BAC & CITI Stock Analysis Report

FINC525 Financial Modeling

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BAC & CITI STOCK ANALYSIS

Compare BAC&CITI stocks

1. We used the daily stock data for two selected companies from Jan 1, 2019 to Mar 31, 2022

   The data was collected from Google Finance.

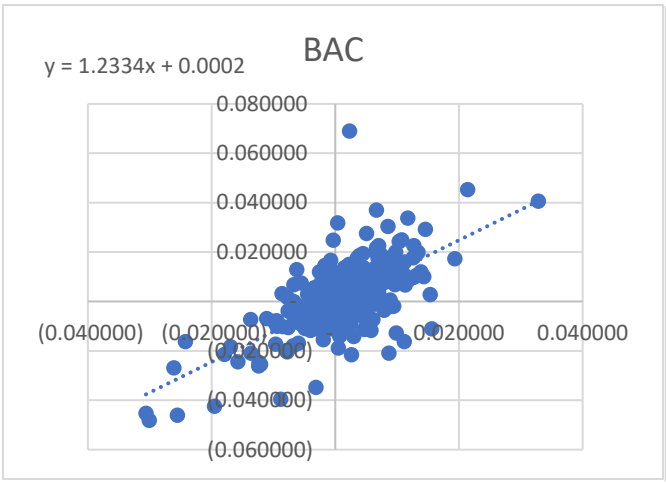
2. We calculated the return, volatility, beta of these 2 companies using 2019 data. We chose stock return as the priority value to invest in a company.

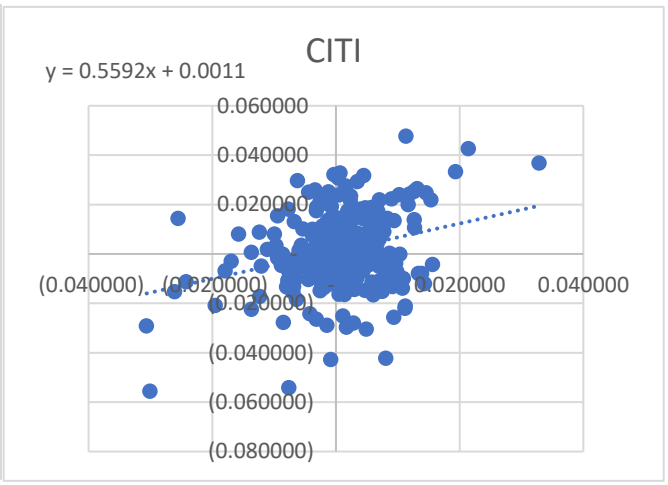
   Following the output, in 2019 CITI stock return was higher than BAC stock return. Based on the return of the 2019 stock data, I can earn 34.6% if I invest in BAC and 43.5% if I invest in CITI.

Correlation	0.34929
Covarriance	0.00008
Weight1- BAC	1
Wight2-CITI	0
Total Weight	1.00000
p_Return	**0.34571**
p_Volatility	0.01455
Rf	0.02140
Rf_daily	0.00008

Correlation	0.34929
Covarriance	0.00008
Weight1- BAC	0
Wight2-CITI	1
Total Weight	1.00000
p_Return	**0.43517**
p_Volatility	0.01559
Rf	0.02140
Rf_daily	0.00008

	BAC	CITI
Average	0.0014	0.0017
Std	0.0145	0.0156
Var	0.0002	0.0002
Beta	1.2334	0.5592
Alpha	0.0002	0.0011
Ri (CAPM)	0.0012	0.0006


BAC
y = 1.2334x + 0.0002
0.080000
0.060000
0.040000
0.020000
(0.040000)
(0.020000)
0.020000
0.040000
(0.040000)
(0.060000)


CITI
y = 0.5592x + 0.0011
0.060000
0.040000
0.020000
(0.040000)
0.020000
0.040000
(0.040000)
(0.060000)
(0.080000)

3. We use 2020 quarter 1 stock data to check our investment above.

   From 2019 data, I used CAPM to predict stock return for 2020 quarter 1.

   To check whether I can make a profit on my investment, I considered the value of Cumulative Abnormal Return (sum of the differences between the expected return on a stock (systematic risk multiplied by the realized market return) and the actual return often used to evaluate the impact of news on a stock price). We can see that BAC Cumulative Abnormal Return was - 24.1% and CITI Cumulative Abnormal Return was -53.5%. There were big differences between the actual value and the prediction.

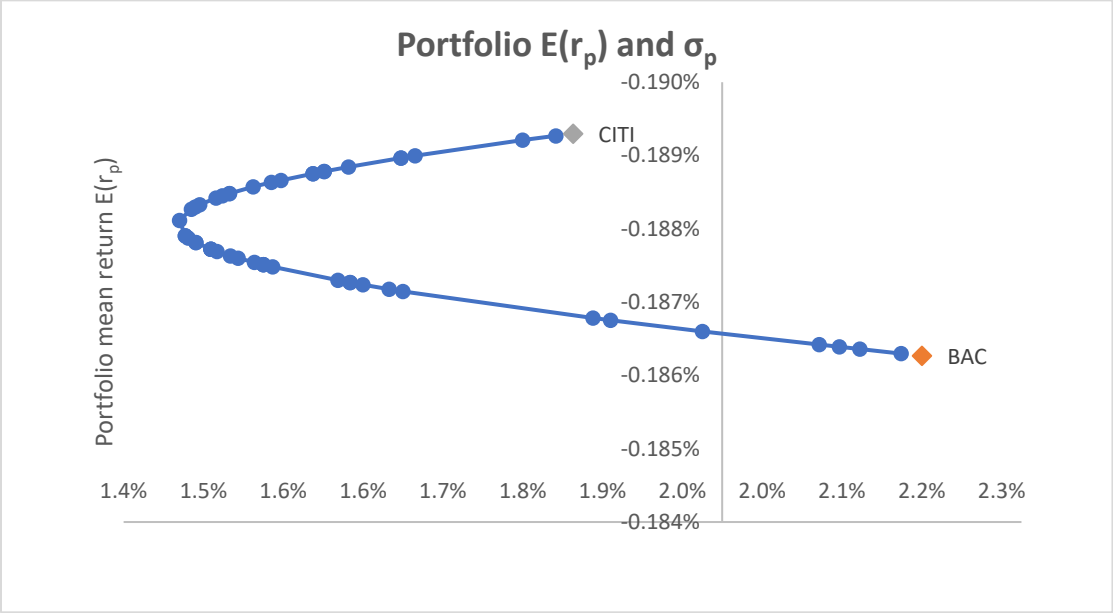
Cumulative Abnormal Return	
BAC	CITI
-24.1%	-53.5%

   After calculating the return of 2 stocks using 2020-2021 data, if we invest in BAC, we can earn 11%, and if we in CITI we can lose 14.6%. We calculated beta, alpha, and risk-free rate equal to the average risk-free rate of 2019 and 2020, after that we predicted 2022 Q1 stock return to check our decision and check our investment. As above, I considered the value of Cumulative Abnormal Return and the actual return often used to evaluate the impact of news on a stock price). We can see that BAC Cumulative Abnormal Return was -0.12% and CITI Cumulative Abnormal Return was -9.29%. There was a small between the actual value and the prediction.

Cumulative Abnormal Return	
BAC	CITI
-0.12%	-9.29%

   The prediction return and the actual return were very different in both cases. Covid-19 occurred in the 2020 Q1 and it did affect two stocks, making the stock return go down dramatically.

4. Build BAC and CITI portfolio, I choose SPY as the market return using 2022 data, the portfolio mean return was negative, and I didn't make any profit by investing in the portfolio.



Portfolio performance

Proportion of BAC	50%
Portfolio mean return	(0.0019)
Portfolio return variance	0.0002
Portfolio return standard deviation	0.0148

We built an optimal portfolio

Optimal Portfolio		
	Weights for optimal portfolio	**Mean returns**
BAC	0.0%	(0.0019)
CITI	100.0%	(0.0019)
Sum	**100.00%**	
Portfolio mean	(0.0019)	
Portfolio sigma	0.0003	
q = Theta = (mean-constant)/sigma	(5.5277)	MAX

5. My optimal portfolio had better performance than the market, however, both market return and optimal portfolio return were negative. So, investing in this portfolio is not a good choice.

	Optimal Portfolio mean	**Market Return**
Daily	(0.0019)	(0.0009)
Quarter	(0.1174)	(0.0570)

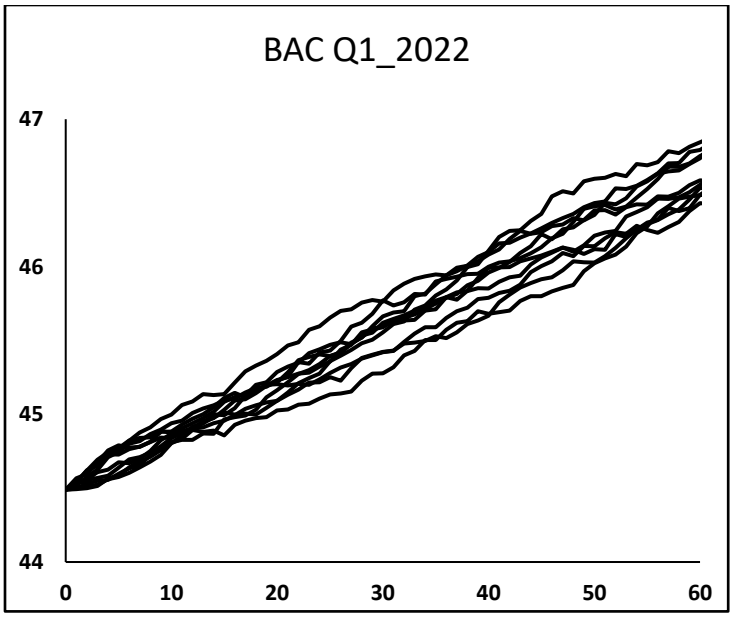
6. We used Monte Carlo simulation to simulate the 3-month stock price for these 2 stocks using 2019-2021 data.
    - Mean, Std was calculated from actual data from 2019-2021.
    - Delta_t was calculated based on 252 days of trading a year.
    - Initial price was the stock price on the date 12/31/2021.

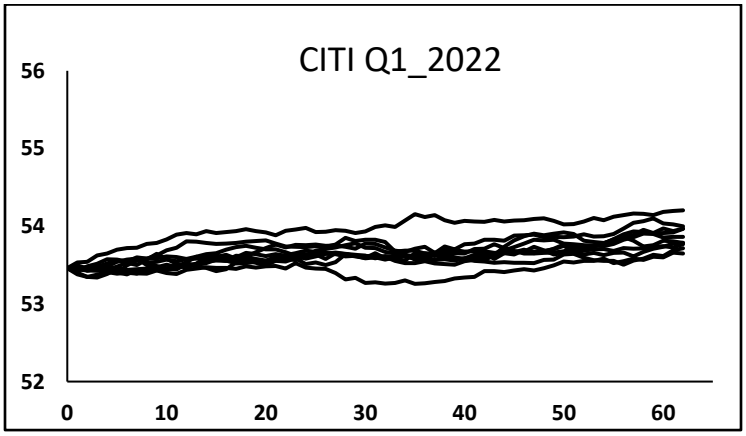
    Compare our prediction and actual BAC and CITI stock price 2022Q1:

    - The prediction for BAC stock price had a positive trend in the period. However, the actual price was not stable, it went up in January and went down at the end of March.
    - Similarly, the prediction for CITI stock price, the prediction had a slightly trending up in the period. However, the actual price went up slowly in January and then went down at the end of March.
    - So we can say that the simulated data is really different from the real data.

    The reasons can be:

    - The stock market was affected heavily covid-19, and there was no stability in the stock data 2019-2022.
    - The prices obtained for opening and closing positions in a stock simulator may also be quite different from those obtained in the real world.
    - Other factors were not considered when predicting stock price, such as one's risk tolerance, investment horizon, investment objectives, taxation issues, the need for diversification, and so on.





Actual data 2022 Q1