

Statistical Arbitrage: Pairs Trading Backtest

Top 1% Quant Project — Demo Report

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Abstract:

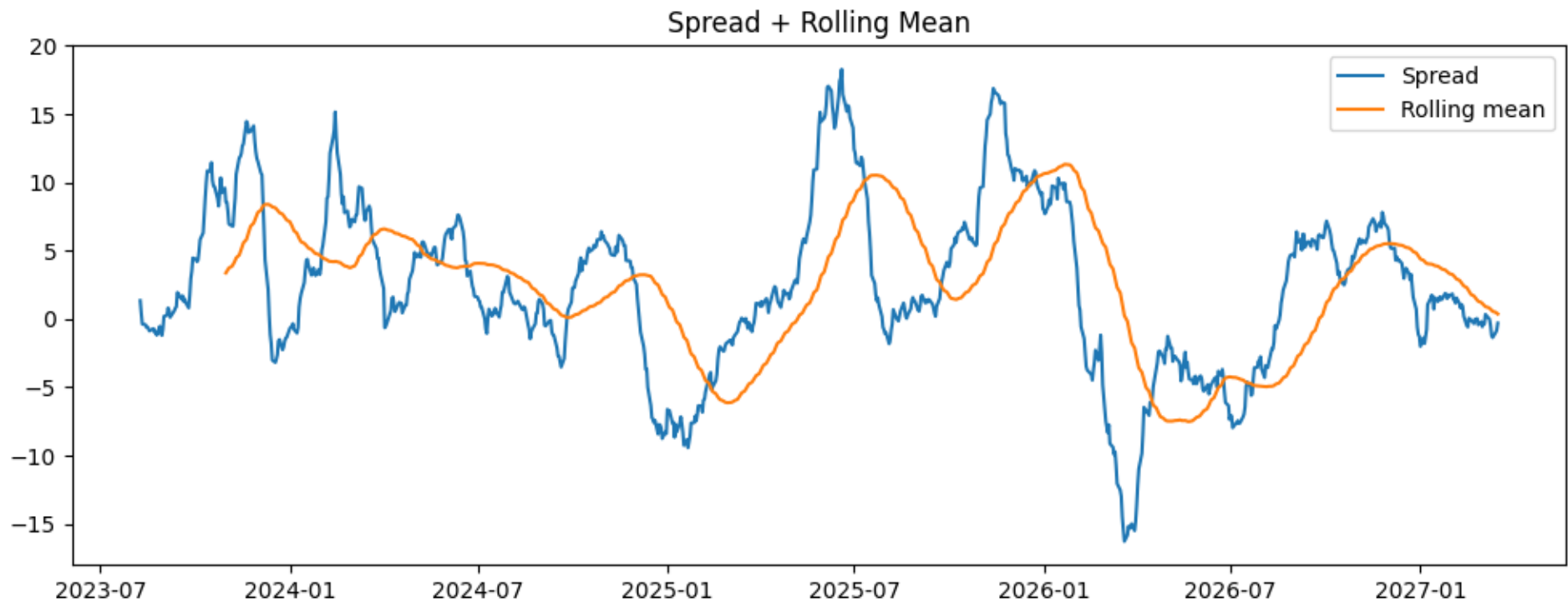
This report documents a reproducible pairs trading strategy. We test for cointegration, compute a rolling hedge ratio, define spread and z-score

1) Statistical Tests & Hedge Ratio

Cointegration test p-value = 0.0003658

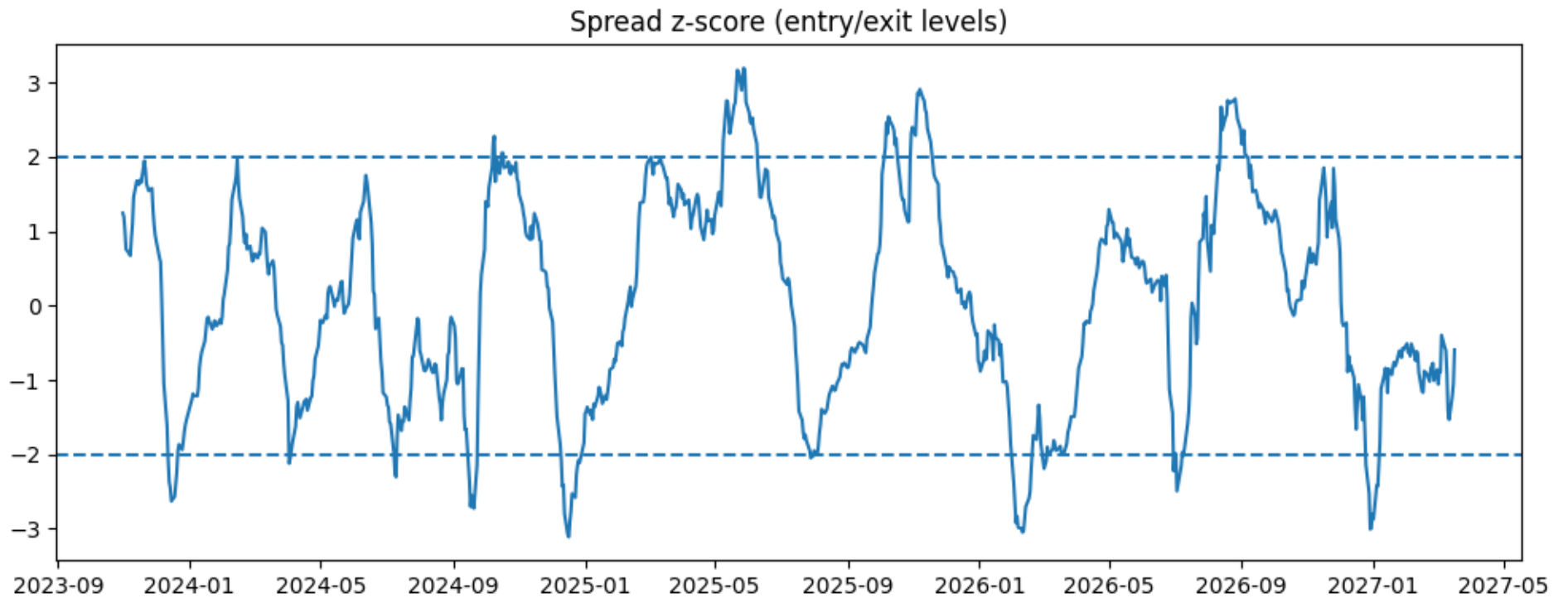
Methodology:

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



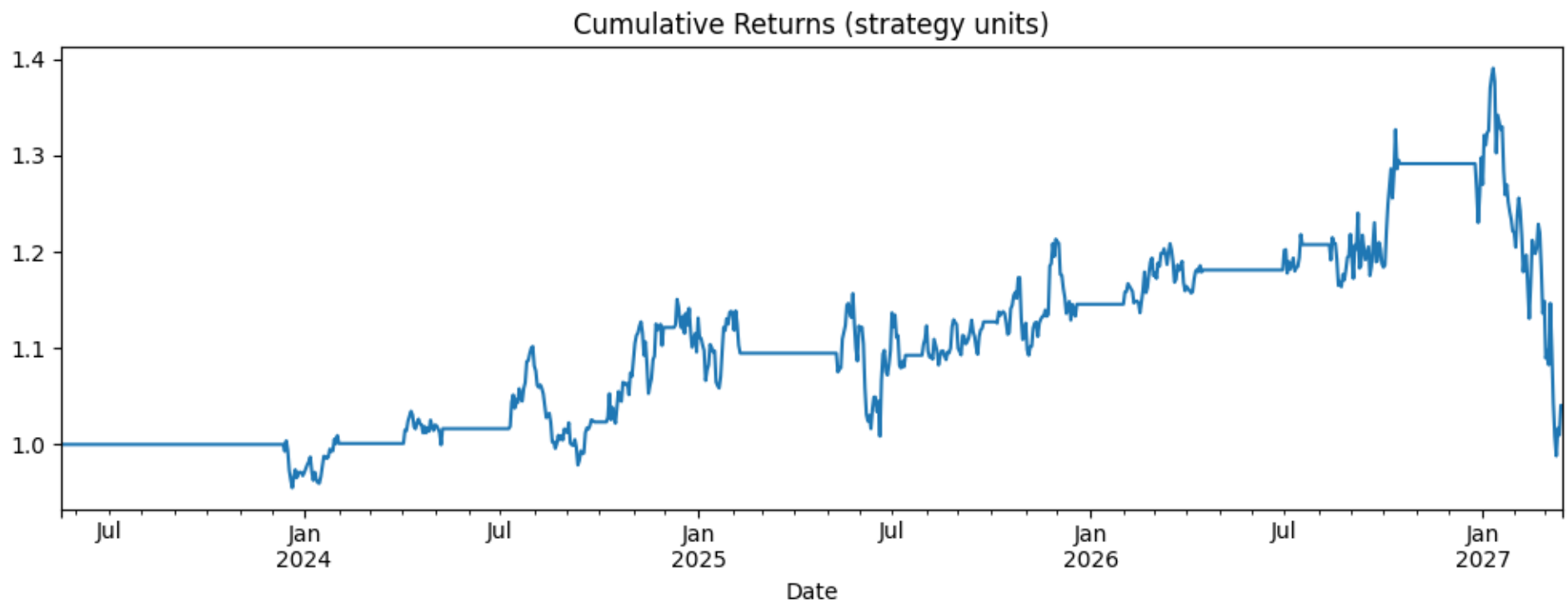
2) Spread Normalization & Signals

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.\n- Use walk-forward optimization for entry/exit and window parameters.\n- R