Week 3 Analysis Report on the Stock Market

The NASDAQ and S&P 500 are two important stock market indexes. The **NASDAQ** includes many technology companies, while the **S&P 500** shows the performance of 500 large companies in the U.S. These indexes help investors understand how the market is doing. In this project, I compare tech stocks like Apple and Microsoft to NASDAQ and S&P 500 to see how closely they follow the overall market and how different they are regarding risk and return. I downloaded the Nasdaq and S&P 500 datasets covering the period from February 2020 until 19 May 2025 using the R code below:

```
nasdaq <- read_csv("C:/Users/Admin/Desktop/Research - Summer 2025/NASDAQ.csv") %>%
  mutate(Date = as.Date(Date, format = "%m/%d/%Y")) %>%
  arrange(Date) %>%
  mutate(Return = Price / lag(Price) - 1)

sp500 <- read_csv("C:/Users/Admin/Desktop/Research - Summer 2025/S&P 500.csv") %>%
  mutate(Date = as.Date(Date, format = "%m/%d/%Y")) %>%
  arrange(Date) %>%
  mutate(Return = Price / lag(Price) - 1)
```

I also did code cleaning by removing NA values in all, Apple return value, Nasdaq, and S&P 500, and combined Apple, NASDAQ, and S&P 500 into one table called "return_df". Removing NA values and creating a return table is important in stock market analysis because it ensures the data is accurate, consistent, and ready for comparison. NA values represent missing data, and keeping them can lead to errors or incorrect results in calculations like beta, correlation, or volatility. By removing them, we make sure that we are only working with dates where all companies and indexes have valid data. Creating a return table—where we calculate daily returns instead of just using raw prices—allows us to measure how much each stock changes over time. This makes it easier to compare different stocks and see how they behave in the overall market. Returns are also required for key financial metrics like beta and standard deviation. Overall, a clean return table without missing values is a crucial step for doing accurate and meaningful stock market analysis.

I also calculated Apple's beta compared to both NASDAQ and S&P 500. Beta determines how a stock moves in the stock market, whether it is volatile, moves at the same speed as the stock market, or has a stable motion with the daily stock market. If the Beta equals 1, that means the company stock moves the same as the stock market. If the Beta value is greater than 1, that means the company is volatile and does not have a stable stock. This can show how the company can be in the stock market. If the company's Beta value is lower than 1, that means the company is stable in the stock market. I wrote an R code to observe the Beta value for each 4 big tech companies compared to NASDAQ and S&P 500. This is the result:

	Stock	Beta_Nasdaq	Beta_SP500
1	Apple	1.1091308	1.152032
2	Microsoft	1.0878354	1.138727
3	Nvidia	1.5573286	1.510150
4	Google	0.9588353	1.023658

I then exported all the Beta values in the table to create a line chart comparing all big tech companies to NASDAQ and S&P 500. I also created dashboards for all of the companies:
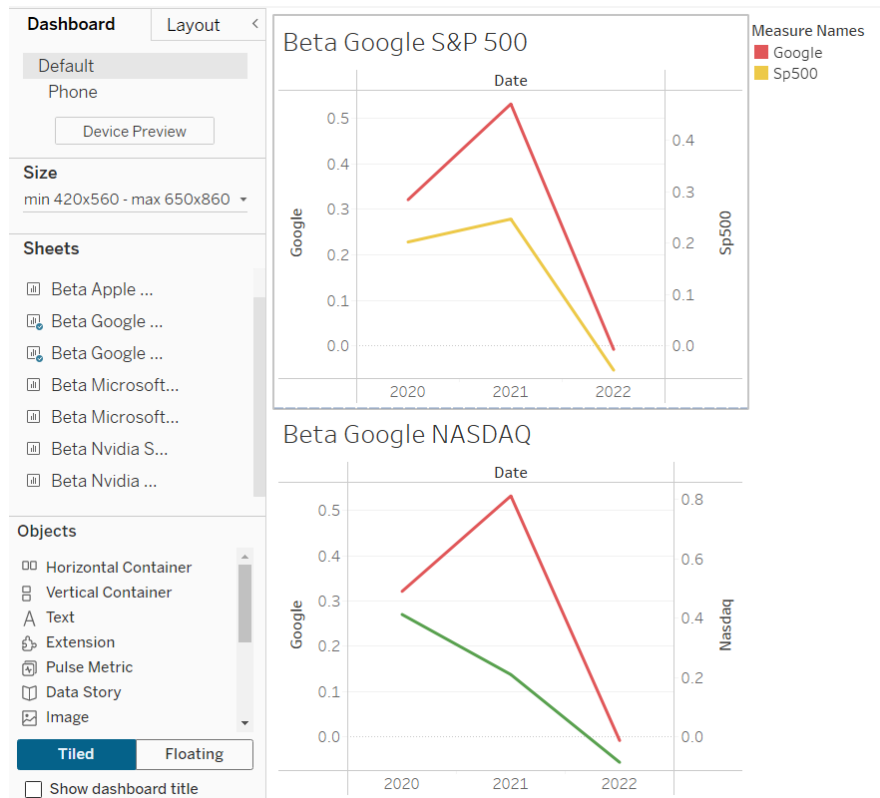
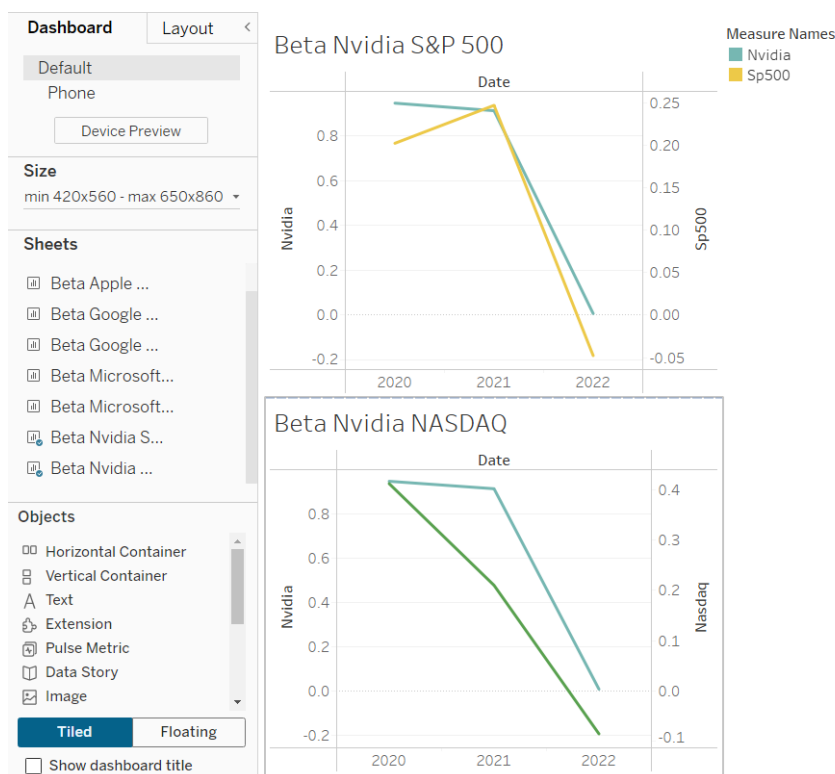1) Comparing Apple to both NASDAQ and S&P 500.
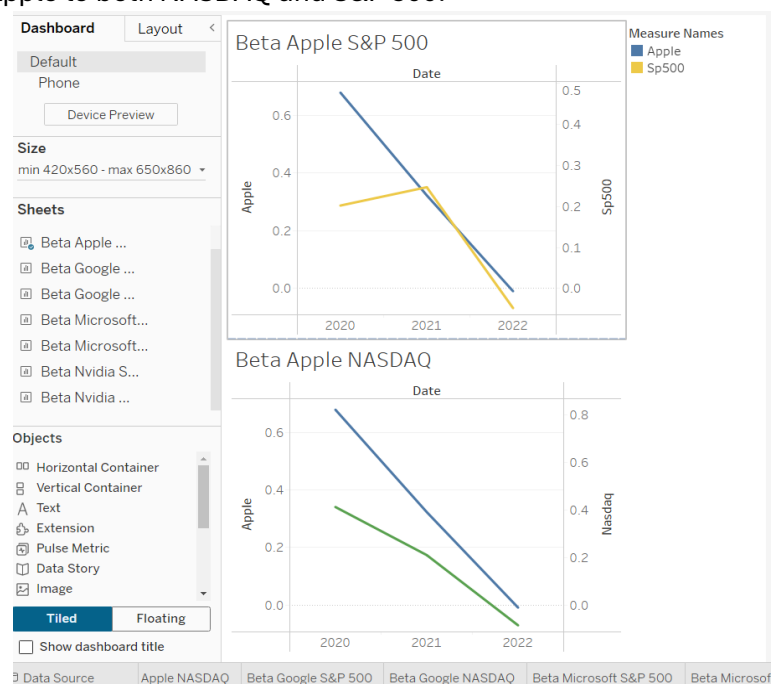
2) Comparing Microsoft to NASDAQ and S&P 500.
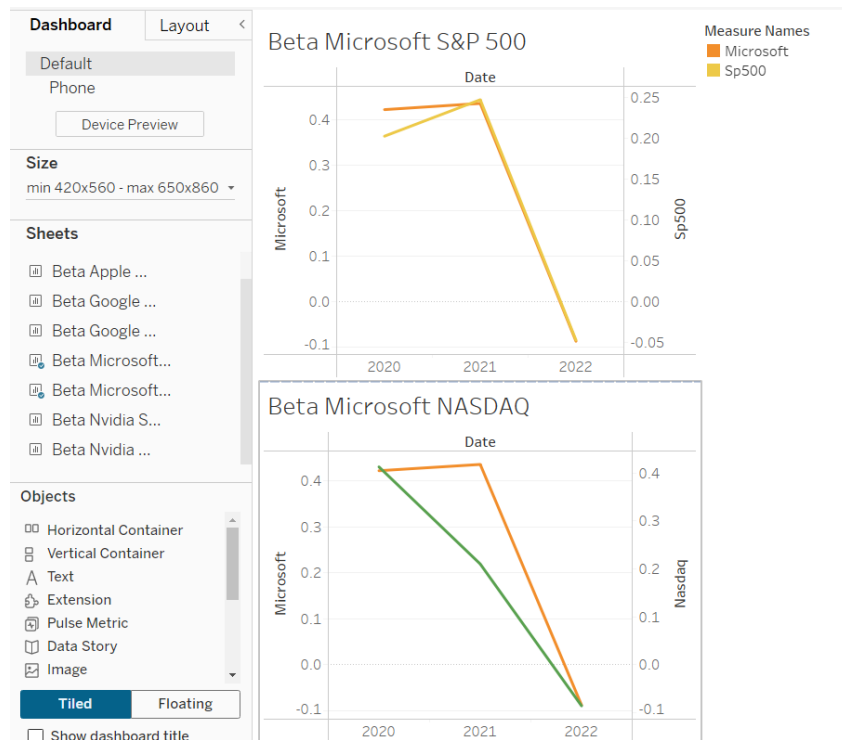
3) Comparing Google to NASDAQ and S&P 500.

4) Comparing Nvidia to NASDAQ and S&P 500.

From the beta values, I found that Nvidia has the highest beta compared to the NASDAQ. This means Nvidia's stock moves more strongly when the market moves—it goes up more during good times and drops more during bad times. This makes Nvidia the most reactive to the tech market, which makes sense because it's a fast-growing and high-risk company in the AI and GPU space.

Apple and Microsoft both have beta values close to 1, meaning they move almost in sync with the overall market. Apple follows both NASDAQ and S&P 500 very closely, which shows that it behaves like a core part of the market. Microsoft is also very stable, which makes both companies good choices for investors who want steady performance and fewer surprises in price changes.

On the other hand, Google had the lowest beta, which means it moves a bit more independently. Its price doesn't react as strongly to market changes as the others. This could be helpful for investors who want to reduce risk, because it may not drop as much when the market falls. Overall, comparing beta values helped me understand how sensitive each stock is to market movements.

Conclusion

This week, I analyzed how four major tech companies—Apple, Microsoft, Google, and Nvidia—respond to movements in the broader stock market by calculating and comparing their beta values against both the NASDAQ and the S&P 500. I

started by cleaning the data, removing any NA values, and creating a return table using daily returns instead of raw prices. This was important to ensure the accuracy of the analysis and to allow a fair comparison between each company and the market indexes.

After preparing the data, I used R to calculate the beta values for each company across the years and then visualized the results using line charts. In the dashboards I created, I included separate graphs for each company showing how their beta values changed over time, about NASDAQ and the S&P 500. These graphs helped identify trends and differences in how each stock behaves compared to the market.

From the graphs, I observed that Nvidia consistently had the highest beta among the four companies. Its beta values were noticeably above 1, especially when compared to the NASDAQ, indicating that Nvidia's stock is very sensitive to market movements. This fits with what we know about Nvidia being a high-growth and high-risk tech company in the AI and GPU space. The graphs showed clear spikes in Nvidia's beta during volatile market periods, confirming its strong reaction to market changes.

Apple and Microsoft, on the other hand, had beta values that stayed close to 1 across all years, which was clearly shown in the graphs. Their charts followed the NASDAQ and S&P 500 trends more steadily. This means their stock prices tend to move in line with the overall market, making them more stable and less risky for investors. Their beta lines didn't show major fluctuations, reinforcing their role as reliable, core market stocks.

Google's beta was the most interesting. According to the graphs, its beta dropped significantly in 2022, especially when compared to the S&P 500. At one point, the beta was close to 0 or even slightly negative, meaning its stock movements were almost independent of the market. This makes Google potentially useful for investors who want to diversify their portfolio and reduce risk, since it may not fall as much during market downturns. The beta lines for Google were flatter and more separated from the benchmark lines, especially in the later years.

In conclusion, this week's beta analysis and graph visualizations helped me understand how each company behaves relative to the market. Nvidia stands out as a high-risk, high-reward stock, while Apple and Microsoft offer more consistent and stable returns. Google appears to be the most independent, offering a potential hedge in uncertain times. This analysis taught me how beta can be used to assess volatility and make informed investment decisions based on risk preferences.

Stock Market's Past and Future Correlation.

In this project, I'm doing a dictionary-based analysis to understand how certain stock market signals might influence price movements. The idea is to look at companies listed on Finviz and match their price changes with the "signals" or "tags" that appear next to them—things like *Top Gainers*, *Top Losers*, *New High*, *Unusual Volume*, and more. Each of these signals can give a hint about what might be happening with the stock, whether it's a breakout, insider activity, analyst changes, or volatility.

To make the analysis meaningful, I picked 10 companies from the Finviz screener based on a variety of signals. I didn't just choose companies that gained or lost the most—I made sure to include a mix. For example, I chose **IMNN** and **SBET** because they had extreme positive gains, which could be connected to news or hype. I also included **GDHG** and **BCAX** because they were big losers, and I wanted to see if signals like *Top Losers* or *Downgrades* have a pattern. I added companies like **MNTN** for its *New High* tag, and **FLYY** and **NVTS** because they had signals like *Oversold* and *Insider Selling*, which might suggest a possible price bounce or red flag. Overall, I wanted to have a good mix of gainers, losers, and stocks with different signal types so I can compare them more fairly.

This analysis will combine those Finviz tags with actual stock price history to see if there's a pattern. For example, does a stock tagged *Oversold* usually bounce back? Or does *Insider Selling* usually lead to a drop? I'll use a dictionary of keywords to help explain the meaning behind each tag and then look at the stock's returns over time to see if there's any connection. This method could help spot useful trends or even help predict stock behavior based on signals.