MLPT STRATEGY

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MLPT Strategy

- The machine learning (ML) pair trading (PT) strategy automatically identifies pairs to implement a market neutral mean reversion strategy
- Publicly traded equities from the NYSE and NASDAQ are considered for pair selection
- Strong quantitative foundation with 14,838 pairs considered
- Backtests suggest annualized net returns of 0.01 during 2019-2020
- Sharpe ratio of -0.025 during the same period

Investment universe and securities

- The universe consists in companies that:
  - are traded on the NASDAQ or NYSE
  - have either quarterly or annual filings of fundamental data during 2019-2020 available in Quandl - Zachs/FC

- The selection process chooses:
  - Pairs to trade based on fundamental and yearly returns data.
  - Pairs with higher correlation coefficients

- The strategy takes:
  - Long and short positions in stocks for 50 pairs
  - Parameters that represent the thresholds to trigger a position, and to close a position.
  - Liquidity constraints in account

Competitive edge

- Data driven pair selection process with innovative features
- Extensive backtesting over a two year period
- A market neutral quantitative strategy

Model construction

- Classic pair trading approach develop by Gatev et al. (2006).
- Unsupervised learning pair selection method as in Sarmento & Horta (2020)
- Our model has some weaknesses not present in other models as it becomes too heavily concentrated on real estate companies stocks

Empirical exploration

- 14,838 pairs are considered after making every possible combination of 1000 different clusters of equities.
- Pearson correlation coefficients are calculated for each pair
- What are the returns of each pair given thresholds for when to take a spread position?

Pairs are concentrated in real estate

After the algorithm selects clusters of stocks, obtaining pairs based on correlation coefficients leaves us with a sample concentrated in real estate companies:

	pair	pearson_corr
13960	(OHI, SBRA)	0.893488
14547	(CPT, UDR)	0.892413
14806	(VIAC, VIACA)	0.891144
14747	(MLM, VMC)	0.887336
12966	(AKR, KRG)	0.882830

Figure: Top 5 pairs on Pearson correlation coefficient

Our implementation

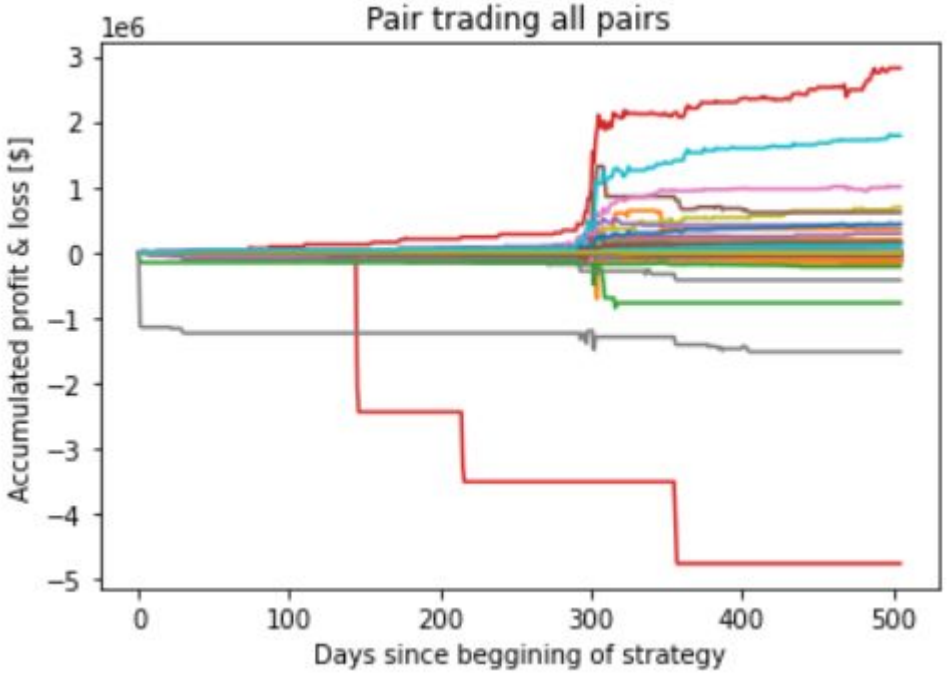
- As in a market neutral trading strategy, we:
  - Take long and short positions based on spread divergence
  - Maintain a long:short ratio of 1:1 by market value
- We trade on a monthly basis, closing all positions on the last day of the month, not allowing more that one spread position per pair, and not trading until next month when a stop-loss is triggered.
- We pick thresholds of 2% to open long positions and -2% to open short positions, and 0.1% to close positions.
- We consider daily returns to calculate the spread, and a stop loss of 25%.
- We take the fairly unrealistic assumption that we can trade at closing day prices every day.

Backtesting

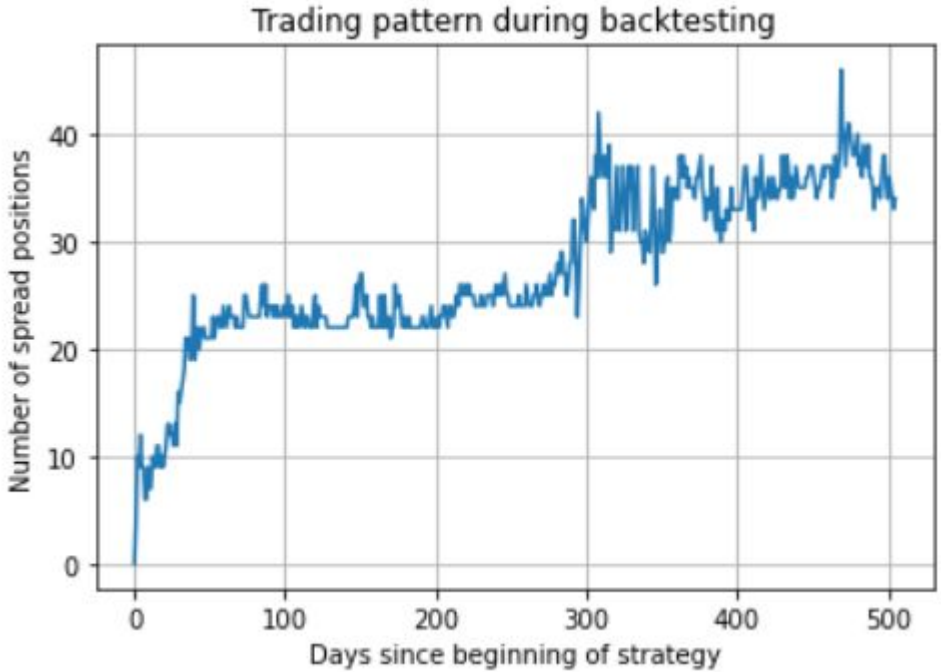
- From the start of 2019 to the end of 2020
- We trade set amounts for each pair based on the least liquid stock , taking a position equal to one thousandth of running trailing 15-trading-day median daily dollar volume.
- We assume we have a total capital equal to (1/50) of the running median volume per pair.

PnL first pair (OHI – SBRA): -4.5% over 2 years

PnL for all 50 pairs

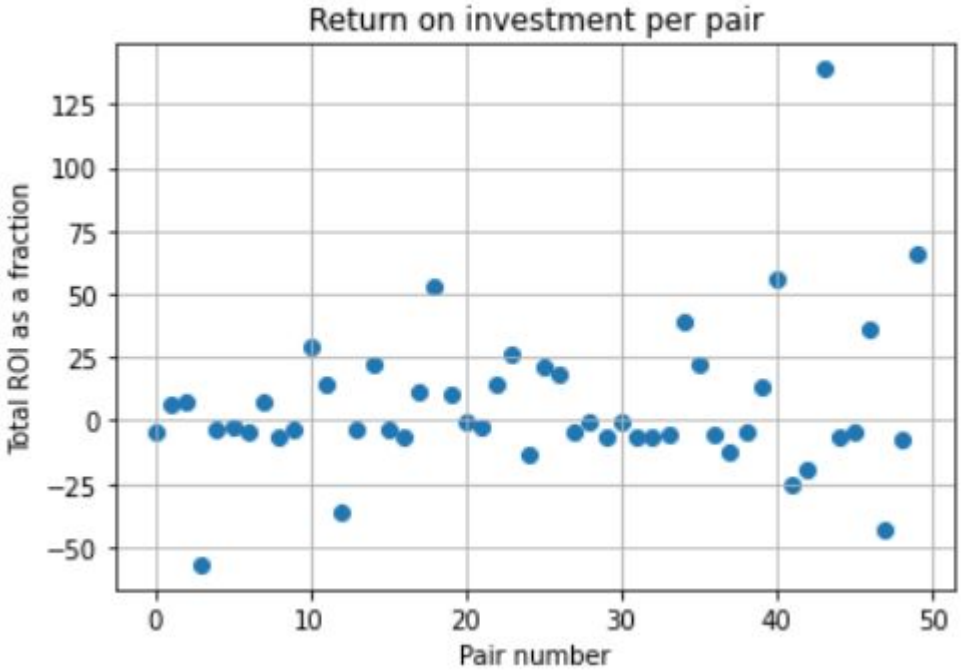


Active positions in time



Aggregated PnL

Overall returns per pair: 6.12%



Summary of returns of backtest

Annualized returns: 1.1%

Sharpe ratio: -0.025

Average total return on investment per pair: 6.1%

Max drawdown: -55%

Range of returns of pairs: [-57%, 139%]

Percentage of pairs that achieved positive returns: 40%

Average active spread positions per day: 27

Conclusion

- Given low yearly returns (1.1%) and high drawdown (-55%). We don’t recommend the strategy for investment at the moment.
- The pairs selected by the strategy, although on average obtained positive returns, are not ideal as some of them incurred on excessive negative returns due to having higher traded volumes. The range of returns on our investments considering our 50 pairs were between -57% to 139%..
- We did not consider trading costs in the strategy, which means that our actual returns would likely be lower given the significant amount of trading incurred.

About the manager

Diego A. Diaz is a master student from the Harris School of Public Policy. He is an expert sommelier of sparkling water from Chile and enjoys coding economic growth models in his free time. He currently lives in Chicago but he expects to move to Boston after the summer.