Variations of Pairs Trading or Mean Reversion Trading

Note that it's also possible to extend pairs trading to more than two stocks. We can identify multiple pairs and include these pairs in the same portfolio. We can also analyze stocks that are in the same industry. If we grouped the stocks within the same industry into a virtual portfolio and calculated the return of that industry, this portfolio return would represent the general expected movement of all stocks within the industry. Then, for each individual stock series, we can calculate the spread between its return and the portfolio return. We can assume that stocks within the same industry may revert towards the industry average. So when the spread between the single stock and the industry changes significantly, we can use that as a signal to buy or sell.

Cointegration with 2 or more stocks

Generalizing the 2-stock pairs trading method

We can extend cointegration from two stocks to three stocks using a method called the Johansen test. First let's see an example of how this works with two stocks.

The Johansen test gives us coefficients that we can multiply to each of the two stock series, so that a linear combination produces a number, and we can use it the same way we used the spread in the prior pairs trading method.

$$w_1 \times stock_1 + w_2 \times stock_2 = spread$$

In other words, if the first stock series moves up significantly relative to the second stock, we can see this by an increase in the "spread" beyond its historical average. We will assume that the spread will revert down towards its historical average, so we'll short the first stock that is relatively high, and long the second stock that is relatively low.

So far, this looks pretty much like what you did before, except instead of computing a hedge ratio to multiply to one stock, the Johansen test gives you one coefficient to multiply to each of the two stock series.