Portfolio Returns Assignment: R&D Capital Replication

Due: Thursday, November 18th before class

You will submit both a PDF write up with exhibits and your corresponding code. The write up should be in brief memo format discussing your process and results. Exhibits should also have brief captions explaining the results. The memo should be a stand-alone document with the intent that a corporate manager could read it and understand the work you have completed.

This assignment is an exercise in computing portfolio returns, replicating some of the calculations presented in class and extending that sample to a more current period. Using the measure discussed in class of R&D capital, you should complete the following:

1. Calculate equal-weighted returns for quintile-sorted portfolios and a portfolio of non-R&D firms (slide 23). Calculate these returns for the three sample periods provided in the slides.

2. Create a long-short portfolio long high R&D capital firms and short low R&D capital firms. Calculate CAPM alpha, Fama-French 3-factor alpha, and the Sharpe ratio of this portfolio (slide 24).

3. Repeat steps 1 and 2 (calculating returns and alphas) using value-weighted returns for the portfolios (slides 26 and 27).

4. Repeat steps 1 and 2 (calculating returns and alphas) excluding the largest 1000 firms each year and using value-weighted returns for the portfolios (slides 29 and 30).

5. Repeat steps 1-4 using an extended sample period through December 2020.

As a reminder, think carefully about the timing of events in the data; this is one of the more complicated parts of portfolio creation. Specifically, ensure that you are merging the annual fundamentals to the correct year of returns when merging the CRSP and Compustat files. As discussed in class, avoid look-ahead-bias by trading on portfolio sorts three months after sorting the portfolios (i.e., sort portfolios on December 31, wait three months such that the financial data would be public, and start trading those sorted portfolios on April 1 the next year).

You can reach out to the TA with questions at eric.vance@mccombs.utexas.edu. Lastly, if the class needs an additional session to answer questions, contact the TA to schedule a mutually convenient time for the class.