Exercise 4: Rolling Estimation

Learning Objective

By the end of this exercise, you should be able to:

- ✓ Perform rolling estimation with SAS macro
- ✓ Calculate risk-adjusted returns (alphas) in portfolio analysis

Part 1. Run a sample code of idiosyncratic volatility

In classic finance theory, firms with high firm-specific risk should have higher expected returns as the compensation for investors' inability to diversify their portfolios. Ang, Hodrick, Xing, and Zhang (2006) find the opposite: firms with high idiosyncratic volatility earn much lower expected returns. Please read Section II of Ang, Hodrick, Xing, and Zhang (2006) for definition of idiosyncratic volatility and Table VI for the performance of portfolios sorted by idiosyncratic volatility.

After the reading, you can run my SAS code for replicating Table VI-Panel B: portfolio sorted by idiosyncratic volatility. You will see how to conduct rolling estimation of idiosyncratic volatility with SAS macro, and you will see how to calculate risk-adjusted portfolio returns (alpha).

The data you need are daily/monthly CRSP stock file and daily/monthly Fama-French factors, and these data can be downloaded from WRDS and Professor French's website respectively.

Part 2. Replication of Betting against beta

Traditional CAPM model predicts a "high beta-high return" risk-return trade-off. However, real data often that high beta stocks tend to have returns much lower than the value predicted by CAPM (high beta-low CAPM alpha). Frazzini and Pedersen (2014) presents a model with leverage and margin constraints that accommodates the "high beta-low CAPM alpha" empirical pattern, and they propose a Betting-Against-Beta factor (BAB factor) accordingly. You need to replicate the BAB factor and calculate the correlation with BAB factor from the original paper. Please read the Data and Methodology section very carefully on the details of rolling estimation of beta, otherwise you cannot get a close replication of BAB factor. Another thing to note is that the rolling estimation of beta takes a lot of time (depending on your computer, it may take several hours to one day for the rolling estimation). Hence, I strongly suggest you to calculate BAB factor for 3-5 years first, and compare it against BAB factor from original paper. Once you are confident about your replication of BAB factor in a short window, then you can calculate BAB in the full sample period of 1926-2012 as in the paper.

The original BAB factor can be found in AQR website:
https://www.aqr.com/Insights/Datasets/Betting-Against-Beta-Equity-Factors-Monthly

You need to submit two results for the replication: 1) Time-series of your BAB factor and original paper's BAB factor in monthly frequency, together with a correlation coefficient, in the sample period of 1963-2012; 2) A replication of Table 3 in Frazzini and Pedersen (2014). You only need to show the Excess return and CAPM alpha for portfolio returns and BAB factor.

Please send the results to the public email:
hqsas19@163.com
hqsas2019