

Covid-19's Impact on US Tech Stocks

Columbia Data Analytics Group 5

Dan Marks

Maneesha Movva

Lauren Valencia

Wengi Dedebar

Perry Abdulkadir





Big Picture Question

How have American tech stocks performed during the Covid-19 pandemic?

- Covid-19 was a Black Swan Event
- Markets plunged and some feared a 1929-style crash was in progress
- Despite a significant initial drop, markets quickly recovered, despite the ongoing pandemic
- This represents a unique historical event, worthy further analysis
- **Our analysis focuses on the technology sector**



Stock Picking Criteria

- **Blue Chip**
 - Defined (for purposes of our analysis) as the 5 largest market cap companies in the tech sector
- **Newcomers**
 - Defined (for purposes of our analysis) the top 5 tech stocks by market cap that IPO'd between 2018-2019
- **Special Purpose Acquisition Company ("SPAC")**
 - We also included 5 SPAC's for our analysis
 - Also known as a "blank check company" is a shell corporation listed on a stock exchange with the purpose of acquiring a private company, thus making it public without going through the traditional IPO process

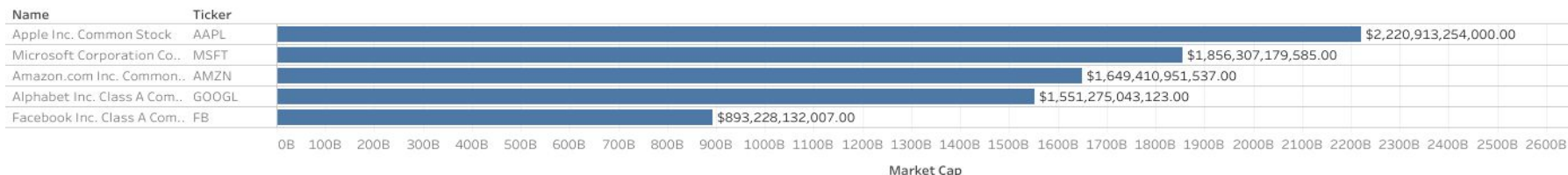
Stock pick criteria



We picked out stocks based on 2 criteria:

- Tech sector
- Top 5 Market Cap

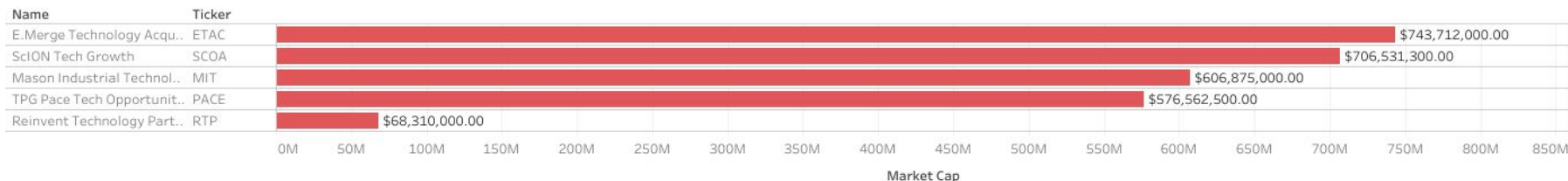
Blue Chip by Market Cap



IPO by Market Cap



Spac by Market Cap





Do Blue Chip stocks have any advantage in forecasting prices with Machine Learning as opposed to newer companies (IPO after 2018)?

- Hypothesis: Blue Chip stocks will have more accurate predictions due to lower volatility



Newly IPOed





Machine Learning

ARIMA/ARMA tests

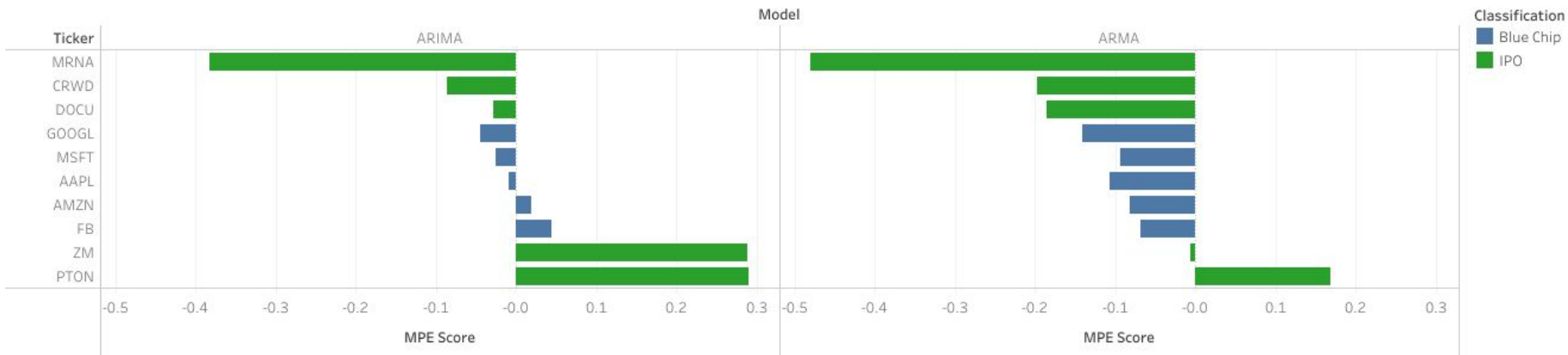
- Example of 2 models ran for each stock
- Each model resulted in a MSE score and an MPE score





Machine Learning

MPE Score Distribution



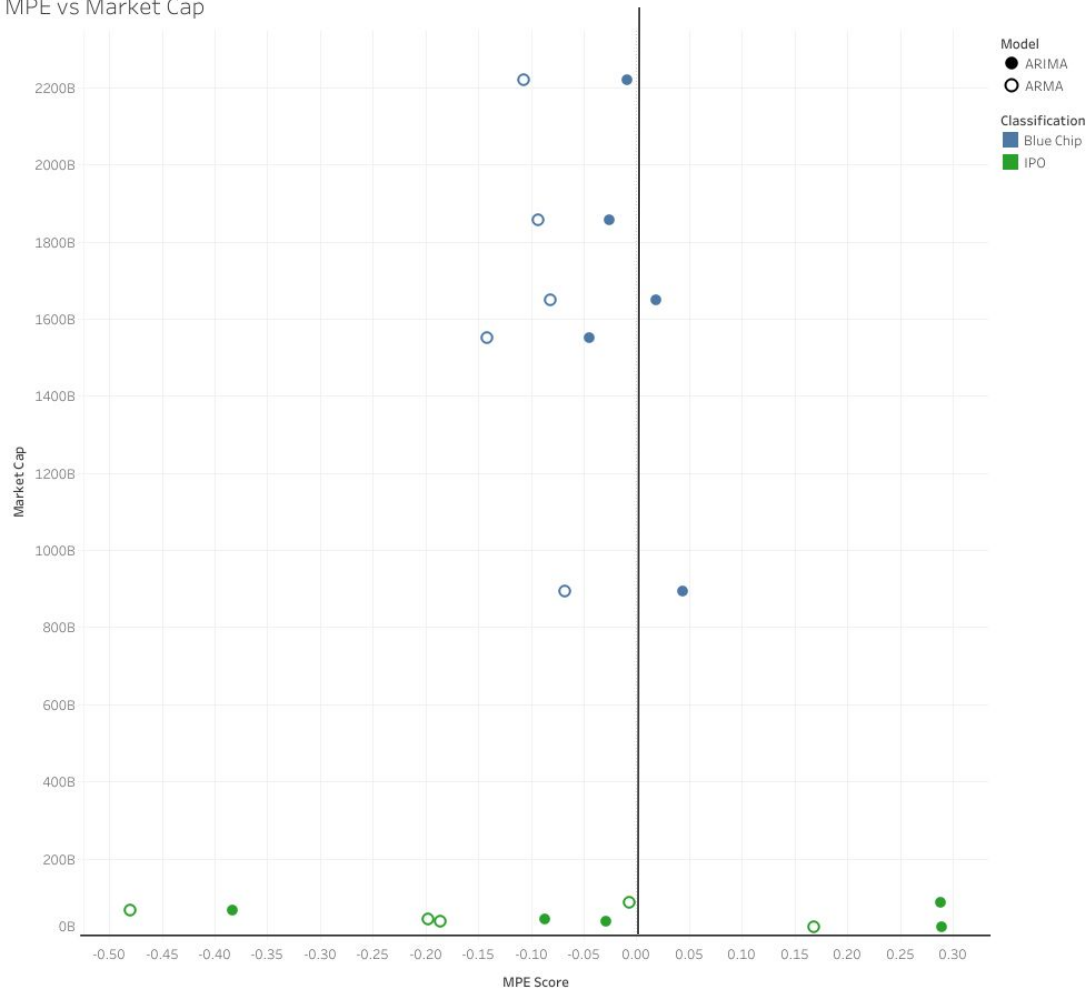


Machine Learning

MPE vs Market Cap

- We can see the results of our MPE scores plotted against the market cap of each company
- As hypothesized we see more accurate results from Blue Chip companies.

MPE vs Market Cap





Have SPACs overtaken IPOs for investor returns in the tech sector?

Hypothesis: Despite the buzz around SPACs, they have generated less return for investors than IPOs because this alternate method of going public signals to markets some underlying issue in the company's fiscal health.



Changes over Time - IPOs

Ticker	Market Cap 1/4	Market Cap 5/7	Change
ZM US Equity	102956.82	86936.45	-16020.37
MRNA US Equity	44212.69	65509.2588	21296.5688
CRWD US Equity	44361.167	42352.905	-2008.262
DOCU US Equity	41492.1241	37992.9183	-3499.2058
PTON US Equity	42698.0328	24999.9592	-17698.074

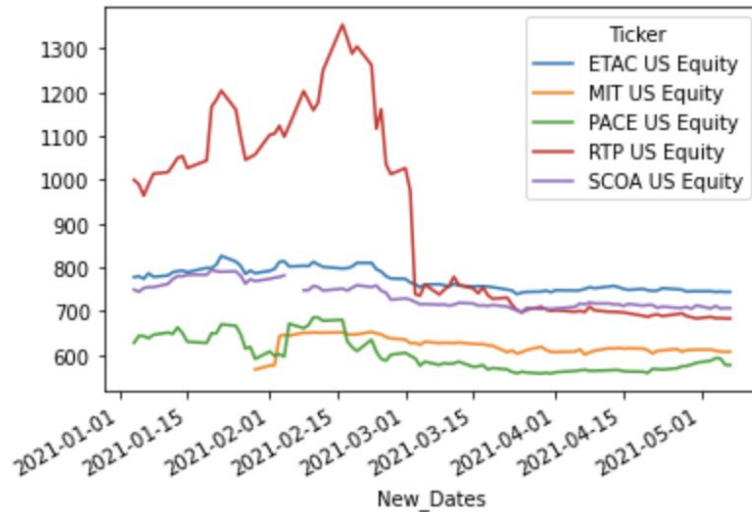
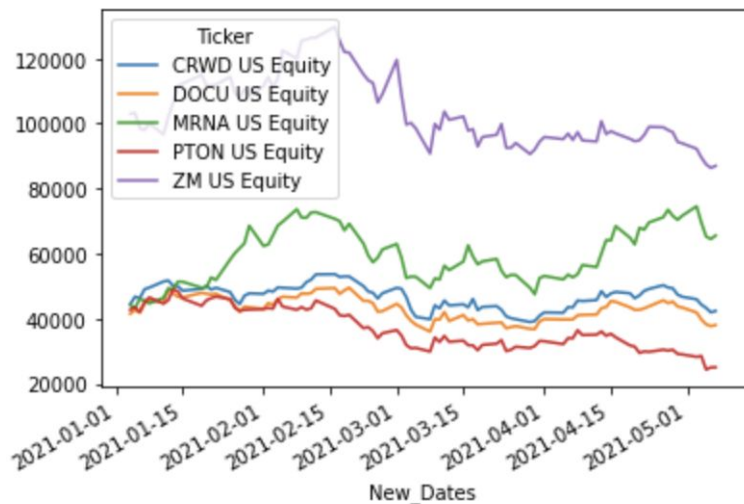


Changes over Time - SPACs

Ticker	Market Cap 1/4	Market Cap 5/7	Change
RTP US Equity	999.64	683.1	-316.54
MIT US Equity	566.4375	606.875	40.4375
ETAC US Equity	777.24	743.712	-33.528
SCOA US Equity	748.9375	706.5313	-42.4062
PACE US Equity	627.1875	576.5626	-50.6249



IPOs vs. SPACs



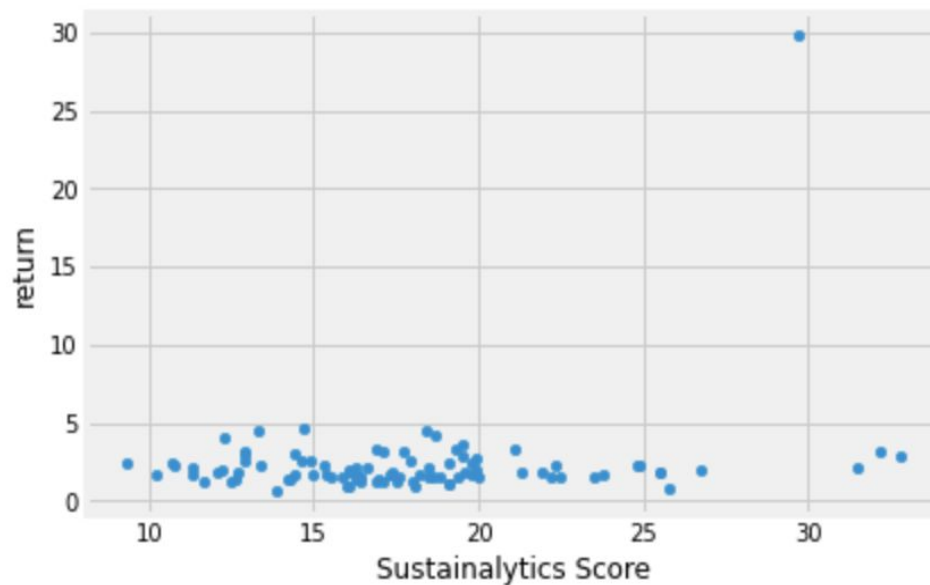


Have tech stocks with higher ESG scores generated higher returns during the Covid-19 pandemic?

- Hypothesis: companies with better ESG scores (environmental, social, governance) have performed better during the Covid-19 pandemic.



Two different ESG scores vs. returns



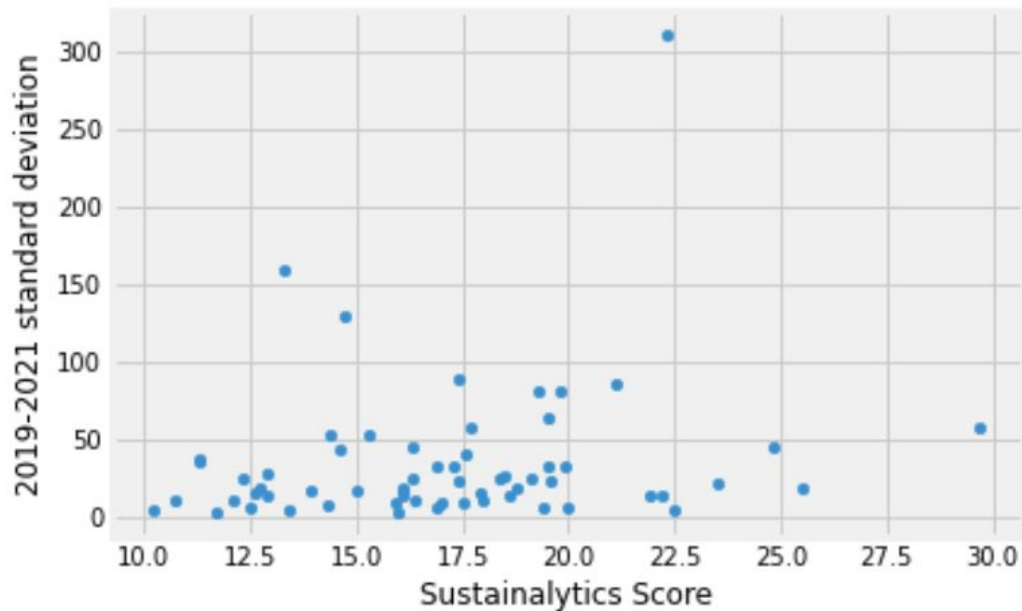
A bubble chart showing the distribution of stock tickers. The largest bubble is ENPH (red). Other large bubbles include GOOGL (red), AAPL (green), and NVDA (green). Smaller bubbles include VRSN, MPWR, FB, DISH, ADI, and many others. The bubbles are color-coded: red for high values, orange for medium, and green for low.

Ticker	Color	Relative Size
ENPH	Red	Largest
GOOGL	Red	Large
AAPL	Green	Large
NVDA	Green	Large
VRSN	Red	Medium
MPWR	Orange	Medium
FB	Red	Medium
DISH	Red	Medium
ADI	Red	Medium
IT	Red	Medium
MXIM	Red	Medium
WDC	Green	Small
VIAC	Green	Small
NFLX	Green	Small
MSFT	Green	Small
PYPL	Green	Small
TTWO	Green	Small
TYL	Green	Small
KLAC	Green	Small
MA	Green	Small
JNPR	Green	Small
EA	Green	Small
FLIR	Green	Small
NWSA	Green	Small
PAYC	Green	Small
PAYX	Green	Small
PTC	Green	Small
STX	Green	Small
TEL	Green	Small
V	Green	Small
XLNX	Green	Small
MU	Green	Small
IBM	Green	Small
GPN	Green	Small
HPE	Green	Small
INTC	Green	Small
DIS	Green	Small
CTSH	Green	Small
CSCO	Green	Small
AMT	Green	Small
ACN	Green	Small
ADSK	Green	Small
ADP	Green	Small
CMCSA	Green	Small
FFIV	Green	Small
FIS	Green	Small
CRM	Green	Small
CDNS	Green	Small
BR	Green	Small
SNPS	Green	Small
NTAP	Green	Small
ATVI	Green	Small
DISCA	Green	Small
LRCX	Green	Small
TRMB	Green	Small
NXPI	Green	Small

The bigger the bubble,
the higher the relative
return



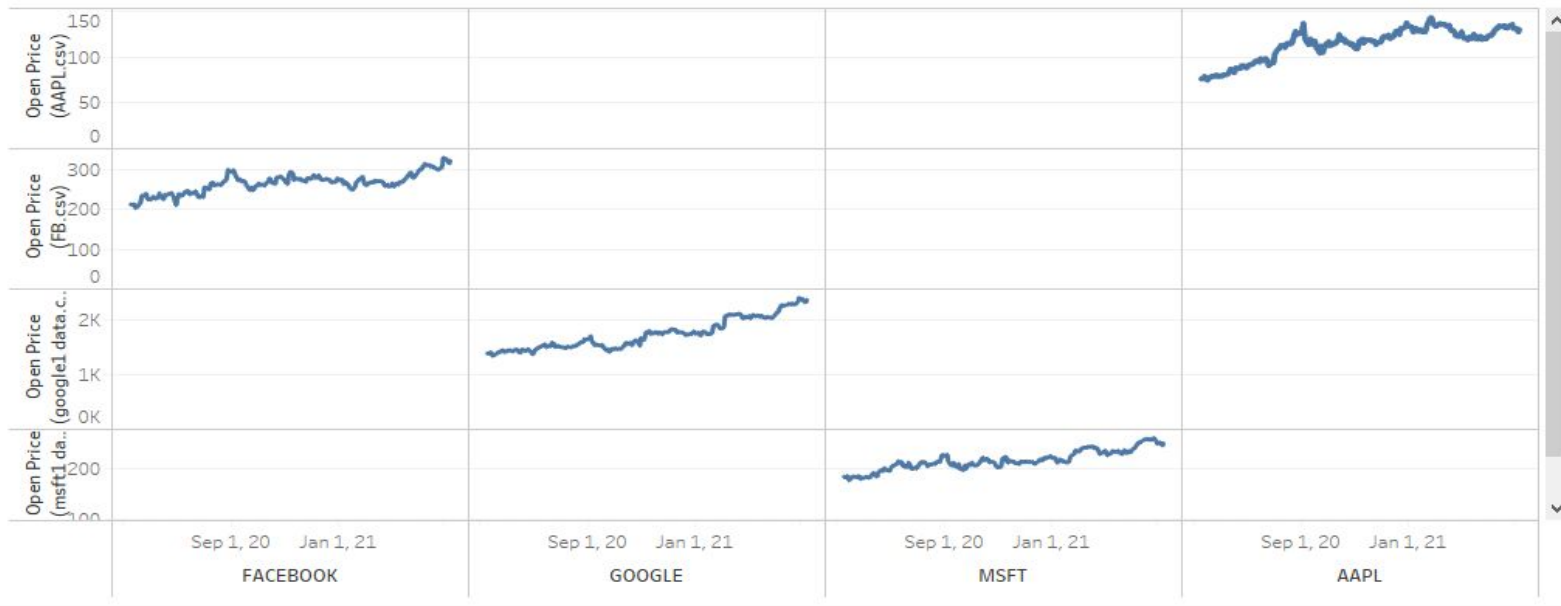
ESG Scores vs. Standard Deviation



Have tech stocks outperformed other sectors since the beginning of the Covid-19 pandemic?

- Hypothesis: the large cap stocks in the tech sector have outperformed stocks in other industries during the Covid-19 pandemic

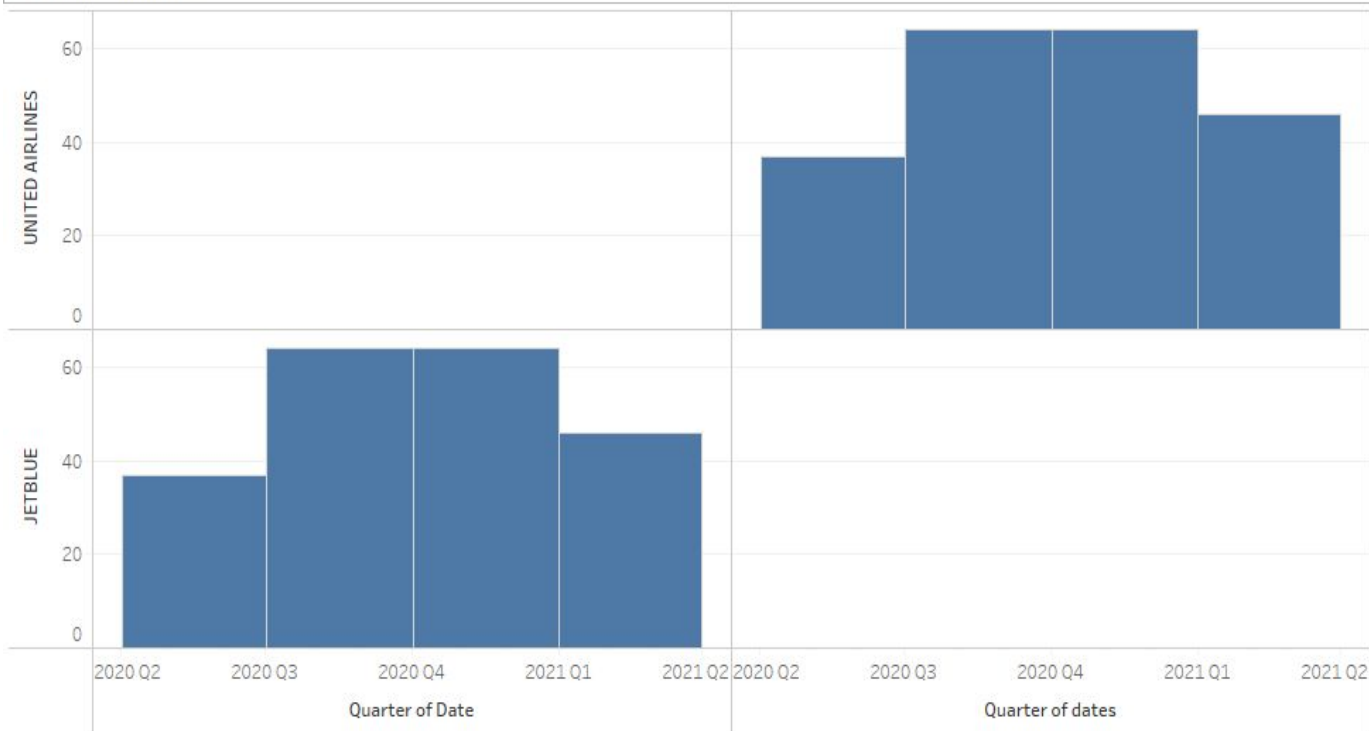
Tech Stocks





Airline Stocks

Airline Stocks





Summary

- Tech has been a solid investment for the Covid era
- Blue chip tech stocks performed better than recently IPO'd stocks
- Despite their popularity, tech IPOs outperformed tech SPACs



Data sources

- Yahoo Finance - <https://www.finance.yahoo.com/>
- FactSet
- MSCI
- Sustainalytics
- Bloomberg
- Nasdaq - <https://www.nasdaq.com/market-activity/stocks/screener>