

A RSI-based Momentum Trading Strategy

Summary

The project explores a RSI-based momentum trading strategy with various versions of constraints. A benchmark is synthesized for each strategy to facilitate the statistical test on the mean of the returns to conclude if there is alpha in the signal of the trading strategy. Further analysis includes annualized risk and return along with Sharpe ratio. A brief discussion on pros and cons of each strategy is provided.

Assumption

No survivorship bias: Every single stock is held from the inception, assuming the dataset is impervious to survivorship.

No stock splits, cash or dividends distributions happening on the dates where Adjusted Close prices are missing.

Strategies

Strategy 1:

Constraints: Only invest in one asset at any point in time or none. No shorting allowed.

Solution: Open long one position every month end based on minimum RSI among all stocks in that month. Hold the position for one month then close at the end of the following month before repeating.

Benchmark: Equal weight market portfolio as the benchmark.

Statistical Test: Perform a t-test with the null hypothesis being that the expected mean return is the benchmark mean return. With p-value at 0.24, we fail to reject the null hypothesis at the 5% significance level.

Strategy 2:

Constraints: Can invest in more than one asset at any point in time or none. No shorting allowed.

Solution: Open long 5 positions every month end based on the lowest 5 RSI scores among all stocks in that month. Hold the positions for one month then close all at the end of the following month before repeating. The script can accommodate any number of long positions.

Benchmark: Equal weight market portfolio as the benchmark.

Statistical Test: Perform a t-test with the null hypothesis being that the expected mean return is the benchmark mean return. With p-value at 0.45, we fail to reject the null hypothesis at the 5% significance level.

Strategy 3:

Constraints: Based on Strategy 2, add the constraint of sector neutrality i.e. each sector should hold the same weight.

Solution: Open long 2 positions per sector every month end based on the lowest 2 RSI scores among all stocks in the sector of that month. Hold the positions for one month then close all at the end of the following month before repeating. The script can accommodate any number of long positions.

Benchmark: Sector Neutral Benchmark to match the sector neutral trading strategy.

Statistical Test: Perform a t-test with the null hypothesis being that the expected mean return is the benchmark mean return. With p-value at 0.33, we fail to reject the null hypothesis at the 5% significance level.

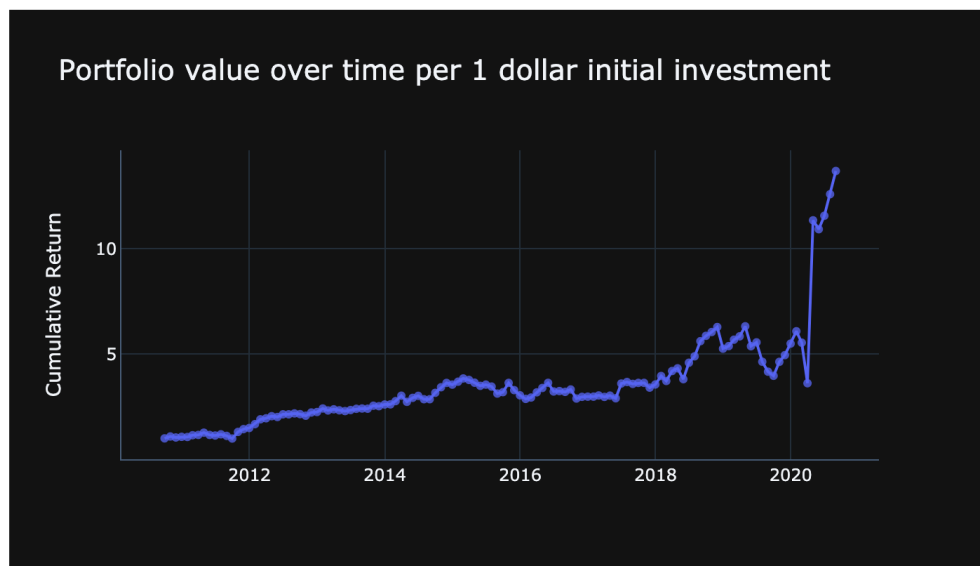
Strategy comparison

1. Risk, Return and Sharpe Ratio

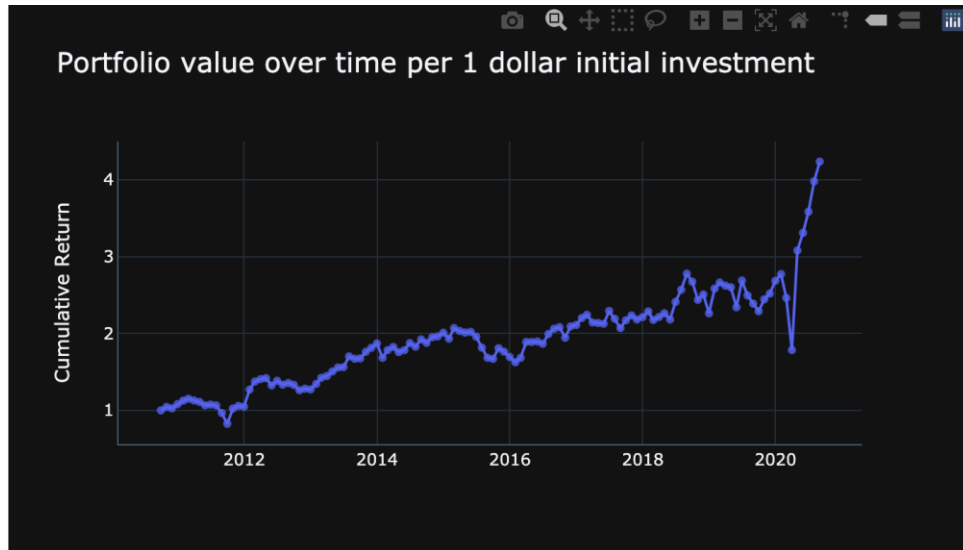
	Strategy 1	Strategy 2	Strategy 3
Return	0.49	0.21	0.22
Risk	0.73	0.32	0.18
Sharpe	0.67	0.64	1.18

2. Cumulative return profile

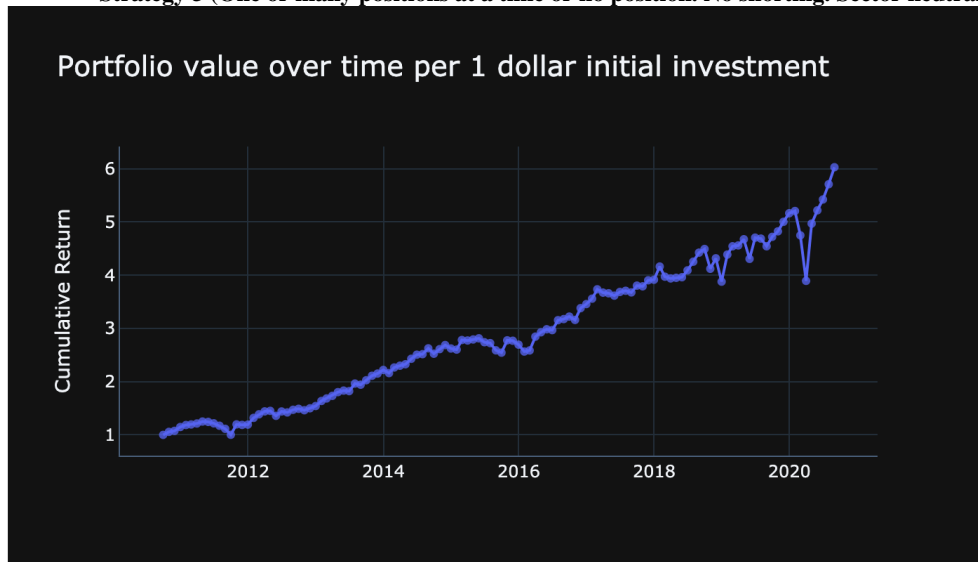
Strategy 1 (One position at a time or no position. No shorting)



Strategy 2 (One or many positions at a time or no position. No shorting)



Strategy 3 (One or many positions at a time or no position. No shorting. Sector neutral.)



Strategy 3 outperforms the other two on the basis of Sharpe ratio. The higher risk adjusted return is attributable to its well diversified holdings. Strategy 1 has the highest risk profile and generates the highest cumulative return. Strategy 2 beats Strategy 1 in the Sharpe ratio category but underperforms Strategy 3. The pros and cons of each strategy depend upon each individual investor's risk appetite and institution's risk mandates.

Next step

Further exploration includes correlation analysis between different sectors with a heatmap as a visualization helper and regression analysis between strategy portfolios with the corresponding benchmark portfolios.