

FIN 3080 Investment Analysis and Portfolio Management

Spring 2025 | CUHK (SZ)

Assignment IV

Due: 23:59, April 27, 2025

Disciplines

- Late submissions without valid justification will result in point penalties.
- A complete submission must include:
 - One readable PDF (1.5-spaced, 11pt font, not exceeding 5 pages) containing arguments, tables, and figures.
 - A compressed archive named `YourID_YourName.zip` with all code files needed to reproduce empirical results.
- Collaboration with peers is permitted, but plagiarism or data fabrication will result in disciplinary action.
- You may use any programming language for assignments. Note that Excel is excluded and cannot be used for programming tasks.

Problems

Please access the CSMAR database and download the following data: (i) monthly *Market Risk Premium Factor (Weighted Average Value of Negotiable Shares)*, *Book-to-Market Ratio Factor (Weighted Average Value of Negotiable Shares)* over December 2000 to December 2024 from the *Factor Research Series/Fama-French Factors* table, (ii) monthly *Market Value of Tradable Shares*, *Return Without Cash Dividend Reinvested* and *Market Type* over December 2000 to December 2024 from the *China Stock Market Series/Stock Trading* table.

1. Focus on A-share mainboard stocks listed on Shenzhen Stock Exchange (SZSE) and Shanghai Stock Exchange (SSE). For each month from January 2001 to December 2024, sort firms based on their last-month *market capitalization* (i.e., *market value of tradable shares*) and divide firms into ten groups according to last-month *market capitalization* deciles. By holding all stocks within each group with equal weights and rebalancing positions monthly, we can construct ten portfolios. Please calculate the monthly returns for each of the ten portfolios from January 2001 to December 2024 and for each portfolio report results for the following regression:

$$\text{Portfolio Return}_t^i = \alpha + \beta_1 \text{Market Risk}_t + \beta_2 \text{BM Ratio}_t + \epsilon_t^i,$$

where $\text{Portfolio Return}_{i,t}$ is the monthly return for portfolio i at month t , and Market Risk_t and BM Ratio_t are the monthly *Market Risk Premium Factor* and *Book-to-Market Ratio Factor* at month t , respectively. Discuss your findings.

Hints

1. The idea of portfolio construction is the same with that in Homework 2. We are expected to construct ten portfolios based on *market capitalization* in the previous month. In other words, the composition of these portfolios changes every month. Denote by $D_{i,t}$ ($i \in \{1, 2, \dots, 9\}$) the 9 deciles/cutoffs for *market capitalization* at t and further define $D_{0,t}$ ($D_{10,t}$) as the minimal (maximal) *market capitalization* at t . Then portfolio i at t consists of equal-weighted *stock j*'s with *market capitalization* $j_{t-1} \in [D_{i-1,t-1}, D_{i,t-1}]$ and the return for the i -th portfolio at month t (denoted by r_t^i) is given by

$$r_t^i = \frac{1}{N_t^i} \sum_{j=1}^{N_t^i} r_{j,t}^s$$

where N_t^i denotes the number of stocks with *P/B ratios* at $t - 1$ lying in $[D_{i-1,t-1}, D_{i,t-1}]$ and r_j^s denotes the monthly return for *stock j* at t .

You may find [bysort](#) and [xtile](#) in Stata helpful to generate *market capitalization* deciles by month.

2. The original Fama-French factor dataset consists of factors derived from different markets. We only need to use records from the *SSE-SZSE A share market (excluding STAR Market, ChiNext)*. In other words, we select records where **Market Type ID** equals “P9706”.