Trading Assignment 3: Pairs Trading

This trading strategy examines the profitability of a pairs trading based on the price correlation of two securities. The assumption of the pairs trading strategy is that the two highly correlated assets will drift in and out of an equilibrium cointegrating relation. A position is open when the pair is out of an equilibrium and the spread is large and closed when the assets return to an equilibrium and the spread converges to its historical mean. The risk with a pairs strategy is if or when the assets continue to diverge instead of converging.

The strategy follows a two-step process. First, find two securities whose prices have moved together historically in a formation period. Second, monitor the spread between them in a subsequent trading period. If the prices diverge and the spread widens, short the winner and buy the loser.

1. You will form pairs over a twelve-month period (formation period) and trade them in the next one-month period (trading period).

Pairs Formation: Go to CRSP https://wrds-www.wharton.upenn.edu/pages/get-data/center-research-security-prices-crsp/ and download the daily stock file for the past 12 months. Screen out all stocks from the CRSP daily files that have one or more days with no trade. This serves to identify relatively liquid stocks as well as to facilitate pairs formation.

Construct a cumulative total return index for each stock over the formation period. Then choose a matching partner for each stock by finding the security that minimizes the sum of squared deviations between the two normalized series.

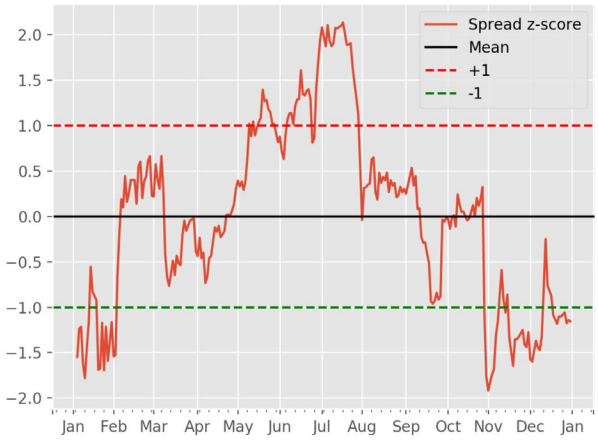
Select the top 20 pairs. For each pair confirm that there is better than 90% confidence on cointegration tests.

For each pair ($x=\log(price_A)$,$y=\log(price_B)$) compute:

(i) the hedge ratio as the slope from regression of y on x,

(ii) spread=y – hedge ratio*x

(iii) z-score = (spread(-1) – spread.mean)/spread.std.



Trading:

A long-short position is entered when the magnitude of the z-score is larger than one in absolute value and closed when it crosses the +1,-1 bounds.