

# Finance & Risk Analytics

---

- Kamal H. Thampi





# Agenda

---

- Introduction
- Overview
- Sector-wise Analysis
- Key Findings
- Portfolio Analysis
- Methodology

# Introduction

---

# Objective

---

- We have two investors with distinct financial objectives and risk tolerance levels.
- As the portfolio manager, our responsibility is to provide personalized consultation and investment advice tailored to each investor's needs and goals.



**Mr. Patrick Jyenger**

A conservative investor seeking to invest \$500K in stocks , prioritizing low risk. His goal is to double his capital within a 5-year timeframe.



**Mr. Peter Jyenger**

A high-risk investor looking to invest \$1 million in equities, aiming for higher returns. His objective is also to double his capital within a 5-year period.

# Investor Profiles

## Mr. Patrick Jyengar

Wants to maintain a decent standard of living post his retirement.

Has always been a conservative investor during his life

Available capital of \$1 million; Wants to invest \$500K in a magazine (Naturo) for minority stake and remaining \$500K in equities

Expects doubling his capital with less risk in 5 years' time to buy a minority portion of Naturo

## Mr. Peter Jyengar

Consistent with his attitude towards risk, he prefers high-return investments

Believes that he can still bounce back in case of any occasional losses

Wants to invest \$1 million from company's cash and cash equivalents in the most high-margin stocks

Expects high returns within 5 years for inorganic expansion of JWW

# Overview

---

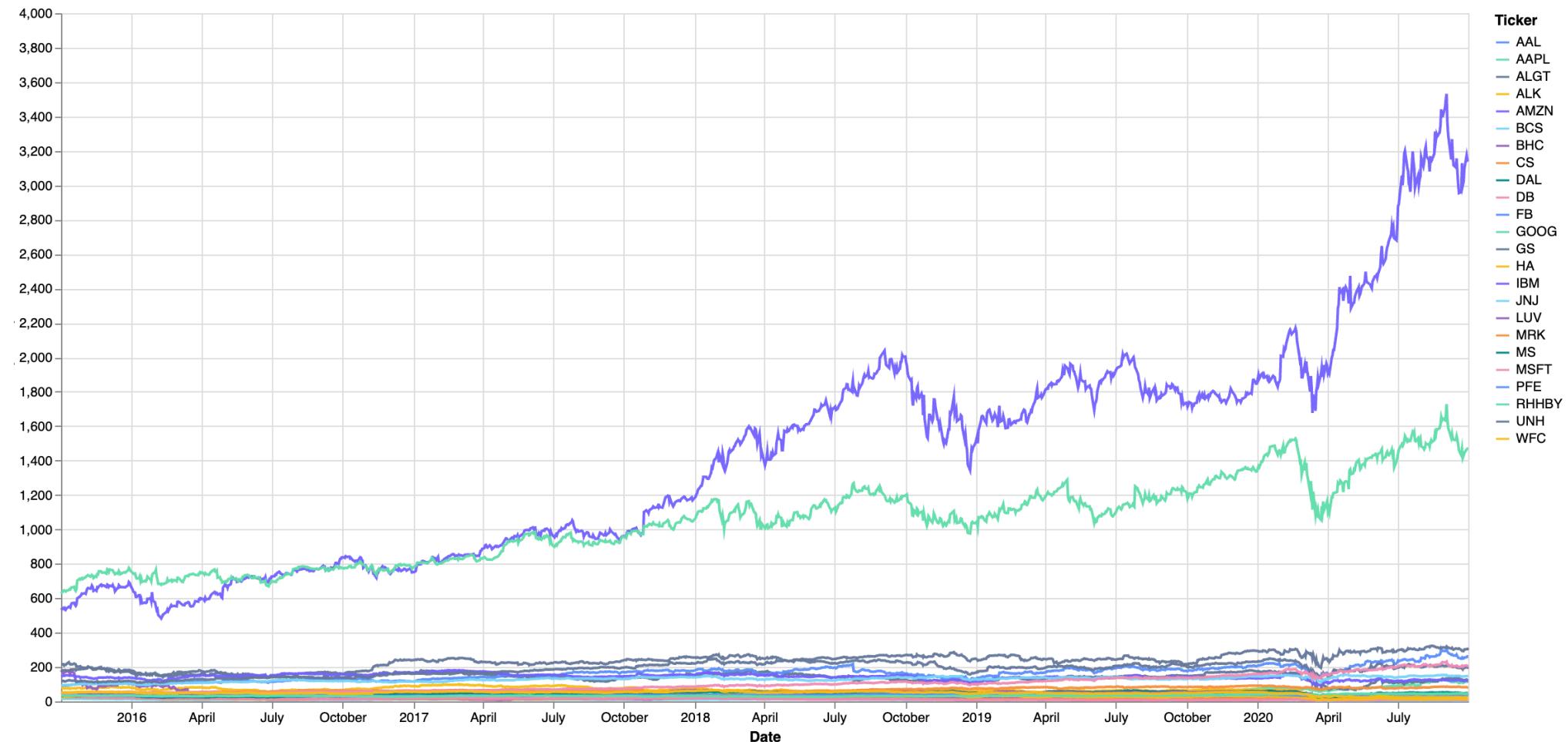
# Stocks Data

- 24 stocks across various domains**
  - Technology
  - Aviation
  - Financial Services
  - Pharmaceuticals/Healthcare
- Data points**
  - Date
  - Open price (start of the day)
  - Close price (end of the day)
  - High price (highest reached during the day)
  - Low price (lowest reached during the day)
  - Adjusted close price (including dividends)
  - Volume traded (number of stocks traded)
- Duration**
  - October 1, 2010 to September 30, 2020

Ticker	Industry	Company Name
AAL	Aviation	American Airlines Group Inc
ALGT	Aviation	Allegiant Travel Company
ALK	Aviation	Alaska Air Group Inc
DAL	Aviation	Delta Air Lines Inc
HA	Aviation	Hawaiian Holdings Inc
LUV	Aviation	Southwest Airlines Co
BCS	Finance	Barclays
CS	Finance	Credit Suisse
DB	Finance	Deutsche Bank
GS	Finance	Goldman Sachs
MS	Finance	Morgan Stanley
WFC	Finance	Wells Fargo
JNJ	Healthcare	Johnson & Johnson
MRK	Healthcare	Merck and CO inc.
PFE	Healthcare	Pfizer inc
UNH	Healthcare	United Health Group Inc
BHC	Pharmaceuticals	Bausch Health Companies inc
RHHBY	Pharmaceuticals	Roche Holding AG
AAPL	Technology	Apple Inc
AMZN	Technology	Amazon
FB	Technology	Facebook
GOOG	Technology	Alphabet
IBM	Technology	IBM
MSFT	Technology	Microsoft

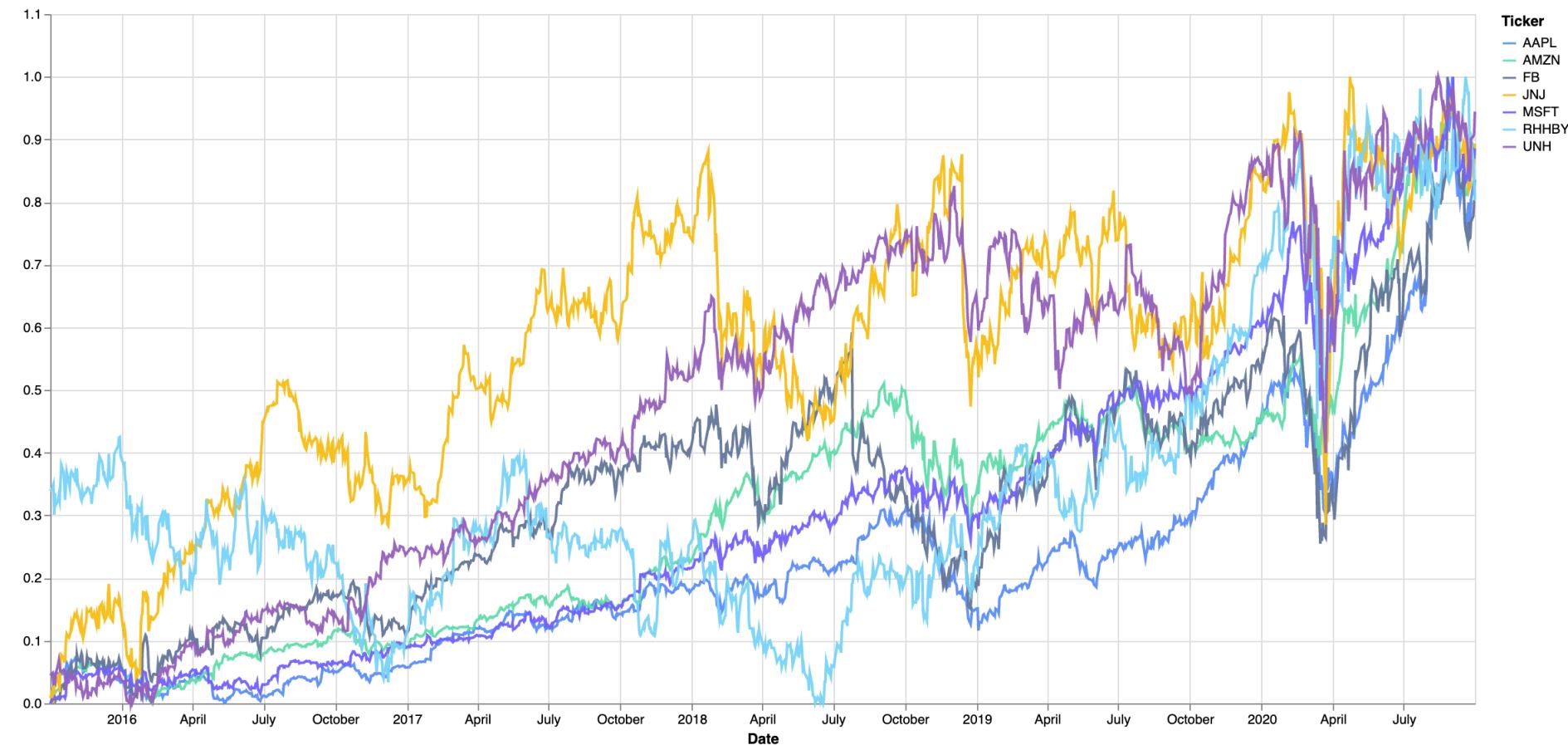
# Stocks Performance (over last 5 years)

In the last 5 years, Amazon & Google have outperformed other stocks.



# Stocks Performance (normalized data) - I

With normalized data, Apple, Amazon, Facebook, Johnson & Johnson, Microsoft, Roche Holding AG and United Health Group Inc have shown above 80% performance.



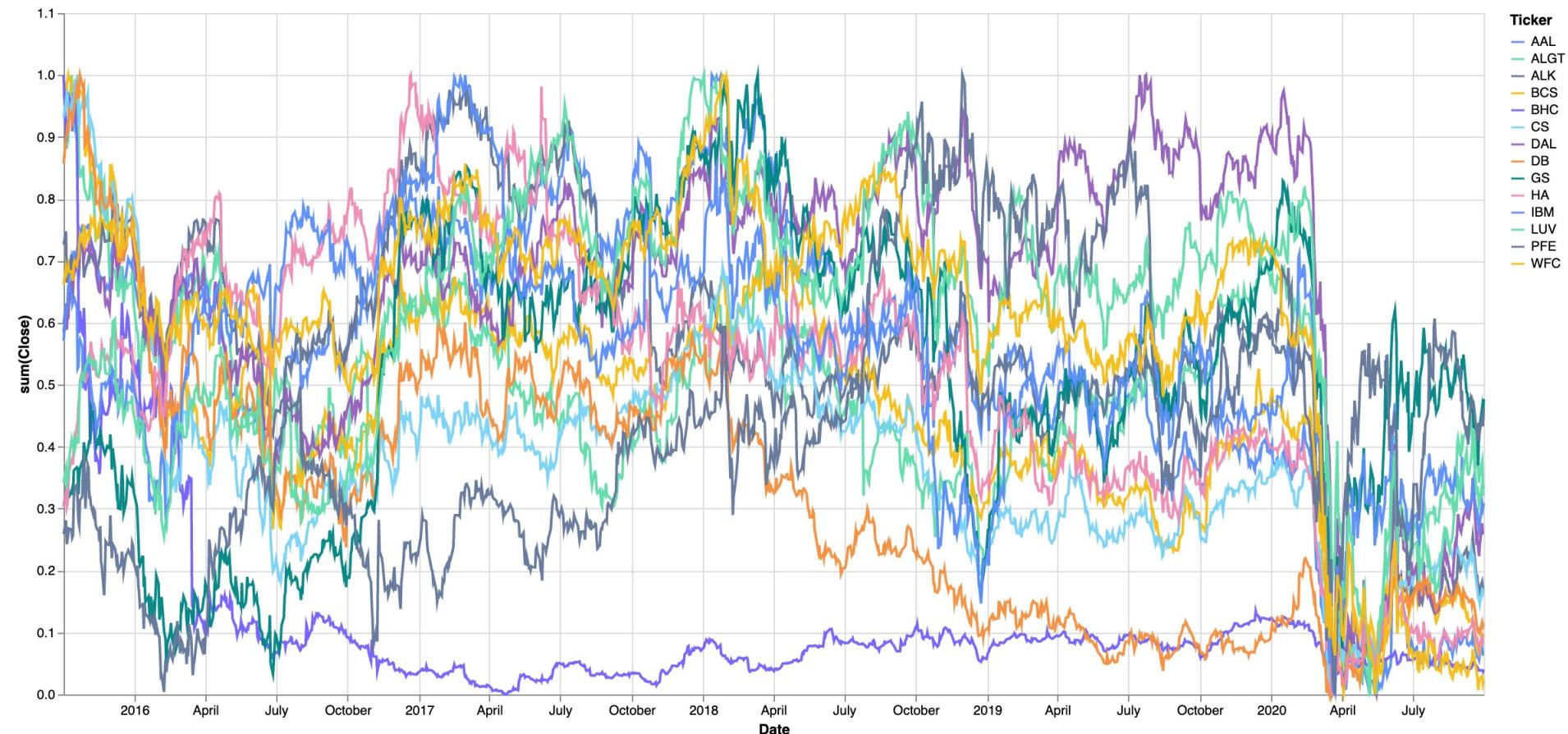
# Stocks Performance (normalized data) - II

With normalized data – Google, Merck and Co Inc. & Morgan Stanley have shown above 50% performance in the last 5 years.



# Stocks Performance (normalized data) - III

Aviation Industry, Barclays, Bausch Health Companies, Credit Suisse, Deutsche Bank, Goldman Sachs, IBM, Pfizer and Wells Fargo have shown below 50% performance.



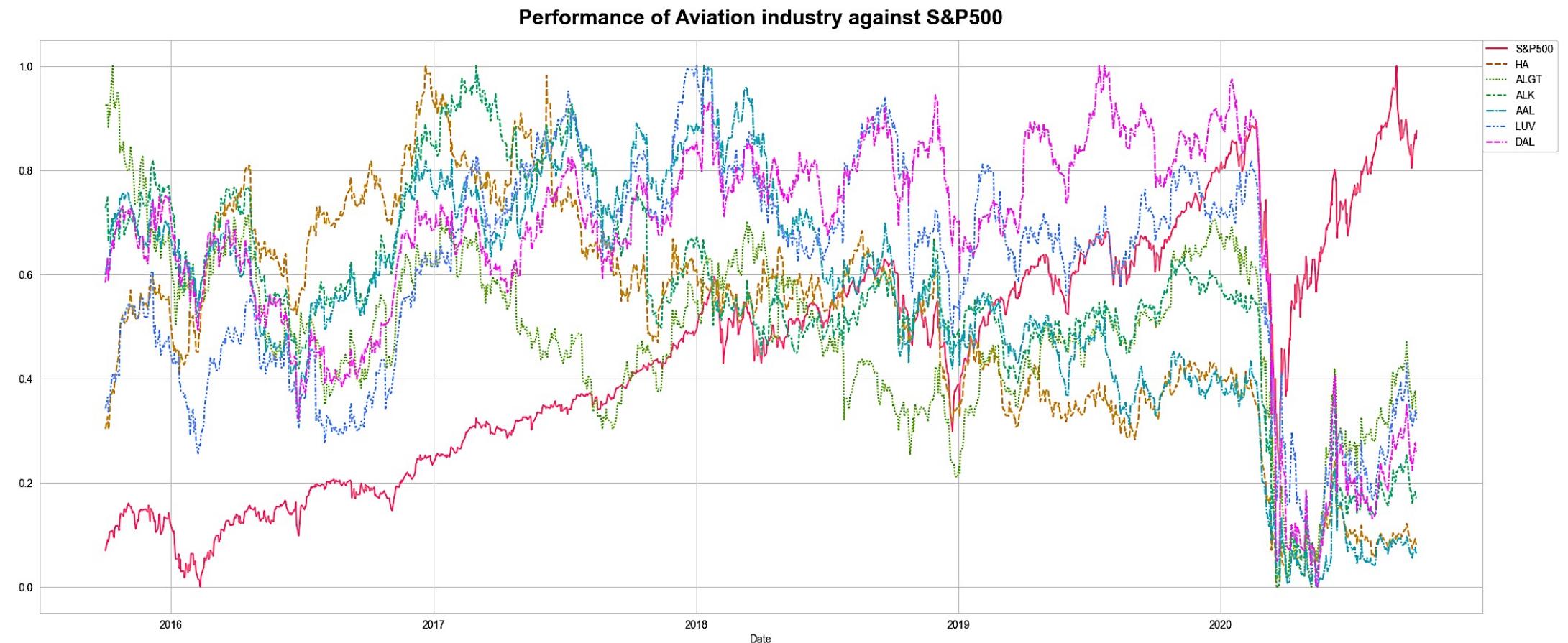
# Sector-wise Analysis

---

# Aviation

---

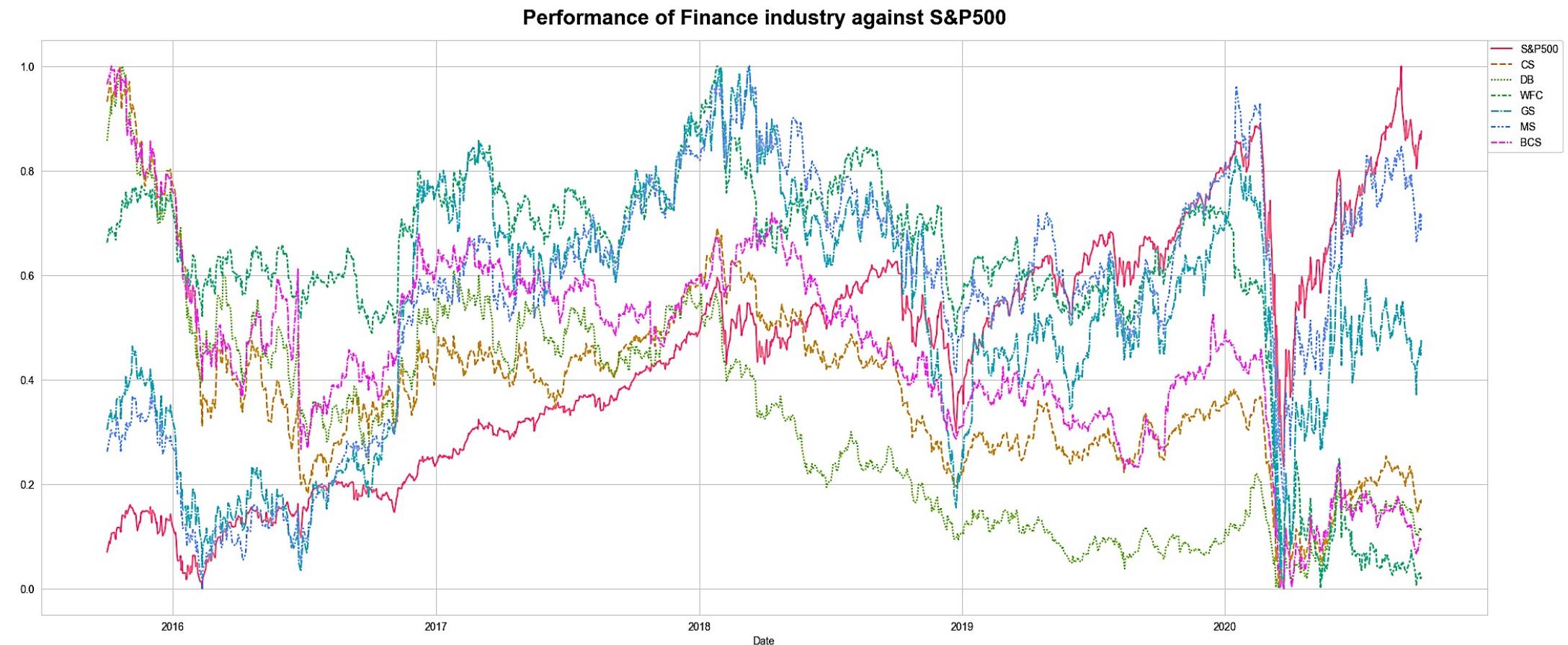
This sector suffered a severe decline in March 2020 due to COVID-19 and has not yet recovered, with ongoing challenges persisting despite an improving overall market.



# Finance

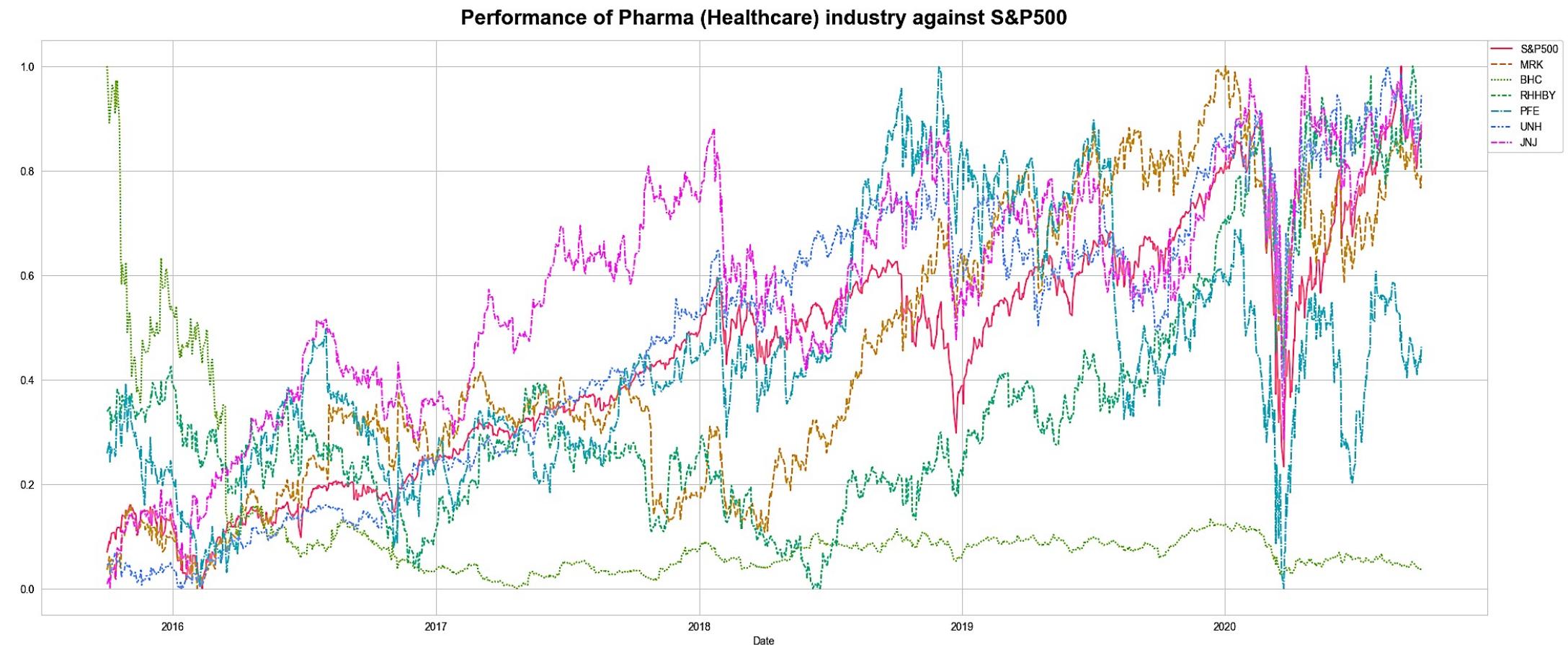
---

This sector was also impacted by COVID-19, but while many stocks struggled to recover, Morgan Stanley and Goldman Sachs stood out as relative performers.



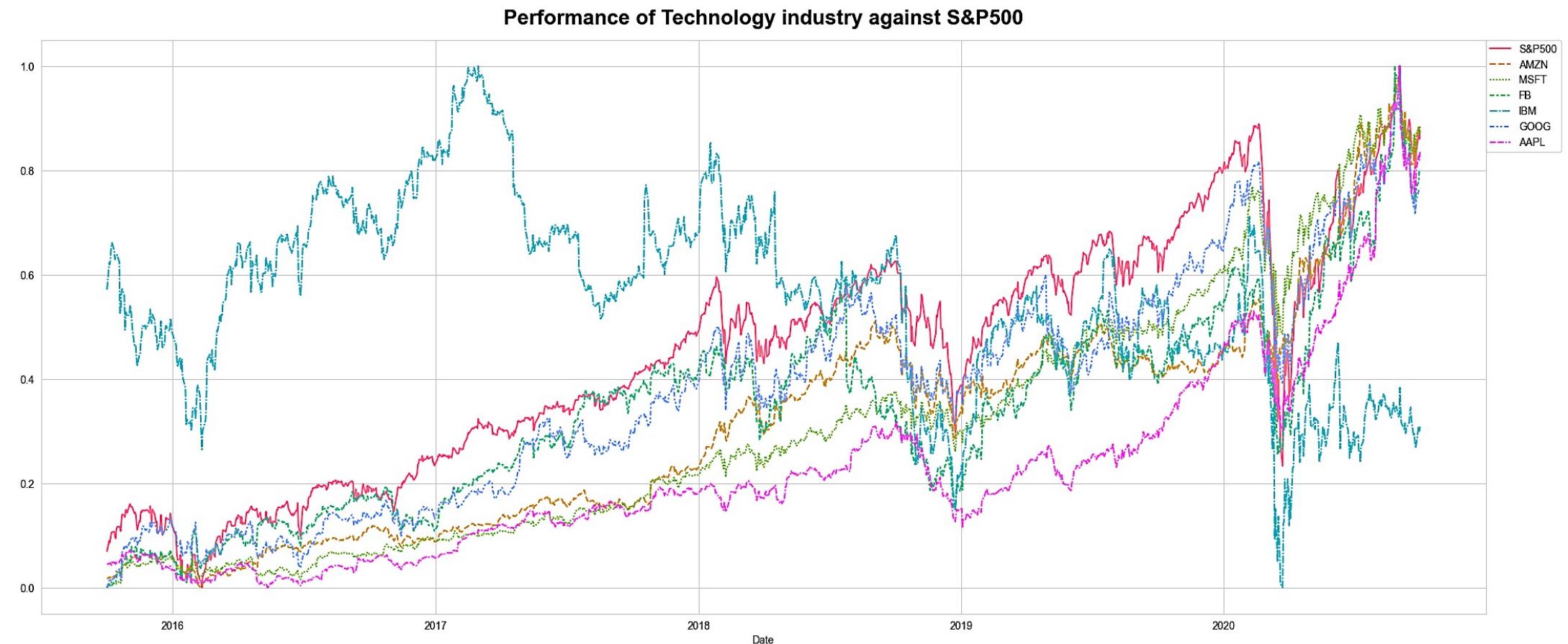
# Pharmaceuticals / Healthcare

The pandemic also impacted this sector, but UnitedHealth and Johnson & Johnson have since outperformed the S&P Index, while Bausch Health has underperformed.



# Technology

The sector has shown a commendable recovery, with Microsoft, Amazon, Apple, Facebook, and Google not only rebounding but also outperforming the market index.



# Key Findings

---

# Annual Returns

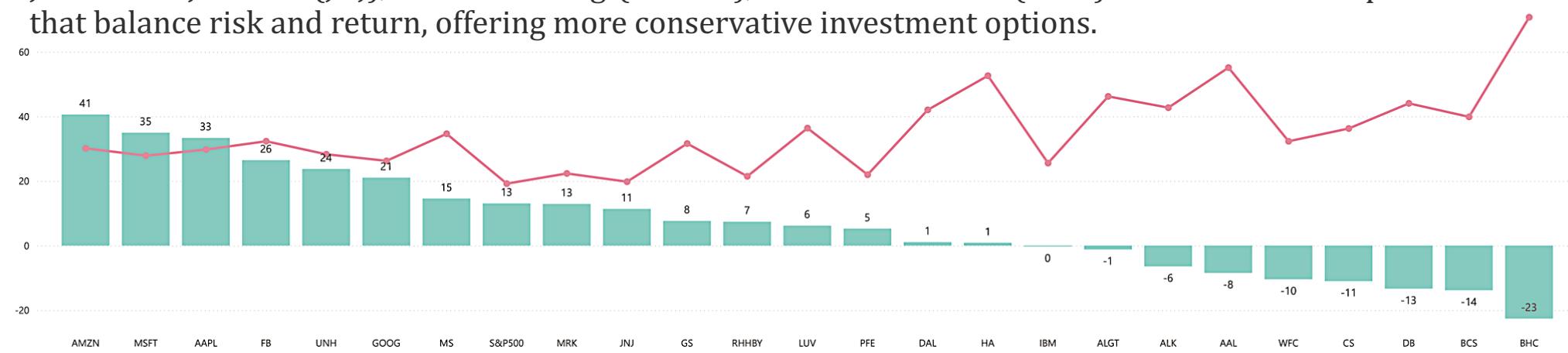
## Top Stocks with High Annual Returns

- **AMZN:** 40.59%
- **MSFT:** 34.95%
- **AAPL:** 33.32%
- **FB:** 26.45%
- **UNH:** 23.72%
- **GOOG:** 21.02%
- **MS:** 14.55%

Ticker	Avg. Daily Returns	Risk	Min	Max	Annualized Returns	Annualized Risk	Sharpe Ratio	Cumulative Returns
<b>AMZN</b>	0.16	1.9	-7.92	13.22	40.59	30.11	1.32	504.69
<b>MSFT</b>	0.14	1.75	-14.74	14.22	34.95	27.84	1.23	371.49
<b>AAPL</b>	0.13	1.87	-12.86	11.98	33.32	29.73	1.1	322.74
<b>FB</b>	0.1	2.04	-18.96	15.52	26.45	32.31	0.8	187.96
<b>UNH</b>	0.09	1.78	-17.28	12.8	23.72	28.27	0.81	167.36
<b>GOOG</b>	0.08	1.65	-11.1	10.45	21.02	26.23	0.77	140.41
<b>MS</b>	0.06	2.18	-15.6	19.77	14.55	34.62	0.4	53.49
<b>S&amp;P500</b>	0.05	1.21	-11.98	9.38	13.04	19.18	0.64	74.81
<b>MRK</b>	0.05	1.41	-8.9	10.41	12.88	22.33	0.54	68.02
<b>JNJ</b>	0.05	1.25	-10.04	8.0	11.35	19.78	0.54	59.79
<b>GS</b>	0.03	1.99	-12.71	17.58	7.64	31.59	0.22	14.17
<b>RHHBY</b>	0.03	1.35	-8.96	13.01	7.38	21.45	0.31	28.87
<b>LUV</b>	0.02	2.29	-15.11	14.44	6.16	36.37	0.15	-2.37
<b>PFE</b>	0.02	1.38	-7.73	8.96	5.25	21.95	0.21	15.26
<b>DAL</b>	0.0	2.65	-25.99	21.02	1.05	42.03	0.01	-32.66
<b>HA</b>	0.0	3.31	-26.5	24.58	0.86	52.6	0.0	-47.88
<b>IBM</b>	0.0	1.61	-12.85	11.3	-0.04	25.54	-0.03	-15.27
<b>ALGT</b>	0.0	2.91	-28.33	29.24	-1.19	46.2	-0.04	-45.04
<b>ALK</b>	-0.03	2.69	-23.24	20.31	-6.44	42.71	-0.17	-54.34
<b>AAL</b>	-0.03	3.47	-25.22	41.1	-8.47	55.12	-0.17	-68.65
<b>WFC</b>	-0.04	2.03	-15.87	14.53	-10.44	32.3	-0.35	-54.3
<b>CS</b>	-0.04	2.28	-18.26	16.34	-11.01	36.26	-0.32	-58.61
<b>DB</b>	-0.05	2.77	-17.49	14.02	-13.33	44.04	-0.32	-68.33
<b>BCS</b>	-0.05	2.51	-21.85	15.1	-13.82	39.87	-0.37	-66.62
<b>BHC</b>	-0.09	4.46	-51.46	33.74	-22.6	70.72	-0.33	-91.35

# Annualized Risk & Returns

- The top five performing stocks by annualized return are Amazon (AMZN), Microsoft (MSFT), Apple (AAPL), Facebook (FB), and UnitedHealth Group (UNH).
- Each of these top 5 stocks has an annualized return exceeding 20%, and their risk profile is considered moderate compared to other equities.
- Conversely, lower returns increase the likelihood of losing initial investment capital.
- The five banks - Bank of America (BHC), Bank of Canada (BCS), Deutsche Bank (DB), Credit Suisse (CS), and Wells Fargo (WFC) - are characterized by higher risk as they did not generate sufficient returns to compensate for the initial investment.
- A lower return on investment (ROI) often indicates a higher level of risk in stocks. Nevertheless, some equities may offer stable returns at relatively low risk, providing investors with a safer opportunity.
- Johnson & Johnson (JNJ), Roche Holding (RHHBY), and Merck & Co. (MRK) are notable examples of stocks that balance risk and return, offering more conservative investment options.



# Portfolio Analysis

---

# Patrick Jyengar's Portfolio

## Investment Objective

- Mr. Patrick aims to double his investment over a period of 5 years.
- He seeks to invest in low-risk stocks that generate decent returns.

## Stock Selection

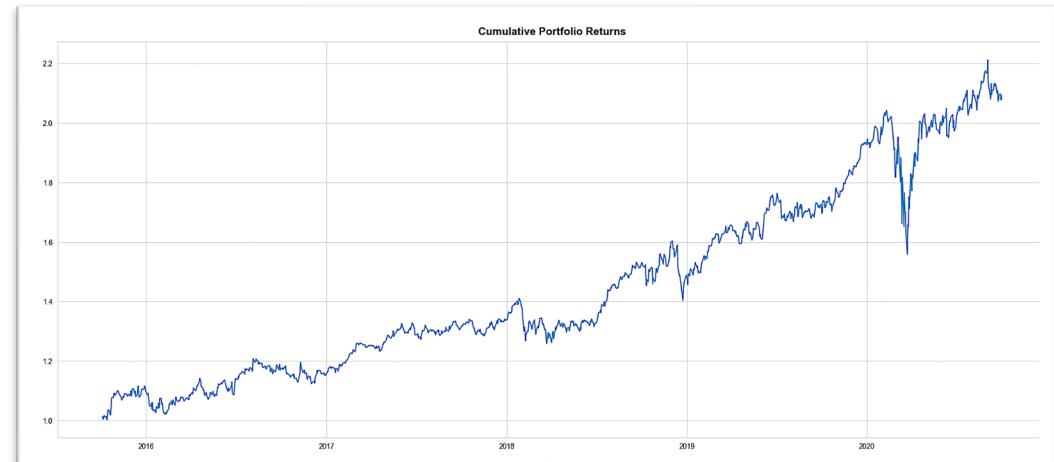
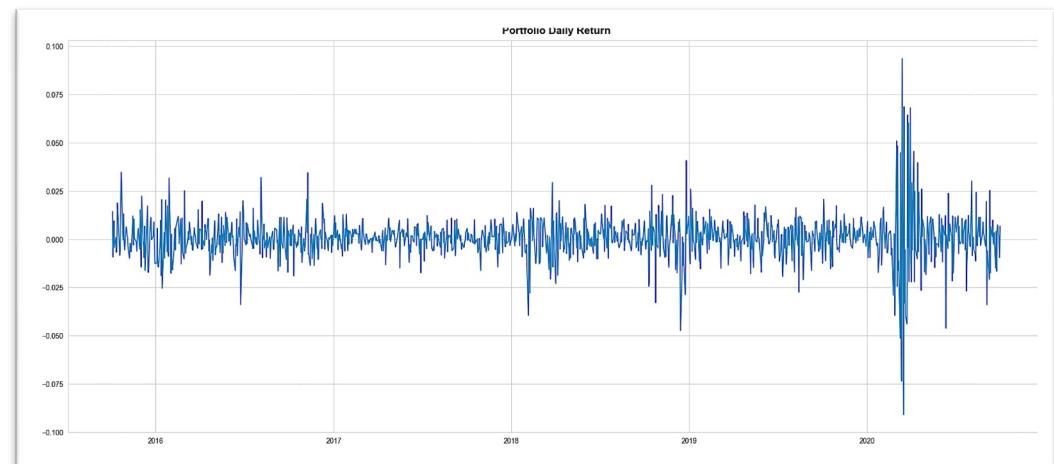
- Based on his profile, suitable low-risk stocks for investment include:
  - **Johnson & Johnson (JNJ)**
  - **Roche Holding AG (RHHBY)**
  - **Merck & Co., Inc. (MRK)**

## Portfolio Composition

- To achieve the desired returns, a portion of Mr. Patrick's wealth will be invested in **Microsoft Corporation (MSFT)**.
- The portfolio will consist of equal weightages of 0.25 for each stock

## Investment Amount and Expected Returns

- Mr. Patrick will invest \$500,000 in the above-mentioned portfolio.
- After 5 years, the expected returns on his investment would be approximately \$1.05 M resulting in a gain of \$558 K.



# Peter Jyengar's Portfolio

## Investment Objective

- Mr. Peter Jyengar seeks high-return investments, consistent with his risk-taking attitude.
- He believes that occasional losses can be mitigated by bouncing back and expects significant returns for inorganic expansion of his company.

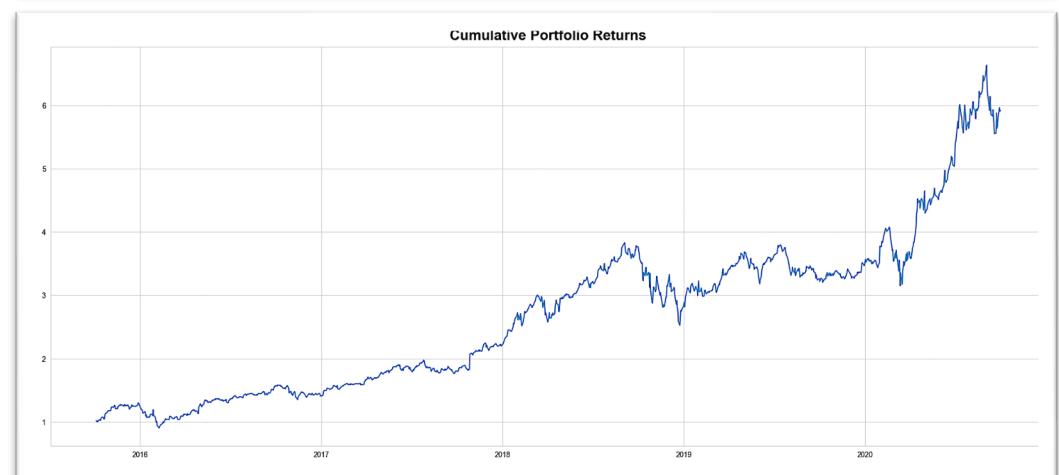
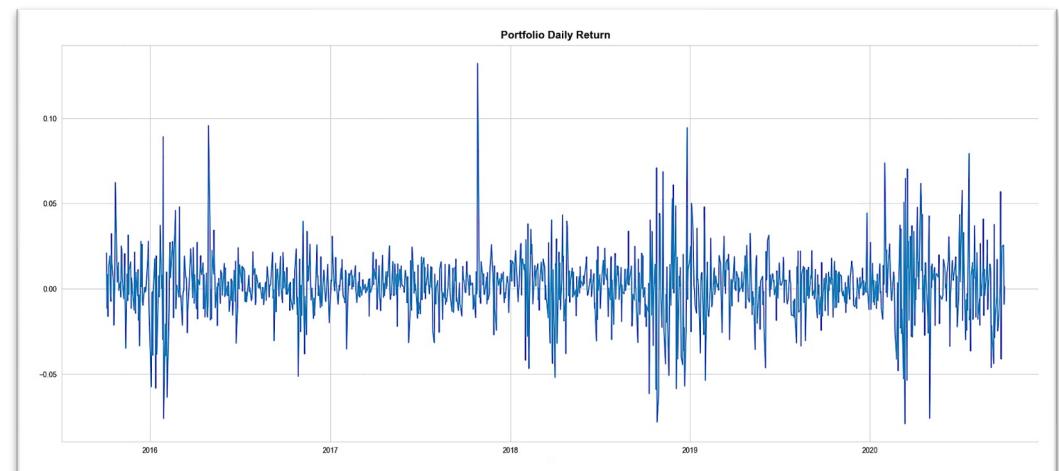
## Portfolio Composition

- Mr. Jyengar aims to invest \$1 million from the company's cash and cash equivalents in a single high-margin stock.
- Based on his profile, a suitable high-risk/high-return stock for investment is **Amazon Inc. (AMZN)**.

## Investment Amount and Expected Returns

- Mr. Peter will invest \$1 million in the AMZN stock.
- After 5 years, the expected returns on his investment would be approximately \$6 million, resulting in a gain of over \$5 million.

**Note:** The high-risk/high-return nature of this portfolio is designed to cater to Mr. Peter's risk tolerance and provide maximum returns for his company's expansion.



# Methodology

---

# Methodology

## Step 1 | Load Libraries and Data

- Imported required libraries in python required for data analysis, manipulation and visualization.
- Imported CSV files with stocks data segregated based on Industry/Sectors.

## Step 2 | Exploratory Data Analysis (EDA)

- Checked for null values.
- About 0.2% of the rows had no data in it, and hence were dropped.
- Examined the dataset for outliers.

## Step 3 | Data Analysis

- Calculated Daily returns, Cumulative returns, Sharpe ratio, Portfolio risk, and ROI.
- Identified the top-performing stocks.
- Discovered stocks with over 80% returns in the last five years.
- Performed sector-wise analysis to get a better view of each sector.

## Step 4 | Stock selection

- Each stock possesses unique characteristics, including varying levels of risk and liability.
- Amazon (AMZN) is notable for its potential to generate high returns, although this comes at a higher level of risk.
- In contrast, stocks such as Johnson & Johnson (JNJ), Roche Holding (RHHBY), Merck & Co. (MRK), and Microsoft (MSFT) offer good returns while presenting lower levels of risk.

## Step 5 | Portfolio creation

- Finalized portfolios for Mr. Patrick and Peter Jyengar based on the analysis and requirements.

THANK YOU.

---

