

MA615-Fianl report

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Assignment Description

Environment Description

The COVID-19 pandemic has had a devastating effect on the economy in the United States. In early March 2020, the first knockdowns began and the stock market plunged. After this initial reaction, however, the market recovered.

In this project, I used online investment advice that was available at the beginning of July 2020 to make investment decisions and then track my investments through the fall until 1 December.

For this project, I assume an initial position of \$250,000 in cash starting on 1 July 2020. And I ignored trading costs, taxes, and any other fees. Also, I ignored minimum investment requirements.

My Portfolio

After referring to opinions from the internet, I find high tech companies have the advantage to overcome the hard time for following reasons:

(1)flexible job system

In COVID-19 pandemic period, many companies has the difficulty how to guarantee their employers to come to work. However, due to the flexible job time or place, high tech companies do not have this problem.

(2)Higher demand

In COVID-19 pandemic period, many people prefer to stay at home, so they spend more time on their phones or computers than before. So the high tech companies get more customers than before and can probably make more profits.

So, I choose three great high tech companies, Microsoft(MSFT), Google(GOOG) and Amazon(AMZN) to track my portfolio.

EDA for stock price

Gain the Stock information

symbol	date	open	high	low	close	volume	adjusted
MSFT	2020-07-01	203.14	206.35	201.77	204.70	32061200	203.6731
MSFT	2020-07-02	205.68	208.02	205.00	206.26	29315800	205.2253
MSFT	2020-07-06	208.83	211.13	208.09	210.70	31897600	209.6430
MSFT	2020-07-07	210.45	214.67	207.99	208.25	33600700	207.2053
MSFT	2020-07-08	210.07	213.26	208.69	212.83	33600000	211.7624
MSFT	2020-07-09	216.33	216.38	211.47	214.32	33121700	213.2449
MSFT	2020-07-10	213.62	214.08	211.08	213.67	26177600	212.5981
MSFT	2020-07-13	214.48	215.80	206.50	207.07	38135600	206.0312
MSFT	2020-07-14	206.13	208.85	202.03	208.35	37591800	207.3048
MSFT	2020-07-15	209.56	211.33	205.03	208.04	32179400	206.9964

Table 1:

The table above is part of the stock information we get.

Summary table

First, let's see the basic information about these three stocks.

symbol	MIN	MAX	AVERAGE	RANGE	Std.
AMZN	2878.70	3531.45	3167.021	652.75000	129.987031
GOOG	1415.21	1793.19	1572.172	377.97998	102.995168
MSFT	200.39	231.65	211.401	31.25999	6.673102

Table 2:

The table above is the basic information of each stock.

From the table, we can see that the range of close price for AMZN is 652.75, for GOOG is 377.98, and for MSFT is 31.26. So, MSFT has a smallest range.

Beside, we can also see that the standard value of close price for AMZN is 129.98(biggest), and GOOG as followed, the MSFT is 6.67(smallest).

So, we can state that the MSFT is more stable than the other.

Dividend

Next, we will check the dividend.

symbol	date	value
MSFT	2020-08-19	0.51
MSFT	2020-11-18	0.56

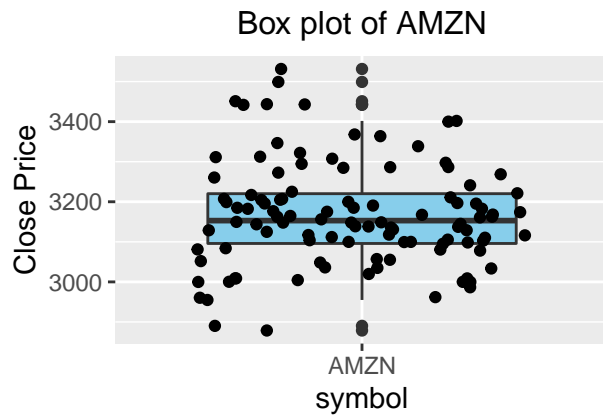
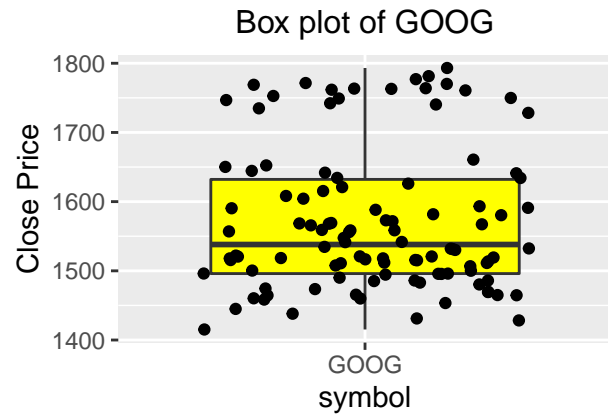
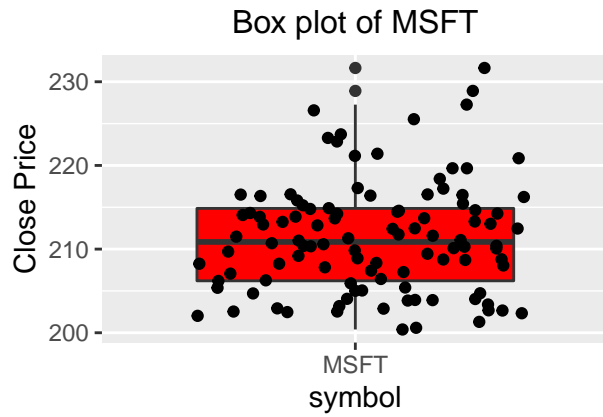
Table 3:

The table above is the dividend of each stock.

As we can see, only MSFT has the dividend on 2020-08-19 and 2020-11-18.

Box plot

Then, we visualize the information to explore more.



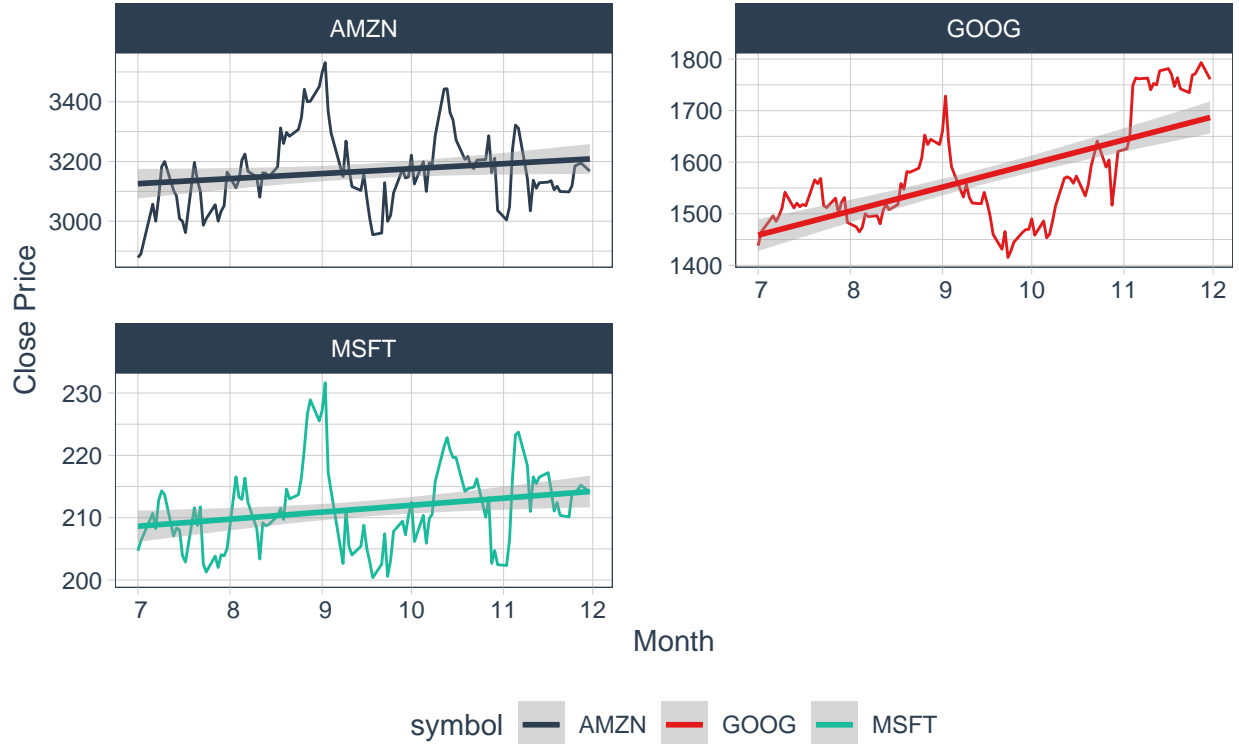
Through the box plot, we can still find that the MSFT is more stable than the other.

Close Price Curve

Next, we visualize the movement of the close price

Close Price Curve for AMZN & GOOG & MSFT

Date:2020/7/1–2020/12/1

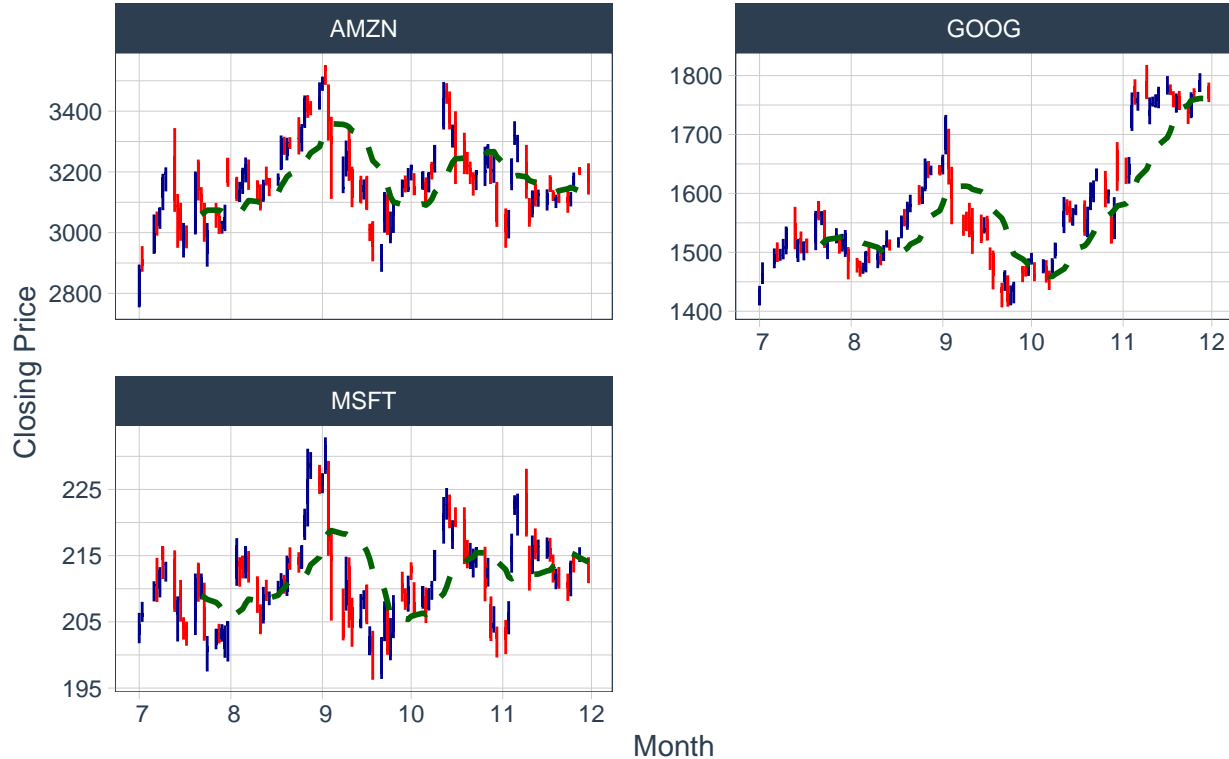


Candlestick Chart

The drawing method of Candlestick chart in the stock market and futures market contains four data, namely, the opening price, the highest price, the lowest price and the closing price. All Candlestick lines are developed around these four data, reflecting the general trend and price information.

Candlestick Chart for AMZN & GOOG & MSFT

Date:2020/7/1–2020/12/1



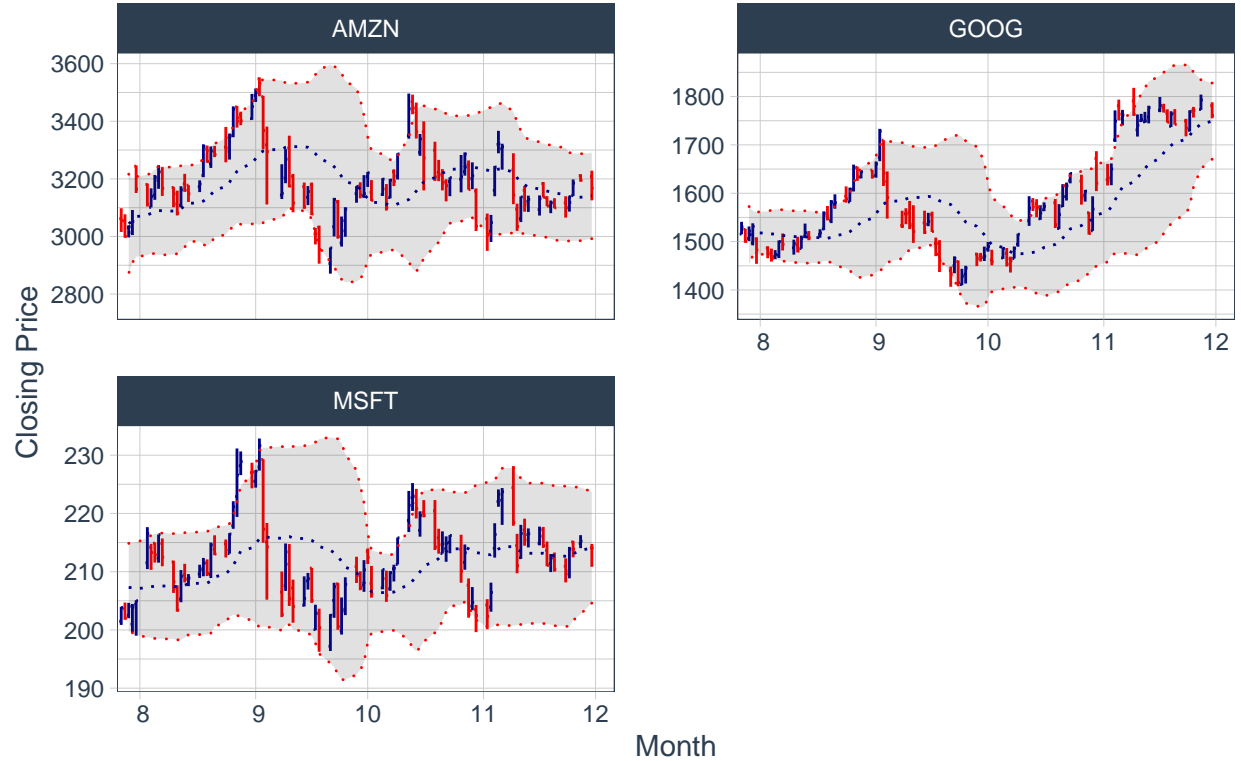
Bar chart with BBands

Bollinger Bands are used to visualize volatility by plotting a range around a moving average typically two standard deviations up and down.

Using the statistical principle, the standard deviation and trust interval of the stock price are calculated, so as to determine the fluctuation range and future trend of the stock price, and the wave band is used to show the safe price of the stock price

Bar Chart with BBands for AMZN & GOOG & MSFT

Date:2020/7/1–2020/12/1



Portfolio

My Portfolio

1.Month Return Curve for each

At first, I want to see the interest rate of each month for each stock.

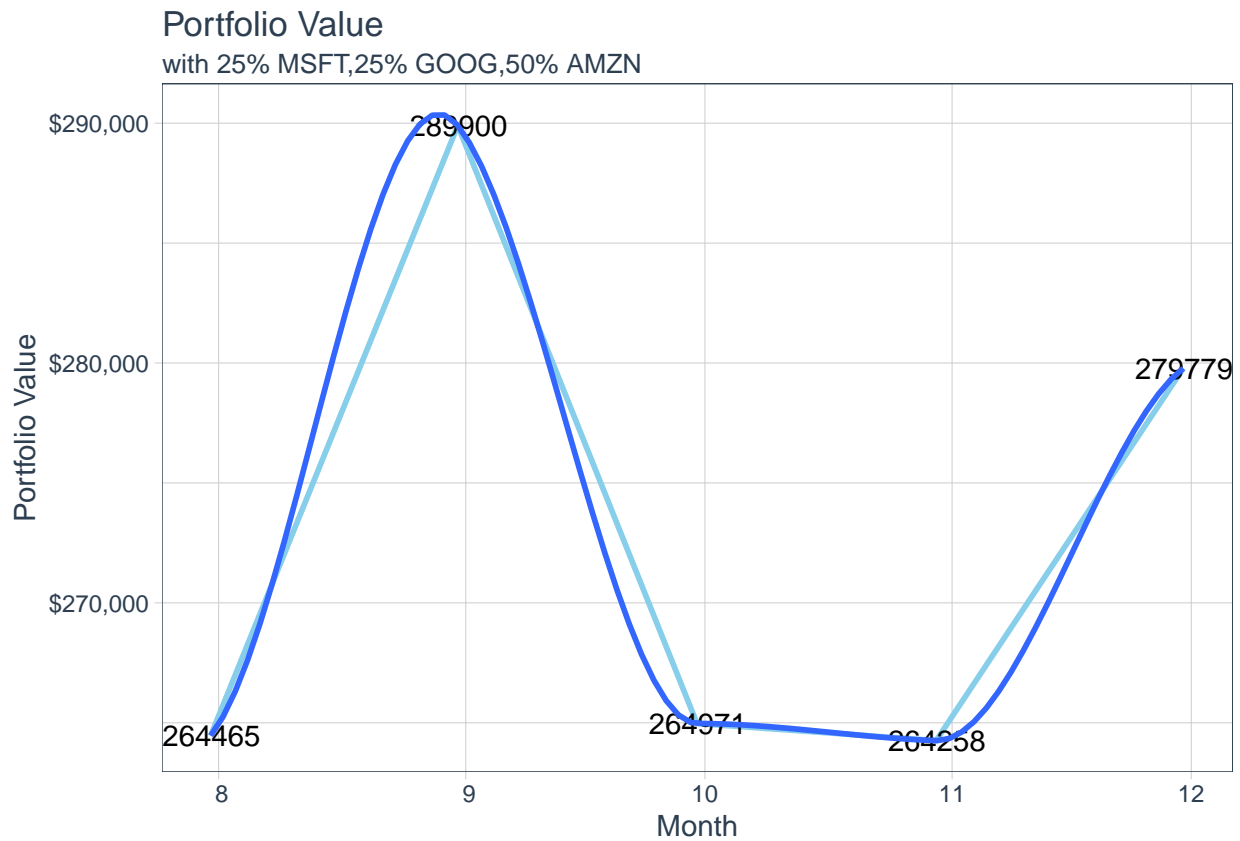
Return rate Curve for AMZN & GOOG & MSFT

Date:2020/7/1–2020/12/1



2.Choose proportion

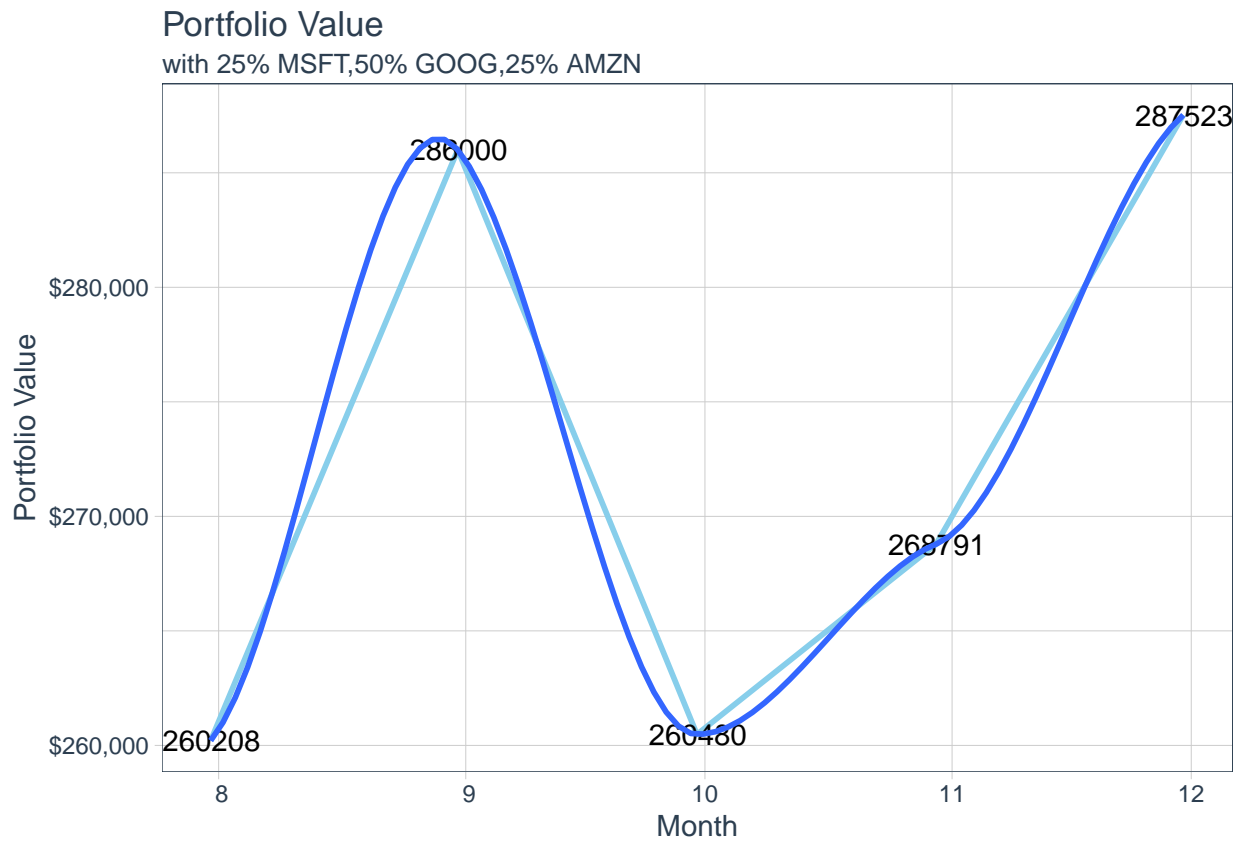
I think people will get more online shopping in COVID-19 pandemic period, so the price of Amazon will grow more. So, my portfolio includes 50% stock of Amazon, and the other is divided half and half, which is 25% for Google and 25% for Microsoft.



According to the plot, we can get about \$28000 at last, earning about \$3000.

Adjusted Portfolio

Besides, I try other portfolio which has much more return than the first one. The portfolio contains 25% for MSFT, 50% for GOOG, and 25% for AMZN.



And we can find that in this portfolio we can gain more earnings than the first.

Reference

- 1.<https://cran.r-project.org/web/packages/tidyquant/vignettes/TQ04-charting-with-tidyquant.html>
- 2.<https://shiny.rstudio.com/tutorial/written-tutorial/lesson3/>
- 3.<https://www.fa-mag.com/financial-advisor-magazine/issues/2020/06>
- 4.<https://www.thinkadvisor.com/investment-advisor/issue/investment-advisor-june-2020-1/>