MGMT 675
AI-ASSISTED FINANCIAL ANALYSIS

RICE | BUSINESS
Jones Graduate School of Business

DATA HANDLING

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TOPICS

- Merge
- Filter
- Sort
- Aggregate by group
- Transform

DATASETS

- metrics.xlsx and tickers.xlsx.
  - Download from the course website.
  - Upload in Julius.
- Online data from various sources.

MERGE METRICS AND TICKERS

- Ask Julius to merge the datasets on the ticker column
- Ask Julius the following.
  - How many rows are there?
  - What are the column names?
  - What are the unique values in the category column?
  - What are the unique values in the sector column?
  - Show the head of the data frame.

FILTER

- Ask Julius to filter on the category column to “Domestic Common Stock” and “Domestic Common Stock Primary Class.” Ask Julius to call this data frame common_stock.
- Ask Julius to create a copy of the common_stock data frame that contains only rows for which pe > 0.
- Ask Julius to create a copy of the common_stock data frame that contains only rows for which marketcap is above the median marketcap.

SORT

- Ask Julius to sort on marketcap in descending order and to show the head of the data frame.

AGGREGATE BY GROUP

- Ask Julius to describe marketcap.
- Ask Julius to compute the mean marketcap by sector.
- Ask Julius to compute the number of firms by sector.
- Ask Julius to compute the total marketcap by sector.

- Ask Julius to compute the mean pe grouped by (sector, scalemarketcap) and to display the results as a two-dimensional table.
- Ask Julius to recreate the table using only rows for which pe > 0.
- Ask Julius to compute the percent of firms for which pe < 0 by sector.

TRANSFORM

- Ask Julius to create a new variable equal to the rank of marketcap in descending order.
- Ask Julius to create a new variable that is 1 if pe > 0 and 0 otherwise (a dummy variable).
- Ask Julius to create a new variable equal to the excess of pb over the median sector pb.

ONLINE DATA

YAHOO FINANCE

- Daily open, high, low, close, adjusted close, volume
- Income statement, balance sheet, and statement of cash flows for past 5 years
- Current market option data (bid, ask, last price, open interest, implied volatility, …)
- Can get with yfinance library

YAHOO'S ADJUSTED CLOSING PRICES

- Yahoo's adjusted closing prices are adjusted for splits and dividends.
- The percent change in the adjusted closing price is the daily close-to-close return including dividends.

CAVEAT

On ex-dividend days, the percent change in the adjusted closing price is

$$\frac{P_t}{P_{t-1} - D_t} - 1$$

rather than what we might prefer:

$$\frac{P_t + D_t}{P_{t-1}} - 1$$

but this is a minor issue (small difference 4 days a year).

MONTHLY, ANNUAL, ... RETURNS

If we want returns at a different frequency, for example annual returns, then we can either

- compound the daily returns, or
- downsample the adjusted closing prices to annual data and compute the percent change of the downsampled data.

EXAMPLE

- Ask Julius to use yfinance to get adjusted closing prices for SPY for the longest history available.
- Ask Julius to downsample the prices to end-of-month.
- Ask Julius to compute monthly returns as the percent change in the downsampled prices.

FEDERAL RESERVE ECONOMIC DATA

- Ask Julius to use the pandas-datareader to get the history of crude oil prices from FRED.
- Ask Julius to get the history of inflation rates from FRED.

KEN FRENCH'S DATA LIBRARY

- Ask Julius to get the Fama-French factors from Ken French's data library.
- Ask Julius to list the datasets on Ken French's data library.
- Ask Julius to get the 48 industry returns from Ken French's data library.

SCRAPING

- Ask Julius to find the constituents of the S&P 100.
- When Julius provides a link, ask Julius to read the table at the link.