

Dispersion Trading - Realized-Correlation Signal & Event-Based Validity Check

This project explores a dispersion trading signal using rolling realized correlations of SPY components. It builds a past-only z-score of realized correlation and runs a small event-based validity check to test whether correlation

Scope: this is a signal-validity study, not a full options P&L backtest yet.

What it does

- Data: Downloads adjusted closes via yfinance for SPY (index) and selected components.
- Signal: Computes rolling pairwise correlations, then a past-only z-score (no lookahead).
- Events: Flags periods of unusually low correlation (z-score below threshold).
- Validity Check: Weekly event-based test that measures forward correlation shifts.
- Outputs:
 - fig_corr.png - Rolling realized correlation
 - fig_zscore.png - Past-only z-score of correlation
 - backtest_signal_validity.csv - Event-based signal statistics

Quickstart

```
pip install -r requirements.txt
```

```
# Run baseline (generates charts/CSVs in ./reports)
```

```
python dispersion_strategy.py --index SPY --components AAPL MSFT NVDA AMZN META --start 2018-01-01
```

```
# Add small event-based validity backtest
```

```
python dispersion_strategy.py --backtest
```

CLI Options

- --index (default: SPY) - the index ticker (basket proxy)
- --components (default: AAPL MSFT NVDA AMZN META) - component tickers
- --start (default: 2018-01-01) - start date
- --window (default: 21) - rolling window size (business days)
- --lookback (default: 756) - past-only lookback for z-scores (~3 years)
- --backtest - run event-based validity test

Roadmap

- Add implied vs realized correlation to study correlation risk premium
- Migrate to Backtrader for a true event-based P&L simulation
- Add costs, slippage, and walk-forward evaluation

Disclaimer

Research/educational purposes only. Not investment advice.