Lab Section 04

Please log in the class website and download the spreadsheet called

Lab 04 Data

In this spreadsheet you will find returns data for stocks belonging to the SP500 index, every month from December 1996 to December 2021.

Please pick 6 stocks you like. Choose one of the six stocks to be your favorite one. Use Excel to do the following calculations.

Calculate expected returns, variances, and correlations

Calculate the expected returns and the standard deviations for each of the 6 stocks you chose. Which stock has highest standard deviation?

Calculate the covariances and correlations between the stocks.
Which stock is most correlated with your favorite stock?

Calculate the minimum variance portfolio

Using the Solver (see the lecture slides), calculate the portfolio weights on the minimum variance portfolio. Does it include large short and long positions?

Which stocks have large portfolio weights? What explain the portfolio weight patterns you obtained?

Suppose the **standard deviation** of your favorite stock goes up by 2%: how would its weight change in the minimum variance portfolio? Why?

Suppose the **expected return** of your favorite stock goes up by 0.5%: how would its weight change in the minimum variance portfolio? Why?

Suppose that your favorite stock has a negative correlation with all other stocks (say -0.1). How would its weight change in the minimum variance portfolio? Why?

Suppose that it is impossible to short, i.e. all your portfolio weights must be positive. Use the Solver to calculate the resulting minimum variance portfolio. Does the portfolio weight change much? Why? Does the standard deviation of the portfolio goes up or down? Why?

Calculate efficient portfolio

Calculate 15 portfolios on the efficient frontier, using the Solver calculate the maximum expected return you can achieve by combining the 6 stocks into portfolio while keeping the standard deviation below some pre-specified level.

Produce a scatter plot of the efficient portfolios and of the 6 stocks in the risk return diagram. What are the gains from diversification? That is, how much extra return can you get by combining your favorite stock with the other 5 in a portfolio, while keeping your risk the same? What about for other stocks?