

Project: Predict stock market crash!
20% of your grade. (50 pts out of 250pts)

Instructions:

This is a group assignment. Please work in groups of no more than 3 people (2 or 3 people).

DO NOT work with anyone not in your group.

DO NOT share your project with other groups.

Please submit:

- A. A report in MS Word format. It must be self-complete so that readers can understand your analyses without looking at the csv file or R code. Single line space & 6 pt after paragraph, Moderate margin, Letter size, Times New Roman, and Main body font size 12.
- B. A csv file that contains all data.
- C. A txt file that contains all R code to solve all questions.¹ The code must run smoothly to earn credit. Insert section between problems (Ctrl + Shift +R)

Clearly document which data you have downloaded; it is your job to ensure you have given me enough information to replicate your calculations and conclusions. The file names should be of the form: P_FAMILYNAME1_FAMILYNAME2.xxxx.

Please make sure that your files are well-organized and clear, with appropriate text, explanations, and formatting – for example, make your final answer very clear. If your grader cannot figure out what you did, then what you did is wrong.

In this assignment you will design models to predict the bear market.

[10 pts] Data: between 1990 and 2022.

- From FRED, download one variable per each category². They will be used as independent variables.
 - Think carefully which data would have good prediction power to market crash. Provide background logic or economic ideas why you chose them. If you have ideas from literature, newspapers, articles, etc., provide references.
 - They must have monthly data between 1990 and 2022.³
- From WRDS, download monthly price return (MthPrcRet) of S&P 500 index⁴.

¹ Copy R script to the “Notepad” app and save it in ‘txt’ format.

² <https://fred.stlouisfed.org/categories/>

³ Weekly or Daily data can be converted to Monthly data.

⁴ Login credentials: ID: mil_fall_2023, Passwd: Margolis@2023

Home/Get Data/CRSP/Annual Update/Index - Version 2 (CIZ)/Monthly Index and Portfolios on S&P 500

- Nicely put those data in a csv file.

Tasks.

1. [5 pts] Simple linear regression. Check the relationships between S&P500 monthly return and individual independent variable by running simple linear regressions. Explain the results.
2. [5 pts] Multiple linear regression. Run a regression of S&P500 with all independent variables. Explain the results.
3. [10 pts] Model selection. Perform model selection to suggest the best multiple regression model to predict the S&P500 monthly return. Provide relevant statistics and explain the results.
4. [10 pts] Dummy regression. There is a belief in the market that August, September, and October are risky months for stock markets. Run dummy regression together with selected variables in Step 3. Explain your findings.
5. [10 pts] Logit regression. Generally, a bear market is when the stock market declines more than 20% from the previous peak. For this project, let's define a bear market when the stock market declines more than equal to 4% a month. (return $\leq -4\%$). Run a logit regression with selected independent variables in Step 3 to predict the bear market. Check how well the model works. Explain.