

Homework 4

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While value stocks have historically outperformed growth stocks, during a few recent years the pattern reversed. In this assignment you will consider the strategies an investor could have used to take advantage of that fact, if they had foreseen it.

Download the spreadsheet “Homework 4 data.xlsx” from Canvas. It contains returns from 2018 through the end of 2021 on three iShares ETFs that all track stocks in the S&P 500, but with different focuses:

- IVE focuses on large-cap value stocks,
- IVW focuses on large-cap growth stocks,
- WFSPX is a passive index fund.

The spreadsheet also reports one-month risk-free rates of return for each month in the sample.

Suppose you have \$1000 to invest from the beginning of 2017 through the end of 2021.

1. For all three funds, calculate and report their Sharpe ratios and the cumulative value of \$1 invested initially during 2017-2021. For IVE and IVW, calculate and report their beta and alpha with respect to WFSPX.
2. Describe how to set up a dollar-neutral investment fund that would generate a monthly excess return equal to the *difference* in returns between IVW and IVE (that is, the return on IVW minus the return on IVE). Assume that your broker only requires cash collateral up to 100%, and allows you to pledge stock for any additional required collateral, and that you earn the risk-free rate of return on any cash you keep with the broker. Calculate the Sharpe ratio of this strategy, and its beta, alpha, and information ratio with respect to WFSPX. What explains the unusual beta value? If you had maintained this strategy from the start of 2017 through end of 2021, and then closed out your positions, what cumulative return would you have earned on each \$1 invested initially?
3. Calculate the Sharpe ratio of a strategy that maintains equal dollar allocation to WFSPX and a dollar-neutral fund like the one described in question #2. Why is this Sharpe ratio much higher than we found for either WFSPX or the dollar-neutral fund alone? (Use concepts from Module 2.)
4. Consider the following two ways that an investor could allocate their wealth:
 - (a) 50% in the risk-free rate, 50% in the index fund WFSPX.
 - (b) 20% in the risk-free rate, 80% in risky investments. In turn, allocate the risky investments as in question 3: half to WFSPX, and half to the dollar-neutral fund from question #2.Compare the volatility of the monthly return, and the cumulative return on \$1 invested, for each of these two strategies. What explains the differences? (Use concepts from Module 2.)