

Assignment 6

Scientific Computing with MATLAB
due: Nov 15, 2018

The following 5 files, which can be downloaded from the course website, contain historical stock price data (adjusted for stock splits) for Apple, Microsoft, Google, Amazon and Facebook.

- <https://www.gribblelab.org/scicomp2018/AAPL.csv>
- <https://www.gribblelab.org/scicomp2018/MSFT.csv>
- <https://www.gribblelab.org/scicomp2018/GOOG.csv>
- <https://www.gribblelab.org/scicomp2018/AMZN.csv>
- <https://www.gribblelab.org/scicomp2018/FB.csv>

Write a MATLAB script that loads in the stock files and answers the questions below.

1. Millionaire

For each company, how much would you have to have invested, as of the first opening price of each stock, to have a present value of one million dollars for each, as of the most recent (adjusted) closing price?

2. Buy and Hold

Assume you bought \$1000 worth of stock in each company based on the closing price at the end of trading on the first day each stock was made available, and then you bought an additional \$100 worth of stock on the first trading day of each subsequent year (based on the opening price). How much would your shares in each company be worth as of the close of October 19, 2018 (use the adjusted closing price).

3. A 5-year investment

Assume that you bought \$1000 worth of stock in each company at the closing price at the end of trading on October 21, 2013, and then an additional \$100 worth of stock on the first trading day of each subsequent year (based on the opening price). How much would your shares in each company be worth as of October 19, 2018? Use the column marked "Adj Close" to get the price of each stock.

4. To upgrade or not to upgrade

In October 2008 Apple introduced the MacBook Air laptop computer, priced at \$2499 (top model). If instead, you purchased a regular MacBook 13-inch (not an Air) priced at \$1599 (top model) and invested the difference (\$900) in Apple stock, how much would your stock be worth as of October 19, 2018 (use the adjusted closing price)? Assume you bought the stock based on the opening price on October 1, 2008.

5. Buy and Hold vs Re-balance

Assume on October 21, 2013 you bought \$1000 worth of stock in each company (use the closing price on October 21, 2013). You compare two strategies: (1) buy and hold (as in Question 1 above) versus (2) a rebalancing strategy, whereby every 90 days you rebalance your stock holdings in each company. For example, for AAPL, if after 90 days your stock is worth only \$900, then buy enough additional shares of AAPL such that your holdings are worth \$1000 again. If your holdings are worth more than \$1000 then sell enough shares to bring your holdings in AAPL back to \$1000.

Assumptions:

- You have a slush account that lets you spend on additional shares as necessary. After buying \$1000 worth of shares in each company, you have \$1000 cash remaining in your slush fund. For simplicity assume there is zero interest on your slush account balance, and that you are allowed to have a negative balance (i.e. you can borrow money to buy more shares as necessary).
- If you sell shares the proceeds go into your slush account.
- You buy \$1000 worth of shares in each company on October 21, 2013 at the adjusted closing price.
- For simplicity, rebalance your holdings in each of the companies every 90 entries in the historical price data rather than every 90 calendar days.
- Use the adjusted closing price when rebalancing your holdings.

As of October 19, 2018, what is the value of your holdings in each company, and what is the value of your slush account?

Please submit your MATLAB script to OWL.