Pairs Trading Strategy: Pepsi (PEP) vs Coca-Cola (KO)

Quantitative Mean Reversion Strategy

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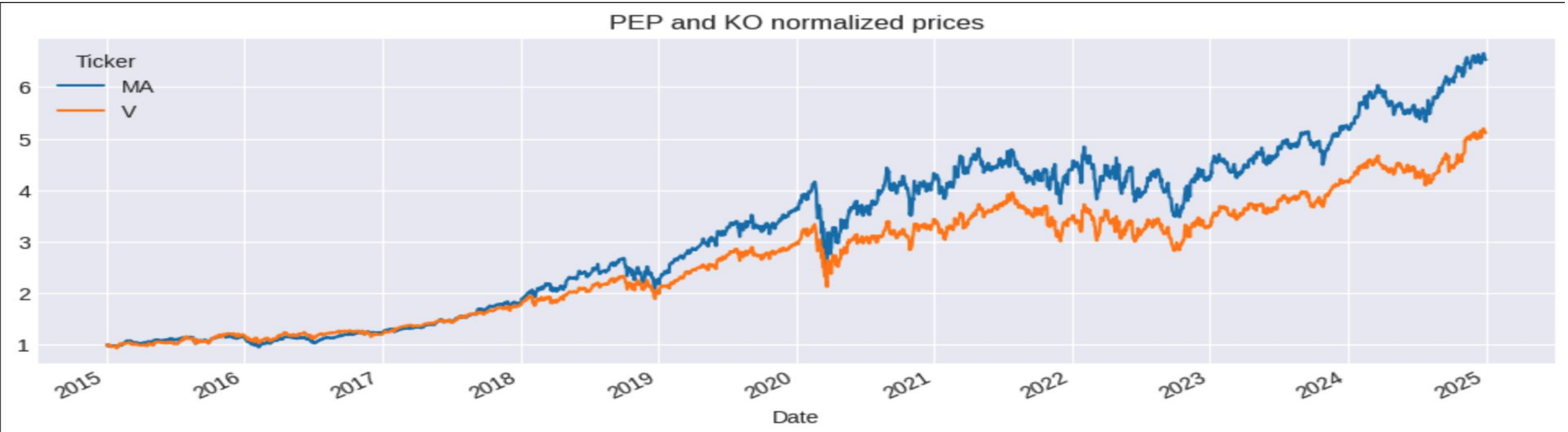
Idea & Setup

- Goal: Test if Pepsi & Coca-Cola stock prices move together (cointegration).
- Method:
  - Download daily price data from Yahoo Finance.
  - Test for cointegration - do they form a stable long-term relationship?
  - Build a trading strategy: when spread is wide, bet it will return to average. (mean reversion)
- Why Pepsi vs Coke?
  - Direct competitors in beverages.
  - Historically seen as substitutes (good candidate for pairs trading)



Strategy Mechanics

- Estimated a hedge ratio (beta): how many KO shares to hold against PEP.
- Built a spread = PEP – beta × KO.
- Calculated a rolling z-score of the spread.
- Trading rules:
- Enter trade if |z| > 2 (spread too far from average).
- Exit trade if |z| < 0.5 (spread normalized).
- Graph to include:
- Spread with mean and ±2 standard deviation bands

Results & Takeaways

- Results from backtest:
  - Cointegration test p-value = 0.86 → **not cointegrated**.
  - Hedge ratio ≈ 2.16 (PEP vs KO). Need to hold 2.16 KO for every 1 of PEP, hedging does not eliminate drift risk since not cointegrated
  - Strategy Sharpe Ratio = –0.32 (not profitable).
  - CAGR ≈ –2%, - money would've shrunk at –2% per year
- What I learned:
  - Even “obvious pairs” may not be statistically good for mean reversion.