

Pairs Trading

Description

The objective of this mini project is to implement a trading algorithm making use of pair trading strategy. For pair trading in general various attribute of two similar stocks are considered to come up with pair. In this project we experiment creating pairs algorithmically.

Pair Identification

The pair identification is done by program as described below

- Get list of top stocks (my market cap) by industry
- From the above list pick up stocks whose price movement is integrated of order 1
- Form pairs by taking combination of stocks by industry
- For each pair check if the pair is co-integrated. If the pair is co-integrated then consider that pair for trading

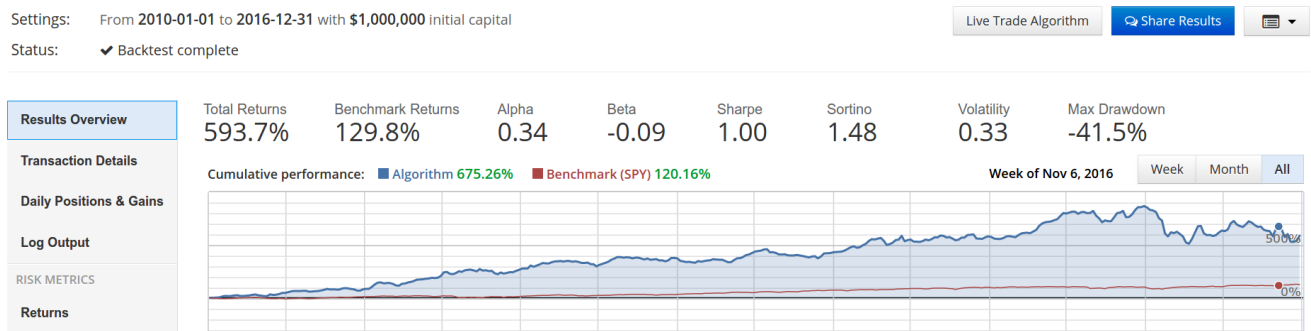
The pairs produced by this strategy was analyzed and seems to be in line with human intuition (some of the pairs produced by the algorithm: MasterCard and Visa, Goldman Sachs and Morgan Stanley, CISCO and Qualcomm, Citigroup and JPMorgan Chase etc).

Trading Strategy

For each co-integrated pair we check how much the current price difference is away from the historic difference. Then top 10 pairs which has highest deviation (in terms of historic standard deviation of the price difference) is picked up for trading. In order to limit volatility only trades which the standard deviation of price difference is less than 10% of stock price. A pair is considered for trade if the price difference is more than 1.25 time standard deviation of historical price difference. A pair position is closed once the price difference reduced to 0.25 standard deviation. In order to limit loss the pair position is closed if the price difference goes beyond 3.1 standard deviation.

Back Testing

The trading algorithm is implemented in quantopian and a back test is conducted from Jan 1,2010 to Dec 31, 2016. The snap shot of result is provided below. The algorithm performed fine and produced returns higher than the overall market.



Summary

The algorithm was able to identify stocks for pair trading and bet on pairs which looked lucrative. The return produced by the algorithm was better than over all market.