FIN 3080 Investment Analysis and Portfolio Management

Spring 2025 | CUHK (SZ)

Assignment III

Due: 23:59, April 8, 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

1. Please download daily *Closing Index* for the *CSI 300* index from CSMAR's *China Stock Market Series/Stock Trading/Market Index* table over 2006/1/1 to 2023/12/31, and finish the following tasks.
   (a) Manually derive monthly *CSI 300* index returns and provide summary statistics on *mean, standard deviation, skewness* and *kurtosis* for monthly *CSI 300* index returns.
   (b) Plot a histogram for *CSI 300* monthly returns.
   (c) Discuss whether returns of the *CSI 300* index follow a normal distribution.
2. Since the seminal work of Jensen, Black, and Scholes (1972, hereafter BJS), there have been numerous empirical attempts to examine the relationship between asset risks and expected returns. In a simplified adaptation of BJS's framework, Chen et al. (2019) apply this methodology to the Chinese stock market. Please carefully read through Chen et al. (2019) and complete the following tasks.
   (a) Download weekly *Returns Without Cash Dividend Reinvested* for all A-share mainboard stocks from *China Stock Market Series/Stock Trading/Individual Stock Trading* table from the first week of 2017 to the last week of 2022.

weekly XXX returns = mean (weekly XXX)

(b) Calculate weekly market returns as the mean value of weekly returns of all mainboard stocks .

(c) Load weekly risk-free return data from *"weekly_risk_free_rate.xlsx"* or *"weekly_risk_free_rate.dta"*.

(d) Follow Section 4 in Chen et al. (2019) to replicate Table 2 and 3 with data obtained from *(a)* - *(c)*. In other words, you reproduce two tables with the original methology yet with different data.

Hints

1. When the requested dataset contains a large number of observation, CSMAR may split the data into mutiple files. Please remember to concatenate all raw data files.

2. Denoted by $R_{k,t}$ the returns for index k at time t. You may calculate $R_{k,t}$ as follows:

Rt = (Xt / X(t-1)) -1

$$R_{k,t} = \frac{I_{k,t}}{I_{k,t-1}} - 1,$$

where $I_{k,t}$ is the closing index for k at t. In other words, you do not have to worry about issues like *dividends* or *changes in tradable shares* when calculationg index returns.

3. The file *"weekly_risk_free_rate"* contains weeklized returns of 1-year government bonds sourced from CBIRC. You can directly use *"risk_free_return"* therein as weekly risk-free returns.

4. You may find the combination of bysort and asreg in Stata helpful to run regressions by group and store coefficients as new columns correspondingly.

5. In an empirical replication, you do not necessarily have to generate exactly the same coefficients or t-statistics (nor is it possible) but you should follow the original design and find comparable results with solid justifications.

References

Chen, Yifan et al. (2019). "Empirical test of CAPM in Shanghai securities market". In: *Finance* 9, pp. 28–33.

Jensen, Michael C, Fischer Black, and Myron S Scholes (1972). "The capital asset pricing model: Some empirical tests". In: *Studies in the Theory of Capital Markets*.