Homework: Simple Spread Trading

Sunday 14th April, 2019

1   Introduction

A spread trading strategy checks a running estimate of the displacement between two related instruments, and makes bets that this displacement will decline whenever it gets large. Here, we define that displacement in terms of recent returns.

2   Data

Obtain split- and dividend-adjusted closing prices[1] for 2 Dec 2016 though 31 Dec 2018 of a pair of ETFs (which we will call X and Y) as specified below. Estimate daily dollar volume, compute the running 15-trading-day median of it over our sample period for X, and denote that running median (as of any day given t) for the less liquid of the two ETFs with the expression N_t.

3   Exercise

3.1   Positions

Create code for a spread-reversion trading strategy that begins on the first day of each month, trades during the month, and closes any open positions the end of each month (i.e. the first potential day for a trade is just after January 1 2017).

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[1]The Quandl EOD database and Bloomberg are the best two sources for this.

Its trades are equal-sized dollar amounts of X and Y to the nearest integer number of shares, as close as possible to $\$N_t/100$ of each. The strategy enters or maintains a position if the size of difference between the M-day return on X and Y is greater than g, and flattens (exits) the position if the size of the difference is less than j (where $j < g$). It does so by shorting the security whose recent return is higher. If the change in difference is large enough the position can flip from shorting the spread to being long the spread and vice versa, as discussed in class.

You only ever hold, at most, one long and one short position (i.e. one spread position). If you already have a position and the next tick is favorable to it, this simply means you continue to hold the position (except in stop loss situations).

3.2   Stop Loss

Include a stop loss parameter s in your strategy. If your simulation experiences a day such that the present position value has lost more than a proportion s of the gross traded cash ($|\$\text{long}| + |\$\text{short}|$ at position entry time), then force an exit at current prices, assume no new positions for the remainder of the month, and include this in your accounting.

3.3   Capital

Set the capital K for your strategy to the maximum of N_t over the data period, times two[2]. You can use this to evaluate return on capital.

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[2]This setting has lookahead bias but is good enough for now.

3.4 Data

ETF pairs X,Y (in order) are as given by the last digit of your student number as follows:

0. RYU XLU

1. FCOM VOX

2. RING GDX

3. FTSL SMH

4. PBE XBI

5. IEO XOP

6. PXJ OIH

7. RTH XRT

8. SIVR SLV

9. HYLD JNK

4 Analysis

Study the performance of your strategy as you vary j, g, s, and M. You need not run a fancy nonlinear optimizer, but try to find which parameters work best. Be sure to highlight which ETF pair you are analyzing.