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Exercise 2: Portfolio Formation

Due 1pm July 2 (at the beginning of class)

Portfolio formation is one of the two methodological pillars in asset pricing (the other one being cross-sectional tests). It allows you to examine the significance of risk premium economically as well as statistically.

Upload a PDF copy of your answer with well-documented code in separate, runnable, human-readable files on Canvas; your result should be verifiable by a third party, as many top finance and economics journals require or recommend. Keep a copy for class discussion. Use a programming language of your choice.

1) The CSV files `df_long_NYSE.csv` and `df_long_NASDAQ.csv` on Canvas contain monthly individual stock data on the New York Stock Exchange (NYSE) and NASDAQ (Global Select), respectively. They were downloaded using the Python program, `a1_download_prices.py`. It obtains ticker symbols available at the time of running from the following URL:
   a) NYSE: https://www.nasdaqtrader.com/dynamic/symdir/otherlisted.txt
   b) NASDAQ: https://www.nasdaqtrader.com/dynamic/symdir/nasdaqlisted.txt

2) Compute returns as the relative change in closing price (`Close`) from the previous day. The first return on each stock should be missing. Do not fill missing returns with zero.

3) Implement the momentum (12, 1) strategy. That is, compute the past 12-month return for each stock in each month. Merge return with the *lagged* past return (why lag?). Form equally-weighted decile portfolios on the past return. Tabulate the time-series means of the decile portfolio returns, their t-statistics, the p-values. Show the average number of stocks for each decile. Plot the means and the t-statistics against the decile rank. Do this separately for NYSE and NASDAQ.

4) Compute the difference between the corresponding deciles of NYSE and NASDAQ and perform the t-test. Are the differences significant? Which market tends to have more extreme momentum returns?

5) Mention two potential concerns, one regarding return computation and the other regarding stock selection. How would you address them?

6) Notes
   a) To compute the value-weighted return, you would weight returns by lagged market capitalization (not necessary in this exercise).

   b) Prof. Kenneth French's data library contains the (12, 1) momentum portfolios and factors (Mom). It might be interesting to compare your result to his.