Exercise 1: Portfolio Sorting

Learning Objective

By the end of this exercise, you should:

- ✓ Get familiar with CRSP Monthly Stock File (CRSP.MSF)
- ✓ Be able to conduct basic portfolio sorting analysis

Part 1. Reading

Read *Empirical Asset Pricing: The Cross Section of Stock Returns*, Page 33 to Page 45 to get a sense about what is portfolio sorting and why we do it.

完成时间：1h

Part 2. Learn WRDS sample code on portfolio sorting

In this part, we are going to run the portfolio sorting SAS codes from WRDS on our own computer. Before that, we should download CRSP monthly stock file (MSF) from WRDS and understand the definition of some key variables including: permno, date, shrcd, exchcd, shrout, prc, ret, dlret, vol. Definitions can be found on the web page where you download the CRSP data, or from the CRSP website: http://www.crsp.com/products/documentation/data-definitions-1

We then do a simple empirical exercise: read the "portfolio by size" sample sas code from WRDS and run these codes on your own SAS terminal. Please find the link to "portfolio by size" on the following webpage:
https://wrds-www.wharton.upenn.edu/pages/support/applications/
There are two cases in the "portfolio by size" page:

- Case 1 : Size Portfolios for all CRSP Securities
- Case 2 : Size Portfolios for Common Stocks Using NYSE Breakpoints

For Python users, please refer to size1.ipynb and size2.ipynb for the above two codes.

Additional notes about running the codes (for SAS user):

- Case 1: you should at least run the codes in "Step 1" thru "Step 4".
- Case 2, you may not understand what Step 1 is doing, you could directly replace Step 1 with following code and run the code from Step 2 to Step 5:

```
data crsp_m;
  set crsp.msf; /* CRSP.MSF is the MSF data file */
  if '31dec2010'd >= date >= '01jan1991'd and shrcd in (10,11);
  if dlret ne . then ret = sum(1,ret)*sum(1,dlret)-1; /* This
is to adjust Delisting return */
  keep permno date exchcd shrcd prc ret dlret; /* Keep relevant
variables in MSF */
run;
```

During this process, you should:

- Understand the purpose of each step
- Pay attention to the usage of Proc SQL in SAS. We must understand the grammar of Proc SQL since this would be the most frequently used command in SAS hereafter.
- Learn to write comment, which will be extremely important if you are going to share your code with others.

Part 3. Stock return seasonality: A further exploration of CRSP MSF

In this step, we are going to examine an old stock return seasonality pattern in US, named January effect, through our own coding (no sample code for this exercise!).

Background: January effect, first documented in Rozeff and Kinney (1976), refers to the phenomenon that stock returns in January is on average higher than returns in non-January months. We take one-step further: Our task is to show that January effect exits among small firms but not among large firms.

Sample: NYSE/AMEX/NASDAQ stocks in the sample period 1933-1977.

Empirical steps: In each month t, sort stocks into 5 groups based on their market cap at previous month-end. We then compute equal-weighted portfolio returns for these 5 portfolios in month t. By performing this calculation in every month from t=1933m1 to 1977m12, we can obtain time series of portfolio return of the 5 size-sorted portfolios (In the output file, you will end up with 6 variables with 540 observations, the first variable is "date" of each month, the rest 5 variables are the respective portfolio returns in each month).

To show January effect, for each portfolio i (i = 1 to 5), we can compute the average monthly return in non-January months every year, and we also have one January return every year. In the sample period of 1933-1977, you should have 45 January return and 45 non-January months return, and next we can compute return difference between January and non-January months. Let's dub this return spread as January effect hereafter. Notice that the return spread is still a time series.

For each of the 5 size-sorted portfolio, compute mean January effect during 1933-1977. Check whether January effect is statistically significant in the smallest and largest size portfolio, respectively. Compute

Part 4: Submit the empirical exercise results

You only need to submit the results in Part 3. What you need to submit is a nice table which shows the January effect for each portfolio in each year. In addition, you should add one more column showing the difference in the magnitude of January effect between smallest portfolio and largest portfolio, which would be something like the following table.

Please submit the results along with your SAS code to the public email: hqsas19@163.com Password: hqsas2019

Year	Portfolio 1 (smallest)	2	3	4	5	1-5
1933	0.0062	0.0092	0.0052	0.0084	0.0041	0.0062
1934	0.0077	0.0026	0.0069	0.0047	0.0028	0.0020
…	…	…	…	…	…	…
1977						
Average	0.0091	0.0094	0.0029	0.0009	0.0016	0.0075
t-stat	(3.45)	(2.05)	(1.95)	(1.45)	(0.78)	(2.48)