Homework 3: Using statistics from portfolio theory

William Mann, Emory University, Fall 2024

Download the spreadsheet “Homework 3 data.xlsx”. It contains monthly data from 2009 to 2023 of risk-free returns, and of total returns to some of the mutual funds we looked at in Homework 1. We will look again at these funds using some of the performance measures from this section of the course.

1. Which funds, if any, had Sharpe ratios higher than VFINX in the data you are given?

2. Calculate the beta and alpha of each fund with respect to VFINX, using the formulas from class. (Use the average excess returns in the data for the “expected” excess returns in the formulas.)

3. Calculate the same numbers by running a regression and reporting the results.

4. For each fund, calculate its information ratio with respect to VFINX. Then determine the highest Sharpe ratio that an investor could achieve by allocating only between VFINX and that fund. (Refer to the formulas from class.)

5. Suppose a fund manager follows a strategy of allocating half of invested funds to VMNFX, and the other half to PTLAX. What is the information ratio of this strategy? If an investor divides her money between this fund and VFINX, what is the highest Sharpe ratio that she can achieve? What weighting of VFINX and the manager's strategy will achieve this Sharpe ratio?