

15.433/4331, Fall 2025

Assignment 2 (6 points + 2 extra points)

Due Sunday, October 12, 2025, 11:59pm

Instructions: You can work in groups of up to 4 students per group. Submit one PDF write-up per group, including the names of all members, with clearly structured responses to each question. Any code should be placed in a well-labelled appendix at the end of the PDF, and the Python notebook must be submitted separately.

In this assignment, you will design and test momentum strategies across industries. Pick your favorite industry breakdown from Ken French's website: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. To make sure there is enough variation across industries, I recommend you select the 30, 38, 48, or 49 industry portfolios. Download the monthly returns of those portfolios, including dividends.

30 Industry Portfolios [TXT](#) [CSV](#) [Details](#)
30 Industry Portfolios [ex. Dividends] [TXT](#) [CSV](#) [Details](#)
30 Industry Portfolios [Daily] [TXT](#) [CSV](#) [Details](#)

38 Industry Portfolios [TXT](#) [CSV](#) [Details](#)
38 Industry Portfolios [ex. Dividends] [TXT](#) [CSV](#) [Details](#)
38 Industry Portfolios [Daily] [TXT](#) [CSV](#) [Details](#)

48 Industry Portfolios [TXT](#) [CSV](#) [Details](#)
48 Industry Portfolios [ex. Dividends] [TXT](#) [CSV](#) [Details](#)
48 Industry Portfolios [Daily] [TXT](#) [CSV](#) [Details](#)

49 Industry Portfolios [TXT](#) [CSV](#) [Details](#)
49 Industry Portfolios [ex. Dividends] [TXT](#) [CSV](#) [Details](#)
49 Industry Portfolios [Daily] [TXT](#) [CSV](#) [Details](#)

You have a great deal of flexibility in constructing and testing your strategy. Here are a few considerations:

- What is your sample period? It should span at least 20 years, ideally longer.
- What is the lookback window for past returns based on which you sort industries?
- Which industries go into your strategy? You may choose to use all industries in your strategy. Or, in each month, you may choose to only use industries that performed very well and very poorly.
- Among the industries you include in your strategy, what are the weights? You may use equal weight in the long leg and the short leg. Or, you may assign a higher weight if the past return is more extreme. Or, you may also decide not to

short anything and only use a long leg, in which case the short leg is the risk-free rate (that you should separately download).

- a. **(4 points)** Construct and test the performance of your strategy. Clearly explain your methodology. With an initial \$1 invested at the start of your sample period, calculate the portfolio value month after month. For example, if the strategy return for month 1 is -1% and the strategy return for month 2 is 2% , the portfolio value at the end of the two months is $(1 - 1\%) \times (1 + 2\%)$. Plot the time series of the portfolio value of your strategy. For ease of comparison, the strategy return in each month should be an excess return (either long leg return minus short leg return or long leg return minus risk-free rate). Also report the geometrically compounded average return per month.
- b. **(Optional, 2 extra points)** Examine the time periods in which your strategy did very well or very poorly, if such periods exist. How would you adjust the strategy? Back test your adjustment and plot the portfolio value.
- b. **(2 points)** What is the alpha of your strategy benchmarked against the Fama-French 3 factor model and the Fama-French 5 factor model? The factor returns can be downloaded from Ken French's webpage.

Fama/French 3 Factors [TXT](#) [CSV](#) [Details](#) [Historical Archives](#)

Fama/French 3 Factors [Weekly] [TXT](#) [CSV](#) [Details](#)

Fama/French 3 Factors [Daily] [TXT](#) [CSV](#) [Details](#)

Fama/French 5 Factors (2x3) [TXT](#) [CSV](#) [Details](#) [Historical Archives](#)

Fama/French 5 Factors (2x3) [Daily] [TXT](#) [CSV](#) [Details](#)

Note: This problem will be graded based on the rigor of your analysis, rather than the returns. It is completely fine if the strategy you constructed and tested does not yield impressive returns!