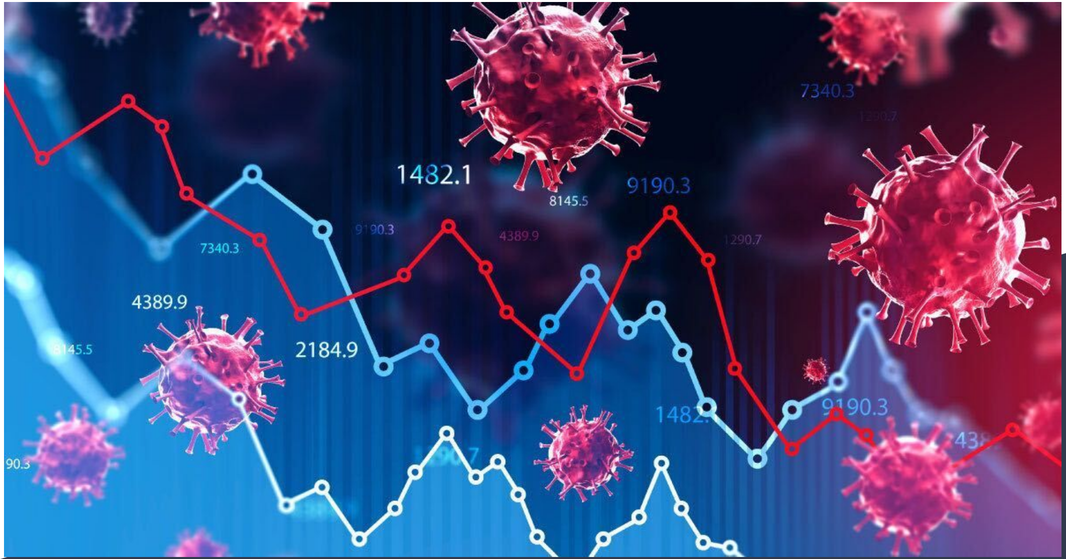
Covid 19 and Its impact on Finance, Tech, Real Estate, and Biotech



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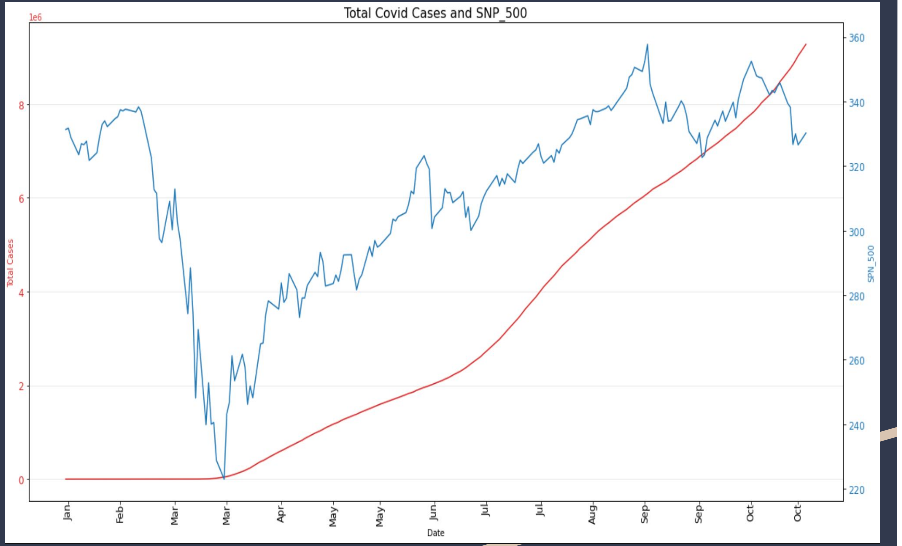
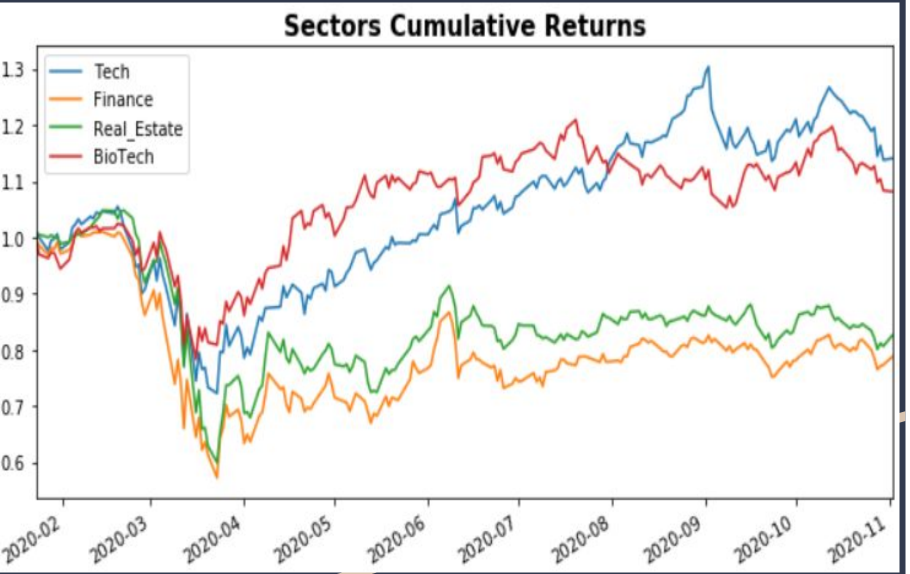
Motivation and Summary



- The COVID 19 Pandemic has had a profound impact on the stock market.
- Our project is to help retail investors (i.e Robinhood, Qapital, Acorn) in guiding their investments during potential future pandemics.
- Based on stock data analysis we will recommend the rebalancing of a theoretical portfolio to outperform the market.

Questions & Data

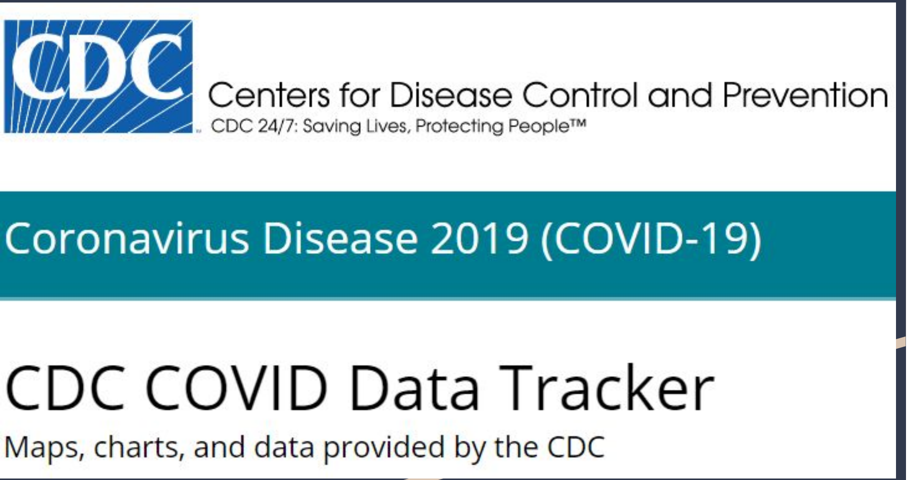


- We chose 4 of the top 10 most influential sectors and we created an equally weighted theoretical portfolio

- For simplicity used the following ETFs to track these market sectors, but the analysis can be easily expanded :
  - Finance (XLF)
  - Tech (XLK)
  - Vanguard Real Estate ETF (VNQ)
  - Biotech (IBB)

- We used the SPY to represent the U.S. market.

Questions & Data



- By analyzing the data we are trying to answer this question:

- **How a hypothetical stock portfolio should be rebalanced after a pandemic hits?**

- We obtained our data from the following sources:
  - Google Finance - https://www.google.com/finance
  - CDC - https://covid.cdc.gov/covid-data-tracker/#cases_casesinlast7days

Data Exploration and Clean up

We gathered closing prices for all our ETF’s from Google Finance ranging from
January 2017- November 3rd 2020.

We created precovid dataframes for each ETF in order to segment our historical data(January 1, 2017- January 22, 2020). January, 22 2020 was the first documented Covid 19 case in the United States.

The next step was to concatenate all data into a precovid dataframe with the date as our index.

We then created present covid 19 dataframes for each ETF ranging from January 22, 2020 - November 3, 2020 and merged them as well.

Then created and cleaned the Covid 19 Dataframe which included total cases and deaths nationwide.

The final step was to concatenate the closing prices dataframe and the covid 19 dataframe.

Data Analysis

- Performed statistical analysis for before and during Covid periods:
    - Percentage Change
    - Standard Deviations
    - Variance and Covariance
    - Beta Values
    - Sharpe Ratios
    - Volatility
    - Correlations

- We created an ARIMA model to forecast future deaths due to the pandemic

Discuss our Findings

Portfolio	Initial Investment	Gain/Loss
Unbalanced	$ 1,000,000	($41,147)
Balanced	$ 1,000,000	$93,027

Based on our analysis we have recommended to rebalance the portfolio as follows.

S&P 500: 0% → 50%

Finance(XLF): 25% → 0%

Real Estate(VNQ): 25% → 0%

Tech(XLK): 25% → 25%

Biotech(IBB): 25% → 25%

The total profit resulting from our analysis was $134,174

What are some elements that we could not account for?

Gov’t policies in response to covid. (i.e. Stimulus Checks, Eviction Moratorium, Business Restrictions)

Impact of the pandemic in non US markets

US Election

Different infection rates throughout the nation.

Vaccines and potential cures/treatments

With more time what could we have analyzed

While the initial market impact of COVID has been clear we suspect that while some of the changes may be permanent (i.e. people will shop more online for example) others will not (i.e. people will go back to eat in restaurants). Also, it's clear that gov't intervention can soften the market impact as well.

With more time we would've liked to try to estimate some of these and dynamically adjust the portfolios to improve potential returns.