

# Lab Section 06

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Please go on the website and download the spreadsheet:

Lab 06 Data

## *What's in the spreadsheet?*

In this spreadsheet you'll find monthly returns on **portfolios** based on stock characteristics, from July 1926 to December 2021. The data are from Ken French website (<http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/>)

The first few blue columns contain the return on the three Fama-French portfolios we discussed in class. First, the excess return on the market (all NYSE, NASDAQ, and AMEX stocks), the return on the small minus big" (SMB) portfolio, and on the "high minus low" (HML) portfolio. Also, you will find the risk free return.

In the green columns, you'll find "size portfolios", constructed as follows. At the beginning of every month, one sorts stocks based on market capitalization. Stocks are grouped into 10 deciles. For example, the "Lo 10" decile contains stocks in the bottom 10% of the distribution of market capitalization, the "2-Dec" contains stocks in the 10%-20% range of the market capitalization distribution, and so on. One records the return on each of these portfolios over the month. At the beginning of the following month, one updates the sort of stocks, form portfolios, and so on for every month.

In the red column, one finds "book-to-market" portfolios, i.e., portfolio sorted based on the ratio of their book to market value. Note: the book value is the value of the installed capital as recorded in the book, and the market value is the market capitalization of the firm.

Finally, in the purple column contains portfolios sorted based on size and book to market. The idea is to start sorting stocks into 5 quintiles based on market capitalization, as explained above. Then, within each quintile, one sorts stocks into 5 new quintiles based on book-to-market. Taken together, this procedure delivers  $5 \times 5 = 25$  different portfolios.

## *Calculate beta and alpha*

Using the function intercept and linest, calculate alpha and beta of all portfolios in the green and red columns. For each column, create a "SML" scatter plot, with beta on the x-axis, and expected return on the y-axis. On the same graphs, shows the theoretical SML relationship implied by CAPM. Does the SML relationship appear to hold to a reasonable level of

approximation? How does it compare to last week SML based on individual stocks?

### *Calculate systematic and idiosyncratic volatility*

Calculate the idiosyncratic volatility of the portfolio returns in the green and red column. Is idiosyncratic volatility lower than for the individual stocks you worked with last week? Based on this, do you expect that using these portfolios we will be able to generate a better picture of the SML?

### *The “size anomaly” and the “value premium”*

Use your calculations of alpha and your graph to argue that, according to CAPM

- Firms with small market capitalization are good deals
- Firms with high book-to-market value (“value firms”) are good deals

### *Calculate Fama-French alpha and beta*

For all portfolios in the spreadsheet, calculate the alphas and betas with respect to the 3 factors of Fama and French. For this you need to use the function LINEST and the function INDEX, as explained during the lecture.

Focusing on the portfolios in the purple column, show that the 3 factors model of Fama and French improves on CAPM.

### *Two questions about alphas and betas*

Suppose I form a portfolio with high beta stocks, and suppose my portfolio outperforms the market in a rising market. Would you say that, according to CAPM, I have generated “alpha”?

Suppose if I form a portfolio heavily weighted towards small cap stocks and value stocks and my portfolio subsequently outperforms the market because small cap stocks and value stocks did great during that period, but the market did not. According to CAPM, have I generated alpha? According to the 3 factors model of Fama and French, have I generated alpha?