

Assignment 2

Asset Allocation and Investment Strategies

January 23, 2026

This assignment focuses on cross-sectional predictability. In particular, you are going to replicate the basic results from the paper “Common risk factors in the returns on stocks and bonds”, Journal of Financial Economics 33 (1993), pp. 3-56, by E.F. Fama and K.F. French (1993). The aim is to understand why the single factor CAPM is no great model and why portfolios mimicking value and size factors present genuine puzzles.

The data provided with this assignment is split in two tables:

- d 25_Portfolios_5x5.csv contains monthly returns of the 25 Fama-French portfolios,
- d F-F_Research_Data_Factors.csv contains monthly returns of the factors rmrf (risky minus risk-free), smb (small minus big), and hml (high minus low). The column rf are the risk-free returns.

You will need to compute excess returns for the factors and the 25 Fama-French portfolios.

Your first task is to evaluate the performance of the single factor CAPM. We will initially focus on the sample period studied by Fama-French, that is, 1/1964–1/1993.

- (i) For each of the $i = 1, \dots, 25$ Fama-French portfolios run the time-series regression

$$r_t^i = \alpha_i + \beta_i \times \text{rmrf}_t + \varepsilon_t^i$$

where r^i it is the excess return on portfolio i. Report

d monthly mean returns,

d β^i and their t-values,

d α^i and their t-values,

d the adjusted R^2 s

in tables of the form

	Low b/m	2	3	4	High b/m
Small					
2					
3					
4					
Big					

- (ii) Discuss in words the patterns of excess returns you have obtained. For example, in which direction (North/South/East/West) do returns increase?
 - (iii) Does the spread in average returns represent a puzzle in itself? Discuss this point in light of the pattern you have obtained for the CAPM β s.
 - (iv) Are any of your α significant? What does this mean? What about the (adjusted) R^2 —is it high or low?
 - (v) Plot the average excess returns versus the excess return predicted by the CAPM ($E[\beta_i \times \text{rmrf}_t]$) along with the 45 degree line.
 - (vi) Does the CAPM have any hope? Does the CAPM work for any of the 25 Fama-French portfolios?
 - (vii) Connect the portfolios within each b/m category? (Similar to figures 20.10 and 20.11 in Cochrane's book.) Is there a relationship?
 - (viii) Connect the the portfolios within each size category? Is there a relationship? What's the puzzle here?
 - (ix) Finally, repeat the plot of excess returns versus predicted excess returns for the sample periods
 - (a) 1/1933–12/1963,
 - (b) 1/1933–12/2023.
- How do things change?