

# Homework: Simple Spread Trading

Monday 4<sup>th</sup> April, 2016

## 1 Introduction

A spread trading strategy checks a running estimate of the displacement between two related instruments and bets that displacement will decline whenever it gets large.

## 2 Data

Obtain split- and dividend-adjusted closing prices<sup>1</sup> for 2 Dec 2013 through 31 Dec 2015 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 call that running median  $N_t$ .

## 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 January 1).

Its trades are sized equal dollar amounts of  $X$  and  $Y$  to the nearest integer number of shares, based on  $\$N_t/100$  of  $X$ . The strategy enters or maintains a position if the size of difference between the  $M$ -day return on  $X$  and  $Y$  is

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<sup>1</sup>The Quandl EOD database and Bloomberg are the best two sources for this.

greater than  $g$ , and flattens (exits) the position if the size of the difference is less than  $j$  (where  $j < g$ ).

You only ever hold 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 ( $|\$long| + |\$short|$  at position entry time), then force an exit at current prices 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<sup>2</sup>.

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<sup>2</sup>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. IST IYZ
2. RING GDX
3. XSD 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  $M$ .

Submit the code you have written and an analysis document. You may submit either a Jupyter notebook containing both code and analysis, or code modules plus an analysis PDF (MS Word and LibreOffice are not acceptable).

Ensure your name and student number appear at the top, and be sure to highlight which ETF pair you are analyzing.