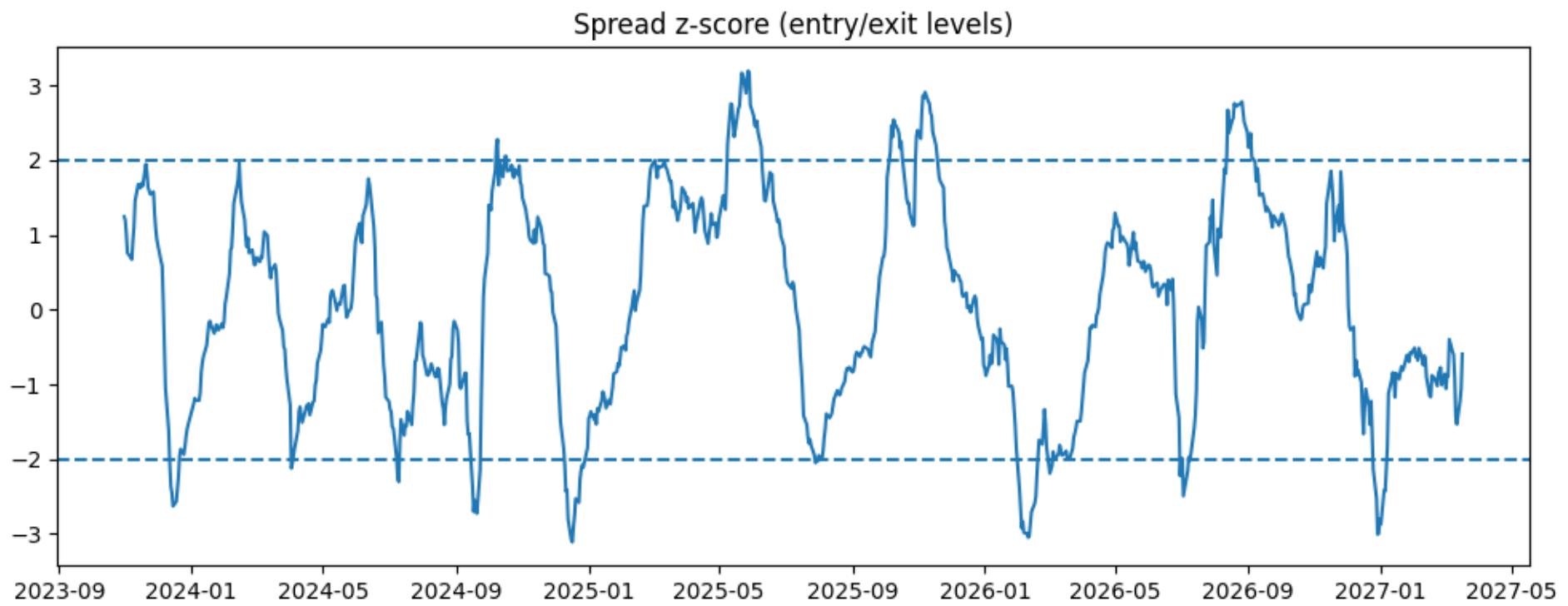
### Methodology:

- Use Engle-Granger two-step: ADF on residuals after OLS regression.
- Estimate rolling hedge ratio (OLS slope) with window=60 days to capture time



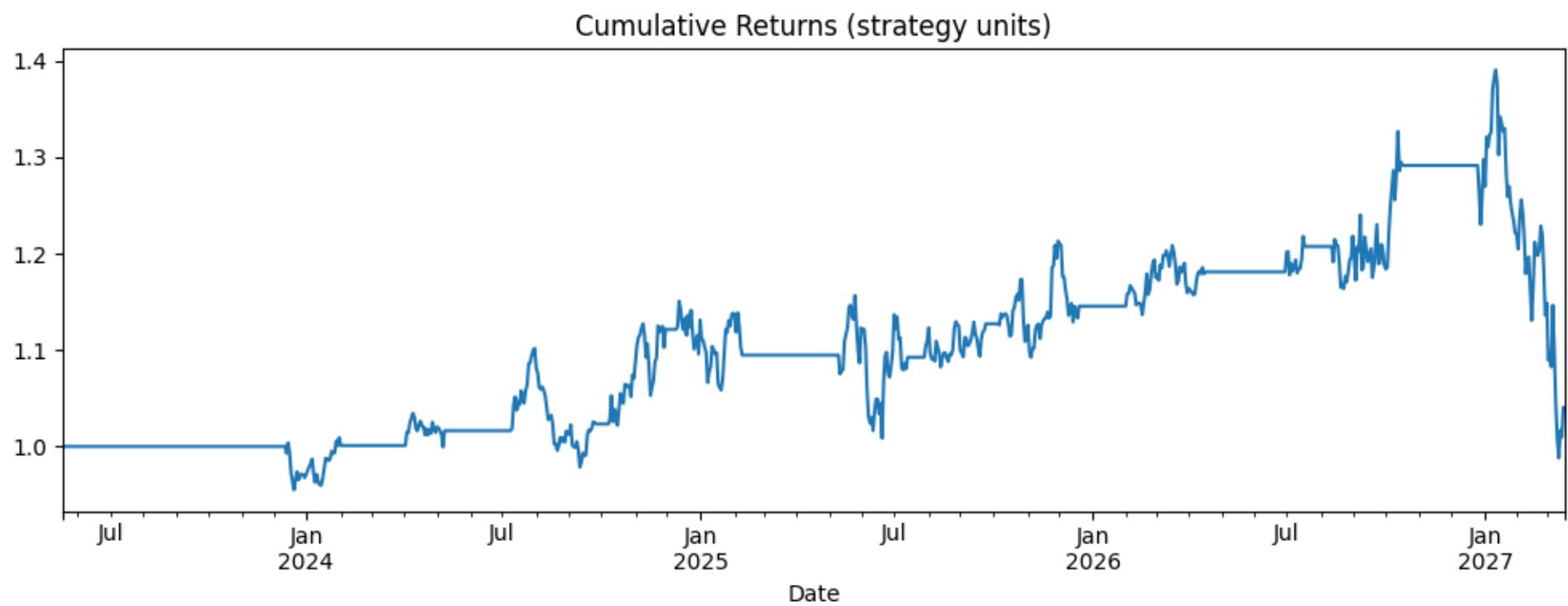
## 2) Spread Normalization & Signals

We compute z-score with rolling window 60. Entry at  $|z| \geq 2.0$ , exit at  $z \sim 0$ .



### **3) Backtest Performance**

- Total return: 4.03%\n- Annualized (approx): 1.00%\n- Sharpe (annualized): 0.14\n- Max drawdown: 28.95%



## **Appendix: Robustness & Productionization**

- Include transaction costs, slippage model, and realistic execution rules.
- Use walk-forward optimization for entry/exit and window parameters.
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