Application #2
Factor Analysis

1 Data

- On Chalk, download the file, "dataAssets.mat".
- Be sure to save this data file into the current directory (or path) of Matlab.
- Use the command: "load dataAssets". Upon running this command, you should see the variable, "prices" in your workspace.
- In the matrix of prices, each row corresponds to a day. The columns correspond, (in order,) to the S&P 500 index, USD index, crude oil index, HYG index, and U.S. 10-yr Treasury index.

2 Summary Statistics

1. Calculate the matrix of returns (in levels) for all securities.

2. Calculate the correlation matrix of the returns. Which pair has the largest correlation? And the smalles?

3. Calculate the volatility of each return.

4. Calculate the skewness of each return, and list any assets for which the skewness is negative.

5. Which asset has the lowest 5th quintile return?

3 Regression

1. For each asset, calculate the regression beta when regressed on the S&P 500—without a constant.

2. Repeat these regressions, this time including a constant.

3. Which regression has the highest R^2 statistic?

4. Which regression (with a constant) has the most statistically significant beta? (ie. largest t-value in magnitude.)

4 Plots

1. Make scatter plots of oil returns versus the S&P 500 returns.

2. Make a histogram of the USD index returns.

3. Make a histogram of the USD-on-S&P regression residuals.