INFO 5100 Project 2

Aasim Ayaz Wani (aw579), Yishu Zhang (yz923)

**Background Information:-**

Markets are a reflection of the confidence which the people feel over the different aspects of society. Coronavirus has been a serious detriment to not just the US economy but the global economy in general. The only way for the economy to recover is for people to go back to work but doing that increases the chance of spreading coronavirus which would only exacerbate the problem. Governments are in the precarious situation of balancing public health with economic stability. People have had to make decisions, which markets fundamentals they still trust over a long time, markets have not been monolithic some market sectors have been winners and some have been performing below the market level benchmarks. In most cases, it is looking as though the market is promoting the most powerful incumbent in each category and punishing everyone else.

**The story we are telling:-**

This unprecedented health crisis has created a new market, while some businesses have benefited from this, most of the companies have been put under extreme financial stress. This has been compounded the market's higher expectations from the companies to return to the pre-COVID status which does not seem on the horizon. In general, companies that have work to reduce personal exposure to the virus has grown in this market. For example, Amazon (online retail, with contactless delivery), Zoom (work from home video communication), etc. On the contrary, companies that depend on people going out of their homes to have been hammered for example Delta (Airlines), UNIQLO(retail stock).

**Project Overview:-**

We have divided stocks into two categories- 'Positive Growth Stocks', which expanded the business during Coronavirus such as 'Life Essential Stocks' and 'Work from home stocks'; 'Negative Growth Stocks' that shrunk the business during the ongoing crisis such as 'Travel Industry Stocks' and 'Retail Store Stocks'). To assess the stocks we compared them to the 'US average market'(SP 500 that integrates the performance of 500 large companies in the US). To understand normal stocks trajectory we are using data from the beginning of November 2019 some time before Coronavirus spread among the world) to the current time (during which several key economic events happened). Essentially speaking, the price (and volume) of the stocks are reflections of people's anticipation about the future market at a certain time and the response that people have shown to the crisis in general (including several economic events that we highlighted in the visualization and explained below).

We downloaded the data from Yahoo Finance (https://finance.yahoo.com) historical data from November 9th to May 2nd (inclusively, exclude weekends, and holidays). For the 'market average', we choose the SP 500 because it integrates the market performance of 500 large companies in the US. Other indexes like NASDAQ are more selective, and only use high performing tech stocks, thus they have shown positive growth.

It is also interesting to observe how trading volumes are related to the corresponding change of closing price. From the graph we can see that regardless of the specific stock we pick, (though there are some exceptions), in most cases the more drastic the change of closing price is (the darker the color is), the higher the trading volume is (in other words, the more active the trading on that day is). This is reasonable considering that the more drastic the price changes, the more the number of people who would like to buy in/sell out. The only one stock that does not quite follow this trend is the one for UNIQLO. However, since this stock is also the one with least trading activities in general, it is reasonable that this trend does not show quite obviously.

**Events which left an indelible impact on the Market:-**

- **March 23**: Markets beginning to realize that coronavirus had reached the United States. This led to a week of statewide lockdowns and work from home orders from employers.
- **March 26**: Senate passes 2 Trillion $ stimulus package as a part of the CARES act.
- **April 16**: Gilead releases partial data of clinical trial results coming from the University of Chicago with all the patients showing promising recovery trends. All the patients seem to have been lucky to have been tested early and got access to these remdesvir early on.
- **April 20**: Oil drops to below 0 $ a barrel first time, due to excess supply in the market. Oil becomes so cheap that producers are paying to stockpiles to take barrels off their hands.

- **April 21** Senate passes 484 Billion $ stimuli to support small and medium scale businesses.
- **April 29**: NIH clinical trial shows Gilead's Remdesivir accelerates recovery from advanced COVID-19

**Visual Design Rationale and Interactive Elements:-**

**Structure of the Chart**

- The four line charts with the closing price trend of the one representative stock and that of SP 500 in the same time period.
- The four bar charts with the trading volume of one representative stock and the corresponding closing price trend line (from top to down, left to right: Amazon; Zoom; Delta; UNIQLO)

The red color of volume indicates that the closing price goes down compared to that of previous day (except for the first day in which we set it to red without comparing); The green color indicates the opposite. One design choice we would like to highlight is the depth of the color indicates percentage wise how drastic the change of closing price is compared to that of previous day (The darker the red/green is, the more drastic the change of closing price is). For each of the four graphs in the first part, we keep the line representing SP closing price on the upper part of the graph while the one representing one representative stock on the lower part of the graph, so that the users can see the contrast more clearly without overlapping. We only keep the y axis corresponding to the values of the one representative stock closing price, and omit the one corresponding to SP 500 to avoid potential confusion caused by two y axes (and to make the layout cleaner at the same time). We utilize the space in the middle of the two lines to mark the crucial economic events happening during the crisis: Green is used to indicate 'positive events' such as stimulus package and Gilead's Remdesivir showed positive effects in clinical trials; Red is used to indicate 'negative events' such as markets realized that coronavirus reached United States and Oil drops to below 0. We include mouse interactive elements in this graph so that the users can trace and compare the prices of the representative stock and that of SP 500 (with the dotted line and text label with stock name and specific price).

For each of the four graphs in the second part, we use bar charts to represent the trading volume of corresponding representative stock (in a daily basis) and use grey (lighter than the black used in previous part to de-emphasis since the new content of this graph is volume) to represent the closing price of the same stock to understand how these two variables (volume versus closing price) are related.

**Categories of Stocks:-**

1. Positive Growth Stocks
   - **Amazon** *Category–Life Essential Stocks*
     - **Effect of COVID-19:** Amazon has become a leader in online retail, due to its wide range of selections, from low to high-end products in a relatively short delivery time, which is what set Amazon different from competitors. However, these competitive advantages no longer remain but people still flock to online retail. Propelled by the fear of an extended coronavirus timeline people have modified their buying behavior. Instead of just buying required things people tend to buy things in excess, just out of the fear of other people doing the same. It is because of this bulk buying the number of credit card transactions have gone down. One of the leaders among this category is Amazon, whose stock has gone up from 1600$ to 2800$. Examples: Amazon, Costco, Walmart, Target, BJ's.
     - **Effect of Recovery:** Though analysts have maintained that Amazon evaluation deserves a haircut yet investors have remained bullish for Amazon stock, mainly because of a common consensus that a vaccine may be more than a year away. Investors have long speculated that Amazon's stock price growth would go down with the reopening of the economy and as people start going back to the new normal. But all essential stocks including Amazon have remained immune to any such news, this has become clear with people choosing to still use online retail despite earlier success in vaccine and development and reopening of the economy in few states. [1].
     - **Challenge of the Future:** For companies with primarily a retail presence it has been a very challenging time, since they are not able to sell their products online even they started to sell there product now to Amazon and if they are not able to do that their business is being taken over by other online retailers.
   - **Zoom** *Category- Work from home stocks*

- **Effect of COVID-19** Zoom which had been initially designed for video communication for enterprises, has become ubiquitous with stay at home teachers, students, families. In December Zoom had been one of the lowest-performing stocks, it grew from 10 million active users to 200 Million active users and have showed 300 Million participants. Analysis of stock price trend shows that whenever there is news of an opening of businesses the work from home stocks shows a weak downward trend[2]. Examples: Zoom, Slack, TeamViewer. [3],[4].
  - **Effect of Recovery** Though the economy has opened up in some states, offices, industries with large employees base remain closed. Since there has been a lot of focus on cost-cutting there has been a surge in demand to replace physical meetings in different countries with zoom meetings. On hearing the news that Remdesvir drug showed promising results the price dropped by more than 10% from their market high of 162$ down to 135.17$.
  - **Challenge of the future** Survey by Gartner suggests that most COVID 19 has left a permanent shift in the way we conduct business. Approximately 74 % of the employers will give their employees the option to work from home. A survey by WSJ suggests that as much as 26% of the employers feel that the employees are performing better.

2. Negative Growth Stocks
   - **Delta** *Category- Travel Industry*
     - **Effect of COVID-19** Before the Covid-19 Airline industry had been showing successive growth in profits for many years. On March 24, TSA counted a more than 87% decline in travelers in the USA vs. the same period last year[5]. This is mainly because of lockdown restrictions imposed by almost every country of the world for international travel and strict restrictions over domestic travel. Since the airline's industry is a high volume customer-focused industry they cannot sustain for too long with these trade and travel restrictions. The 4 major players in US travel space are facing major losses to the tune of millions of dollars over days and companies like Boeing, Oil companies and General Electric whose primary market is the airline's industry have posted major losses for this quarter. Examples: Delta, United Airlines etc.
     - **Effect of Recovery** Since governments have failed to relax any domestic and foreign travel restrictions airlines have failed to generate any investor confidence. The number of flights that have resumed has begun functioning at limited capacity due to social distancing guidelines this has led to a smaller number of people in flights and ticket prices also going up.
     - **Challenge of the future** Most institutional agree that the future of flights will be dismal for the next couple of years. This is because airplanes function as a breeding ground of coronavirus and such until a vaccine is made and the virus eradicated from the planet it doesn't seem likely that the normal flight operations pre COVID-19 will resume.
   - **Uniqlo** *Category- Retail Stores*
     - **Effect of COVID-19** After the financial meltdown of 2008 phenomena of "Retail Apocalypse", starting in 2010 onwards, companies started closing of some underperforming stores due to stress from online retailers like Amazon. As of 2012 there were 12000 stores in the US but 2018 numbers indicate just over 2000 remain, this downward trend shows that retail stores throughout have been under tremendous stress [6], [7]
     - **Effect of Recovery** Even with stimulus money coming in from the Federal Reserve and the government, both for the consumers and the businesses, people don't seem to want to visit any retail stores. With the bills for store properties constantly piling up and shelter in place orders in states, people are dumping retail stocks because of lack of confidence in the company, this is because even if the ever retail store were to open there is going to be a limit on the number of people entering. It's clear that even with payment protection money coming in from congress Uniqlo cannot sustain for long since they cannot allow too many people in the stores at a time.
     - **Challenge of the future** The slow death of American brick and mortar stores have been put under a hyperdrive by the emergence of coronavirus. Most retail stores in the US have closed down due to threats of contamination, most of them have been scrambling to raise cash even after the money coming in from the federal reserve under the CARES act. Some which have failed to do so have been in the process of filing for Chapter 9 bankruptcy protection. Markets have shown very little confidence in any of the retail establishments since it looks that COVID-19 could extend to early next year and Amazon which had taken over roughly 50 % of the market pre-COVID has taken over the entire market now. Examples: Zara, Uniqlo, H&M, Dollar Tree, Marshall, JC Penny, Sears.

**Division of Labor:-**

Aasim focuses on the design part of the project and report writing.;
Yishu focuses on the coding part of the project;
For the coding part, Yishu spent between 1 and 1.5 normal Homework time; The majority of time is devoted to handling the mouse hovering events and the layout of the graph. Aasim spent most of the time researching the effect of markets and developing the story behind the project, used maybe 1 normal homework time.

## References


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