Due: Thursday 4/5/2018, Beginning of Class   **50 Points**

MODULE 4

In this module you will evaluate the historical performance of momentum in the Fama and French 30 industry portfolios. All of the tasks in this module can be completed in either Excel or SAS. The data you will need is in the excel spreadsheet posted on Harvey and titled "Return Data.xlsx." Once you have the data, please complete the following:

1. The driving fundamental idea behind momentum is to buy industries on the rise, and short declining industries. The accompanying Excel spreadsheet has value weighted returns on 30 industry portfolios, the risk free return, and the market return, the SMB factor, and the HML factor. Starting in 1927/07, for each industry and each month, compute the (arithmetic) average return over the previous 12 months for that industry (not including the month itself). Then for each month, rank the industries based on their past average return (hint: Excel has a function called "RANK(cell,range,1)"). Compute each industry's average rank (1=lowest past average return, etc.). Then answer the following:

- Which industry has the lowest average rank and which has the highest?

- What is the average rank of these lowest and highest industries?

- Plot of the rank of Autos industry over time.

- Are the top industries stable or moving around a lot? Put differently, is industry momentum a long-term bet on a few industries or a very dynamic strategy? Do you expect high or low turnover from this strategy?

2. Let the "winner industries" be the 15 industries with the highest past 12-month returns. For each month after 1927/07, compute the average return of the winner industries. That is, compute the return on a portfolio of winner industries. (Hint: There are many ways of doing it. In Excel, an easy way is to use the function IF inside the function AVERAGE: '=AVERAGE(IF(rank-range >= 16, return-range, ""))', but then you must hit control-shift-enter to execute (this is called an array formula). Another way is to do this in two steps: (1) For each industry, report the return if it is a top industry and a blank otherwise, IF(rank >= 16, return, ""). (2) Take the average of these numbers.) Then answer the following:

- What is the average monthly return on this winner portfolio in excess of the risk free return?

- What is the standard deviation of its monthly excess returns?

- What is its monthly Sharpe ratio?

- What is its annualized Sharpe ratio?

3. Compute the return of a portfolio of "loser industries," the 15 industries with the worst past returns. Then answer the following:

- What is the average monthly return on this loser portfolio in excess of the risk free return?

- What is the standard deviation of its monthly excess returns?

- What is its monthly Sharpe ratio?

- What is its annualized Sharpe ratio?

- What is the annualized Sharpe ratio of the overall market index?

4. Compute the return of a portfolio of that goes long $1 of winner industries and short $1 of loser industries each month. This is already an excess return. (To understand this, note that if you first compute the winner's and loser's excess returns over r_f and then subtract one from the other, then the risk-free rates will cancel.) Regress this monthly ind-mom excess return on the excess return of the market. Additionally, regress this monthly ind-mom excess return onto the 3 Fama - French factors.

- What is its annualized Sharpe ratio?

- What is the market beta and the t-statistic of the market beta?

- What is the monthly alpha and the t-statistic of the alpha?

- What is the annualized alpha (12 times monthly alpha)?

- Comment on these numbers

5. Compute the cumulative return of (a) the winner portfolio, (b) the loser portfolio, (c) the long/short ind-mom portfolio, and (d) the market. (Remember to use total returns, not excess returns, i.e., add the risk free return to the returns that are excess returns.) Plot these cumulative returns on a log-scale.

6. Ind-mom loss. Industry momentum had a big loss in 3 consecutive months in 2009. Which months? How did the market do those months? What do you think happened?

The Finished Product:

The results of these steps should be put into a professional looking report. Be sure to fully discuss the results and provide the output in organized tables.