

# **Title: Social Media Influence on Stock Markets**

**Sub Title:** Trump tweets vs Stock markets.

**Team Members:** Rashim, Karthik, Isaac and Ervin

## **Project Description:**

Analysis of the impact of Trump's tweets on financial markets.

## **Research questions to answer:**

1. What are the sentiments of Trump's tweets regarding certain key terms?
2. Do these sentiments have any impact on stock markets?
3. If present, how long do these impacts last?
4. Which sectors are most impacted by these tweets?
5. Is impact dependent on number of likes or retweets?

## **Data sets used:**

1. Twitter API
2. Yahoo Finance CSVs
3. Alpha Vantage API

## **Breakdown of tasks:**

### **Part A - Twitter Data Analysis:**

1. Grab and filter at least 6 months of tweets from Trump's twitter page using Twitter API
2. Clean the data for multiple tweets
3. Identify major key words in trump's tweets that could be impact stock markets
4. Filter the tweets by identified keywords
5. Run sentiment analysis on filtered tweets
6. Clean the data for multiple tweets on same days so that we have a data set with unique dates

7. Filter the data on the following criteria's. Each criterion will create a different data set for analysis vs. Stock market performance.
  - a. Compound Score
  - b. Negative Score
  - c. Positive Score
  - d. Likes
  - e. Retweets

#### **Part B - Stock Market Analysis**

8. Identify the stock market indices and sector indices for analysis
9. Grab the pricing data for stock market indices using Alpha Vantage API
10. Grab the pricing data for major sector indices using Yahoo finance. Save the files as CSVs.
11. Calculate daily performance, next day performance and 2 day's performance for identified stock indices.
12. Calculate daily performance and next day performance for identified sector indices.

#### **Part C - Merge twitter data analysis and Stock Market Analysis**

13. Merge the twitter data analysis data sets and stock market analysis in a data frame and save the file as different CSVs for final data analysis. So, we will have at least 4 merged CSVs:
  - a. Compound Score + Stock market performance CSV
  - b. Negative Score + Stock market performance CSV
  - c. Positive Score + Stock market performance CSV
  - d. Likes and Retweets + Stock market performance CSV

#### **Part D – Final Data Analysis**

14. Read the merged CSVs in a data frame for analysis
15. Calculate the correlation for Compound Sentiment Score vs:
  - a. Stock Indices Performance
  - b. Sector Indices Performance
16. Calculate the correlation for Negative Sentiment Score vs:
  - a. Stock Indices Performance
  - b. Sector Indices Performance
17. Calculate the correlation for Positive Sentiment Score vs:

- a. Stock Indices Performance
  - b. Sector Indices Performance
18. Calculate the correlation for #likes vs:
- a. Stock Indices Performance
  - b. Sector Indices Performance
19. Calculate the correlation for #Retweets vs:
- a. Stock Indices Performance
  - b. Sector Indices Performance
20. Create graphs and charts using Matplotlib based on the above analysis

## List of Key Words for Filtering the tweets

earnings	corporate	trading	nuclear
futures	<b>sanctions</b>	unemployment	wages
investor	<b>tariff</b>	wall street	buy America
market	<b>tax</b>	china	hire America
Nasdaq	<b>jobs</b>	<b>ban</b>	build
North Korea	economy	bull	factories
stock	<b>trade</b>	Kim	labor
market	missile	<b>price</b>	

- Expanded the list of key words

- Dropped certain key words

The choice of key words impacts the quality of filtered data set and analysis.....

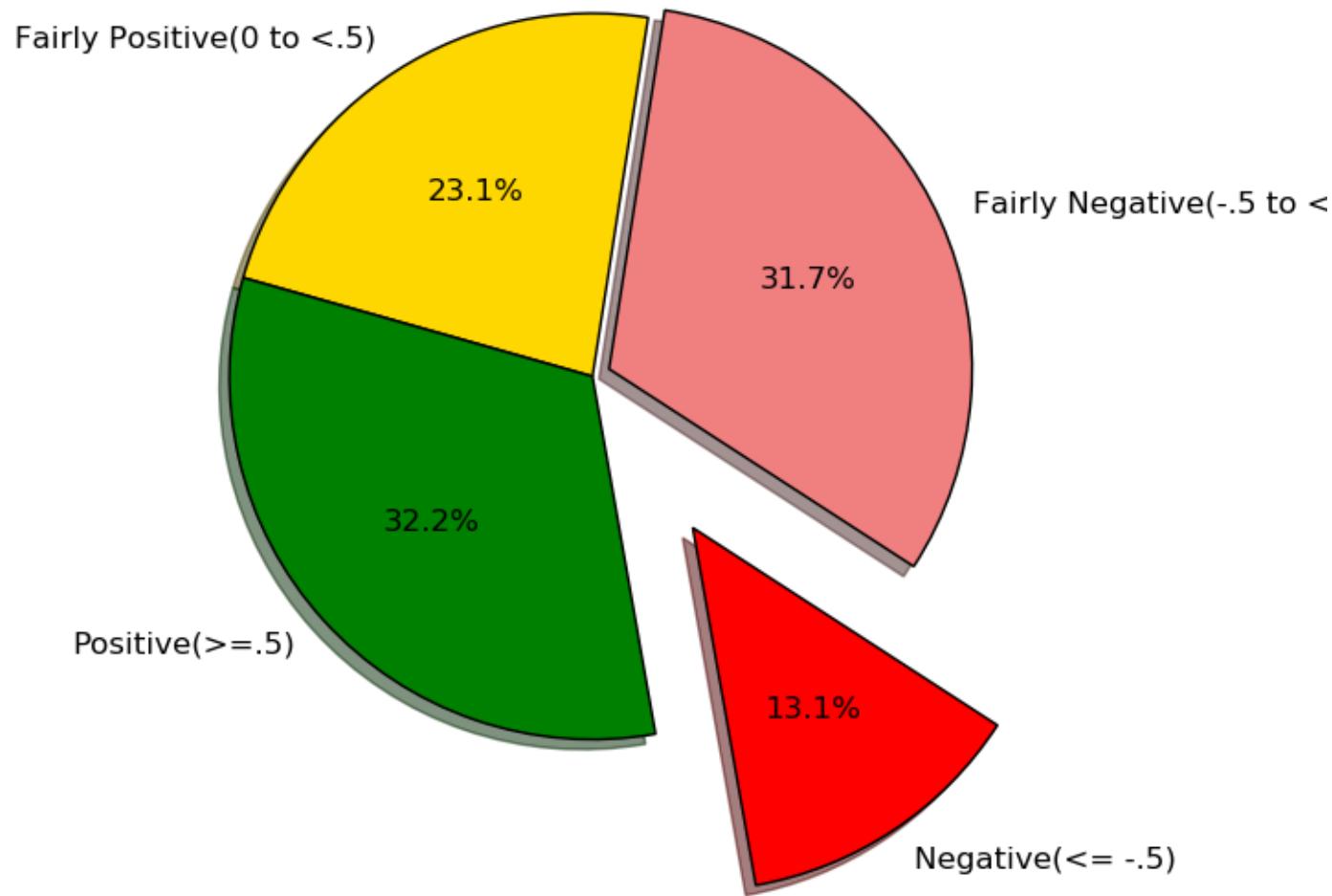
## Our Findings or Answers to the Project Questions:

### Q.1 What are the sentiments of Trump's tweets regarding certain key terms?

The following dataframe gives a snapshot our sentiment analysis on Trump's Tweets:

	index	Tweet	Keyword_x	Date	Retweets	Likes	Positive	Negative	Neutral	Compound
0	0	"after 14 years, u.s. beef hits chinese market..."	[market, market, trade]	2017-07-12	16729	66383	0.300	0.000	0.700	0.7184
1	3	"america's labor market continues to boom" job...	[market, market, jobs, jobs, labor]	2017-07-25	11786	48982	0.000	0.000	1.000	0.0000
2	8	"corporations have never made as much money as..."	[jobs, jobs]	2017-08-01	16023	75961	0.117	0.000	0.883	0.4199
3	10	"dow passes 23,000 for the first time, fueled ...	[earnings]	2017-10-17	10852	44333	0.216	0.000	0.784	0.5106
4	11	"iran hides behind its assertion of technical ...	[nuclear]	2017-10-18	11226	40706	0.000	0.227	0.773	-0.6124
5	12	"the real big story that affects everybody in ...	[tax]	2018-06-21	11617	47247	0.143	0.081	0.775	0.3818
6	13	....and has been horrible on virginia economy....	[economy]	2017-11-07	6740	33605	0.000	0.296	0.704	-0.5848

# Filtered Tweets: 880

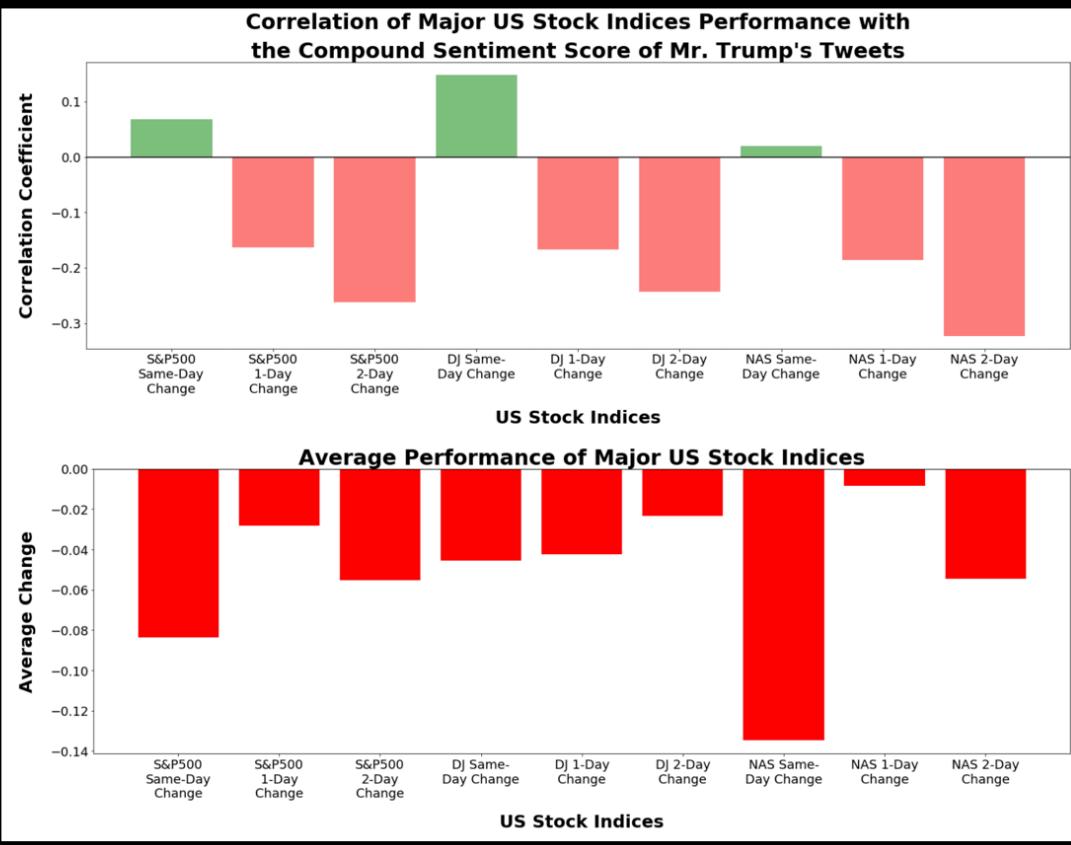


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Q.2 Do these sentiments have any impact on stock markets?

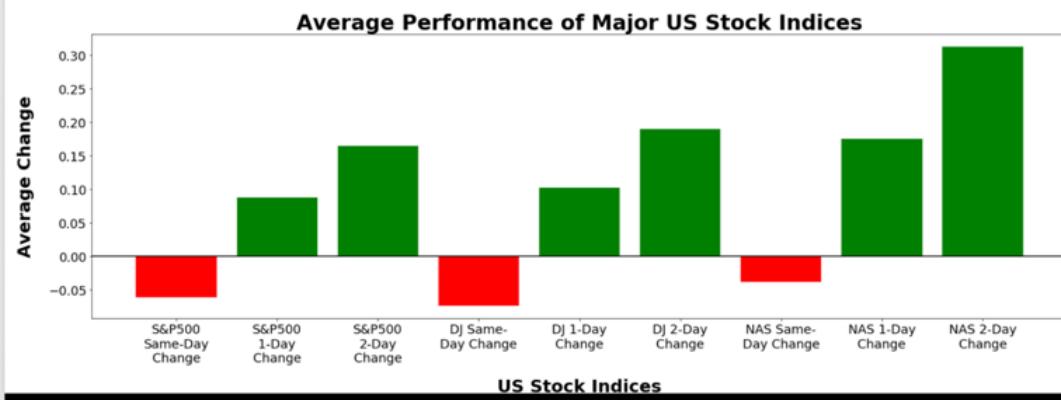
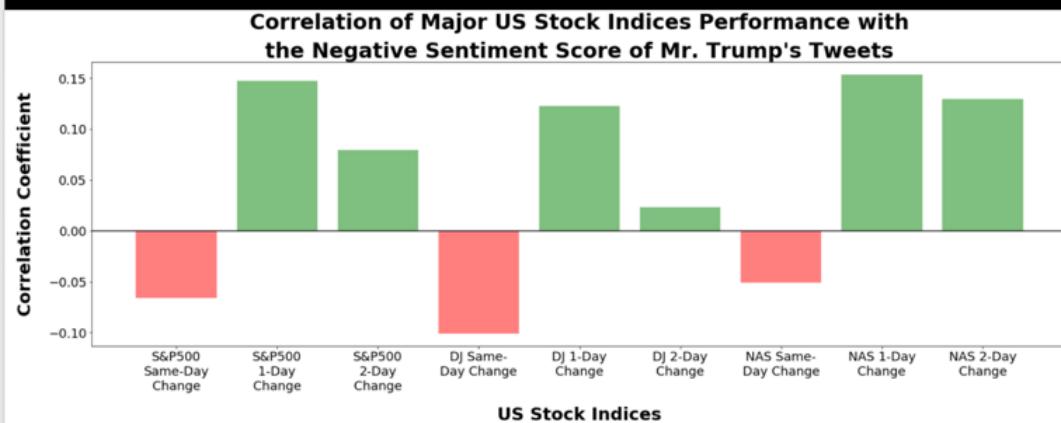
Q.3 If present, how long do these impacts last?

## 1. Compound Sentiment Score vs. Stock Indices Performance



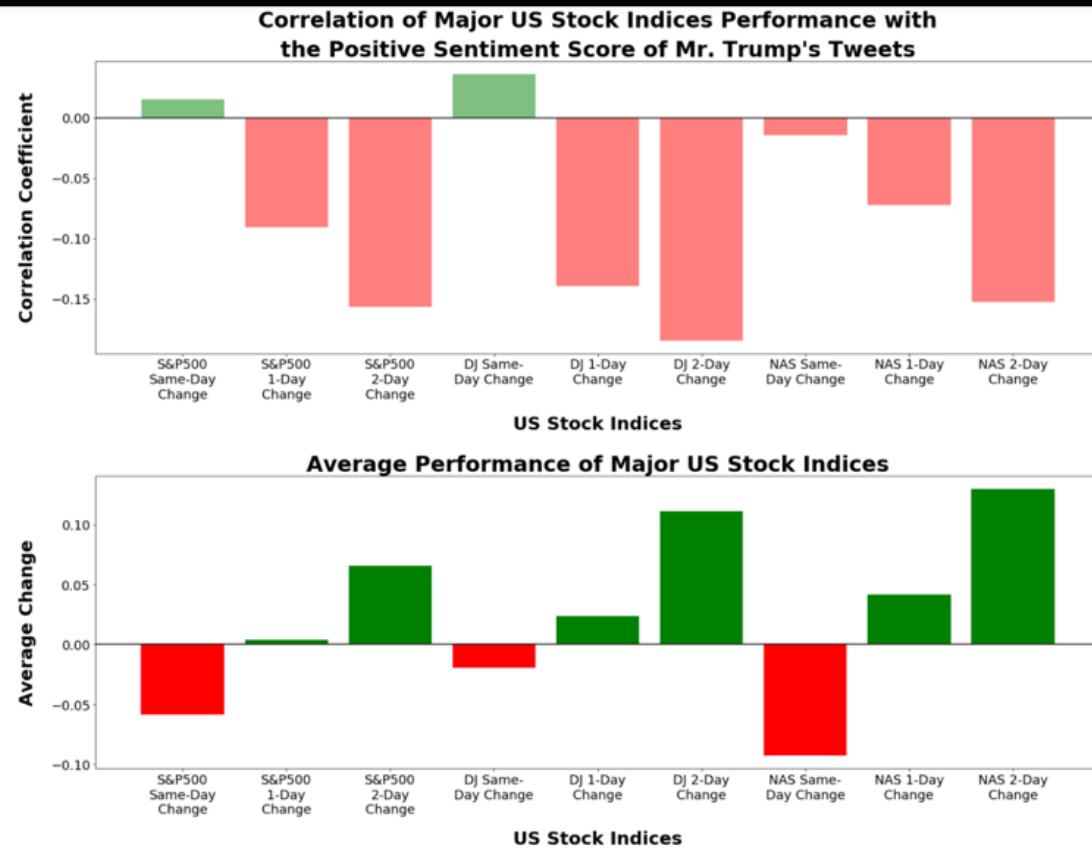
- The bars in **Green color** show the positive correlation between same day stock index performance and compound sentiment score of Mr. Trump's tweets.

### 3. Negative Sentiment Score vs. Stock Indices Performance



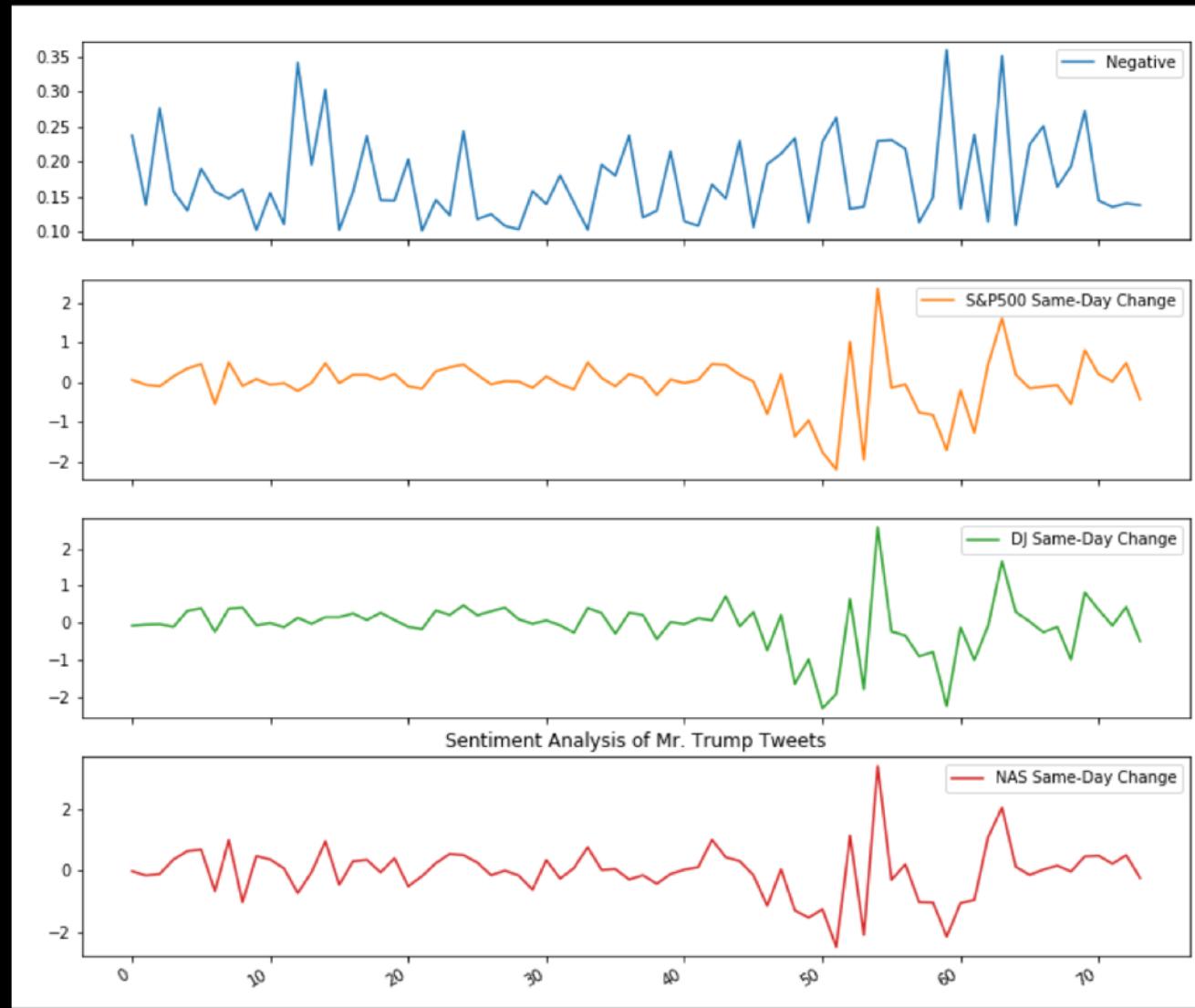
- The bars in **Green color** show the positive correlation between next day and two day stock index performance and negative sentiment score of Mr. Trump's tweets.

## 5. Based on Positive Sentiment Score vs. Stock Indices Performance



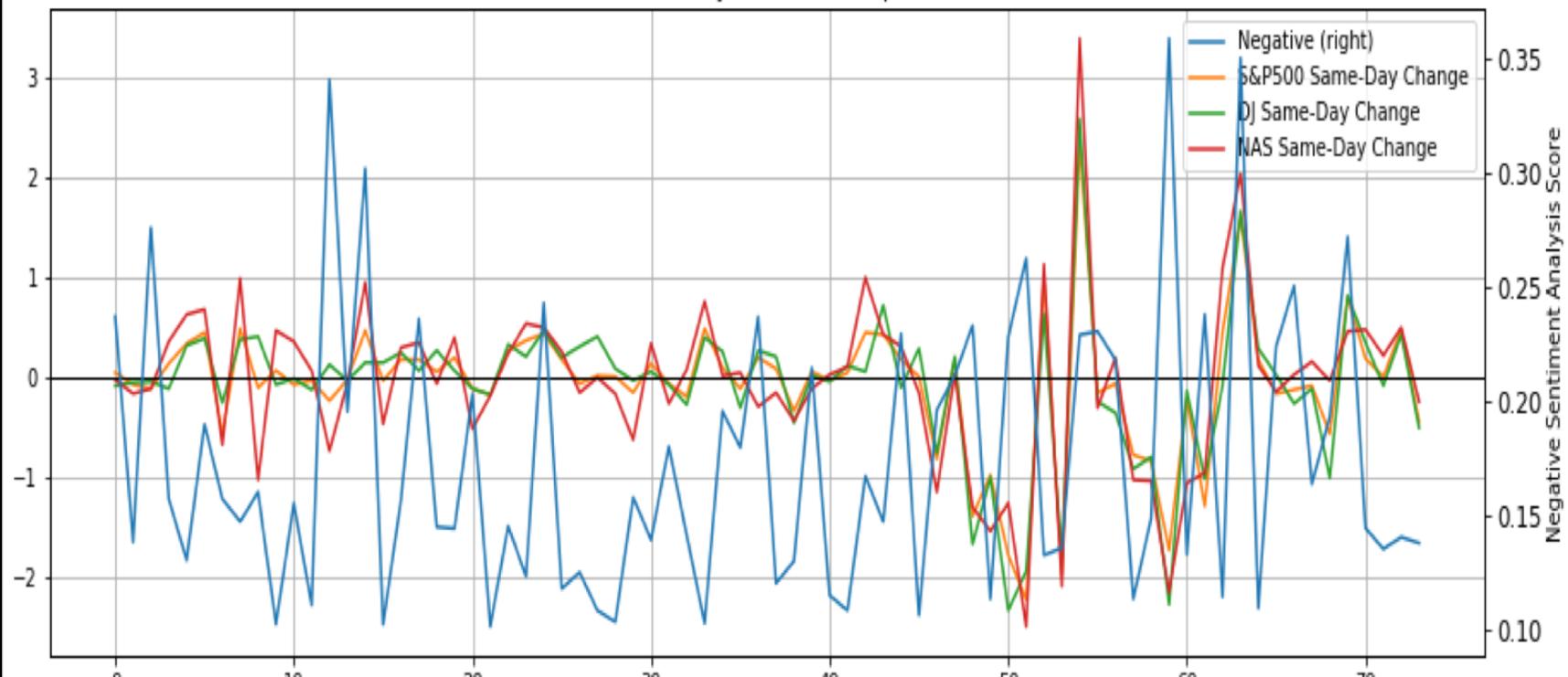
- The bars in **Green color** show the positive correlation between same day stock index performance and positive sentiment score of Mr. Trump's tweets.

## 9. Negative Sentiment Score vs. Stock Index Performance



## 10. Negative Sentiment Score vs. Stock Index Performance

Sentiment Analysis of Mr. Trump Tweets



# Largest Gains

Same Day

Event	Date	Likes	Retweets	Compound	S&P500 Open	S&P500 Close	DJ Open	DJ Close	NAS Open	NAS Close	S&P500 Same-Day Change	DJ Same-Day Change	NAS Same-Day Change
Largest S&P500 Same Day Gain	2017-09-15	208334	49099	-0.6288	2495.6699	2500.2300	22252.4395	22268.3398	6426.1602	6448.4702	3.34	1.6	8.58
Largest NAS Same Day Gain	2017-09-15	208334	49099	-0.6288	2495.6699	2500.2300	22252.4395	22268.3398	6426.1602	6448.4702	3.34	1.6	8.58
Largest DJ Same Day Gain	2018-04-19	0	8372	0.7269	2701.1599	2693.1299	24711.3008	24664.8906	7258.6099	7238.0601	2.43	3.3	-3.69

Two Day

Event	Date	Likes	Retweets	Compound	S&P500 Open	S&P500 Close	DJ Open	DJ Close	NAS Open	NAS Close	S&P500 2-Day Change	DJ 2-Day Change	NAS 2-Day Change
Largest S&P500 2 Day Gain	2017-06-29	126334	29085	0.63655	2442.3799	2419.70	21487.3809	21287.0293	6215.4902	6144.3501	3.97	2.09	11.60
Largest NAS 2 Day Gain	2017-06-29	126334	29085	0.63655	2442.3799	2419.70	21487.3809	21287.0293	6215.4902	6144.3501	3.97	2.09	11.60
Largest DJ 2 Day Gain	2017-07-14	48561	8665	0.75790	2449.1599	2459.27	21532.7695	21637.7402	6289.0801	6312.4702	3.65	3.44	6.39

# Largest Gains Tweets

- Sep 15, 2017 06:20:08 AM ESPN is paying a really big price for its politics (and bad programming). People are dumping it in RECORD numbers. Apologize for untruth! (+3.34% NASDAQ same day)
- Sep 15, 2017 05:54:14 AM The travel ban into the United States should be far larger, tougher and more specific-but stupidly, that would not be politically correct! (+3.34% NASDAQ same Day)
- Jun 29, 2017 08:44:01 PM Just finished a very good meeting with the President of South Korea. Many subjects discussed including North Korea and new trade deal! (+11.6% NASDAQ Two Day)
- Jun 29, 2017 06:09:01 PM When it comes to the future of America's energy needs, we will FIND IT, we will DREAM IT, and we will BUILD IT.... (+11.6% NASDAQ Two Day)

# Largest Losses

Same Day

Event	Date	Likes	Retweets	Compound	S&P500 Open	S&P500 Close	DJ Open	DJ Close	NAS Open	NAS Close	S&P500 Same-Day Change	DJ Same-Day Change	NAS Same-Day Change
Largest S&P500 Same Day Loss	2017-06-29	126334	29085	0.63655	2442.3799	2419.70	21487.3809	21287.0293	6215.4902	6144.3501	-2.80	-1.34	-7.37
Largest NAS Same Day Loss	2017-06-29	126334	29085	0.63655	2442.3799	2419.70	21487.3809	21287.0293	6215.4902	6144.3501	-2.80	-1.34	-7.37
Largest DJ Same Day Loss	2017-07-14	48561	8665	0.75790	2449.1599	2459.27	21532.7695	21637.7402	6289.0801	6312.4702	-2.15	-2.00	-1.32

Two Day

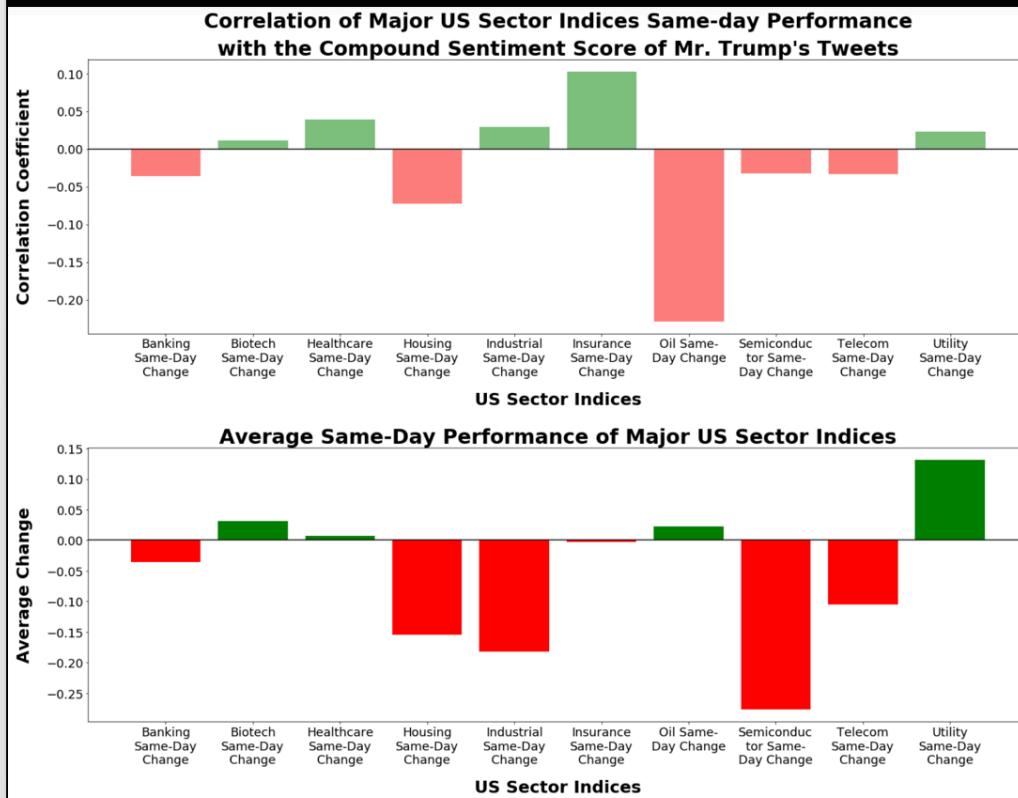
Event	Date	Likes	Retweets	Compound	S&P500 Open	S&P500 Close	DJ Open	DJ Close	NAS Open	NAS Close	S&P500 2-Day Change	DJ 2-Day Change	NAS 2-Day Change
Largest S&P500 2 Day Loss	2018-06-22	63768	13240	0.6696	2760.7900	2754.8799	24526.9707	24580.8906	7739.6899	7692.8198	-3.72	-2.76	-7.96
Largest NAS 2 Day Loss	2018-06-22	63768	13240	0.6696	2760.7900	2754.8799	24526.9707	24580.8906	7739.6899	7692.8198	-3.72	-2.76	-7.96
Largest DJ 2 Day Loss	2017-08-30	79961	13364	-0.7567	2446.0601	2457.5901	21859.7598	21892.4297	6308.6802	6368.3101	-2.45	-4.21	2.53

# Largest Losses Tweets

- Jul 14, 2017 08:47:19 AM Great conversations with President @EmmanuelMacron and his representatives on trade, military and security. (-2% Dow Jones)
- Aug 30, 2017 08:42:20 AM Will be leaving for Missouri soon for a speech on tax cuts and tax reform - so badly needed! (-4.21% Dow Jones)
- Jun 22, 2018 07:34:33 PM Based on the Tariffs and Trade Barriers long placed on the U.S. & its great companies and workers by the European Union, if these Tariffs and Barriers are not soon broken down and removed, we will be placing a 20% Tariff on all of their cars coming into the U.S. Build them here! (-2.76% Dow Jones)
- Jun 22, 2018 09:10:07 AM Hope OPEC will increase output substantially. Need to keep prices down! (-2.76% Dow Jones)

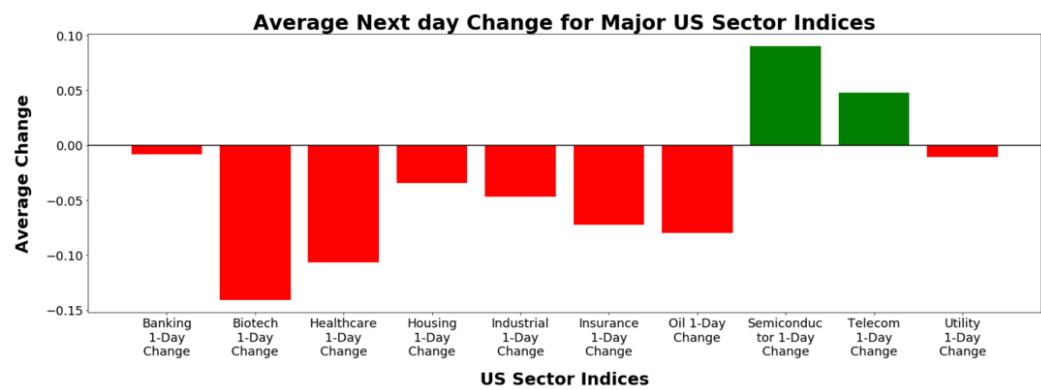
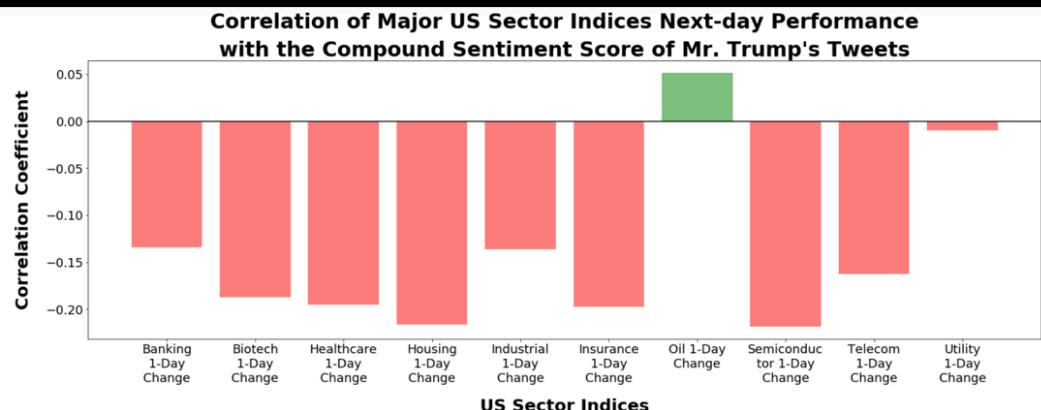
#### Q.4 Which sectors are most impacted by these tweets?

## 2. Compound Sentiment Score vs. Sector Performance



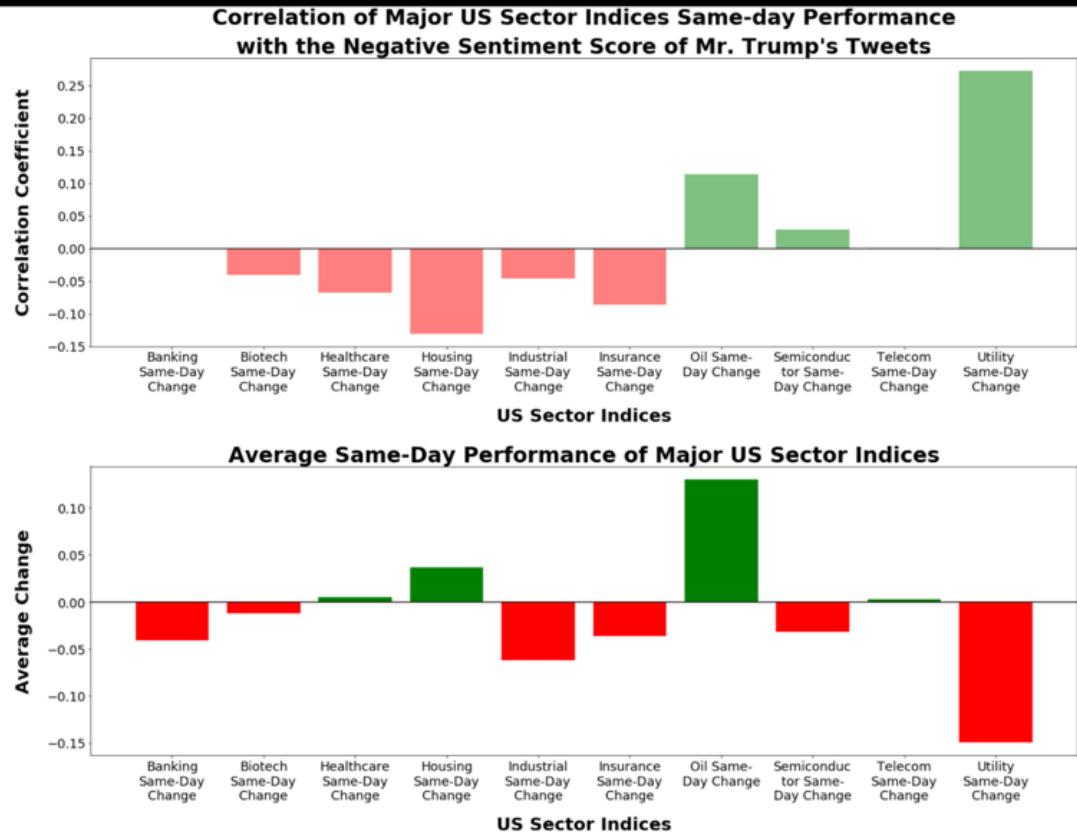
- The bars in **Green color** show the positive correlation between same day sector performance and compound sentiment score of Mr. Trump's tweets.
- We found positive correlation for Biotech, Healthcare, Industrials, Insurance and Utility sectors.

## 2.1- Based on Compound Sentiment Score vs. Sector Performance



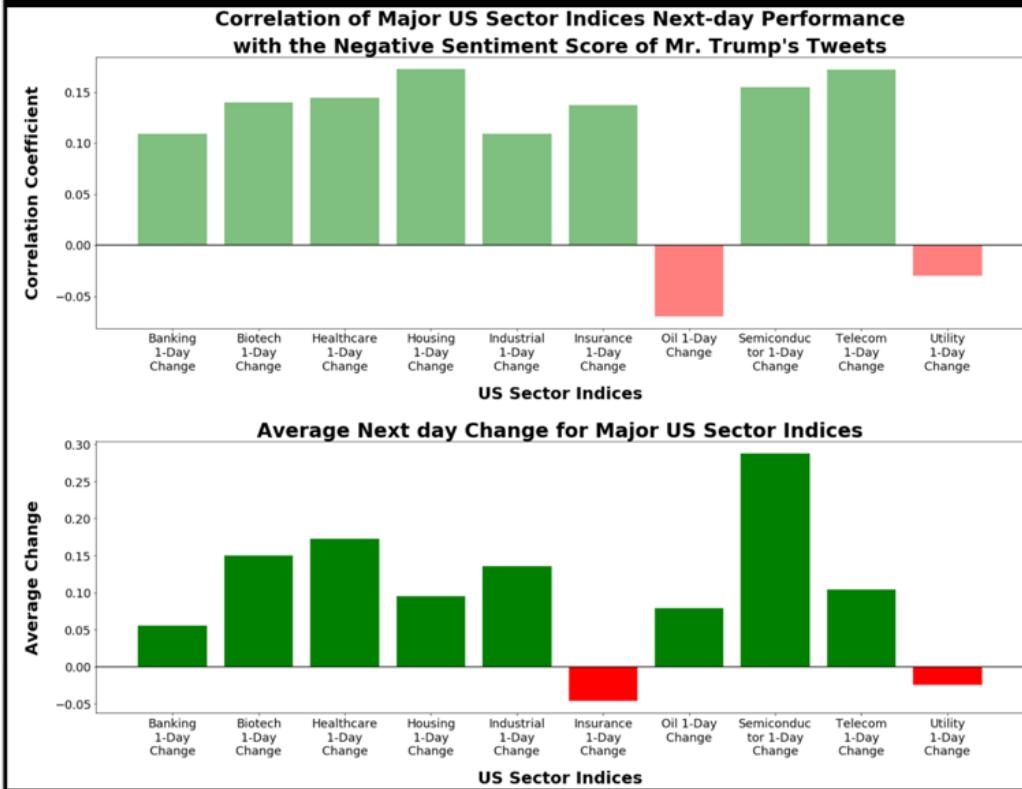
- We found no positive correlation between one day sector performance and Mr. Trump's Tweets for most sectors.

#### 4. Based on Negative Sentiment Score vs. Sector Performance



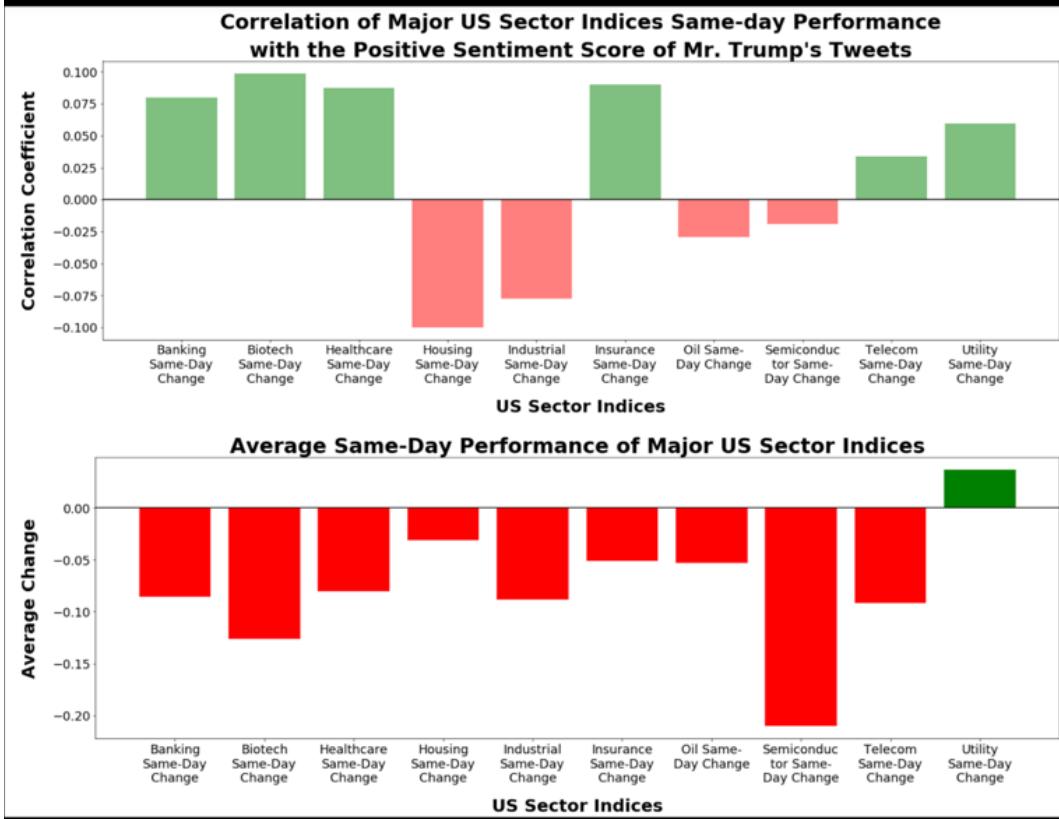
- The bars in **Green color** show the positive correlation between same day sector performance and negative sentiment score of Mr. Trump's tweets.
- We found positive correlation for Oil & Gas, Semiconductors and Utility sectors.

## 4.1 Based on Negative Sentiment Score and Sector performance



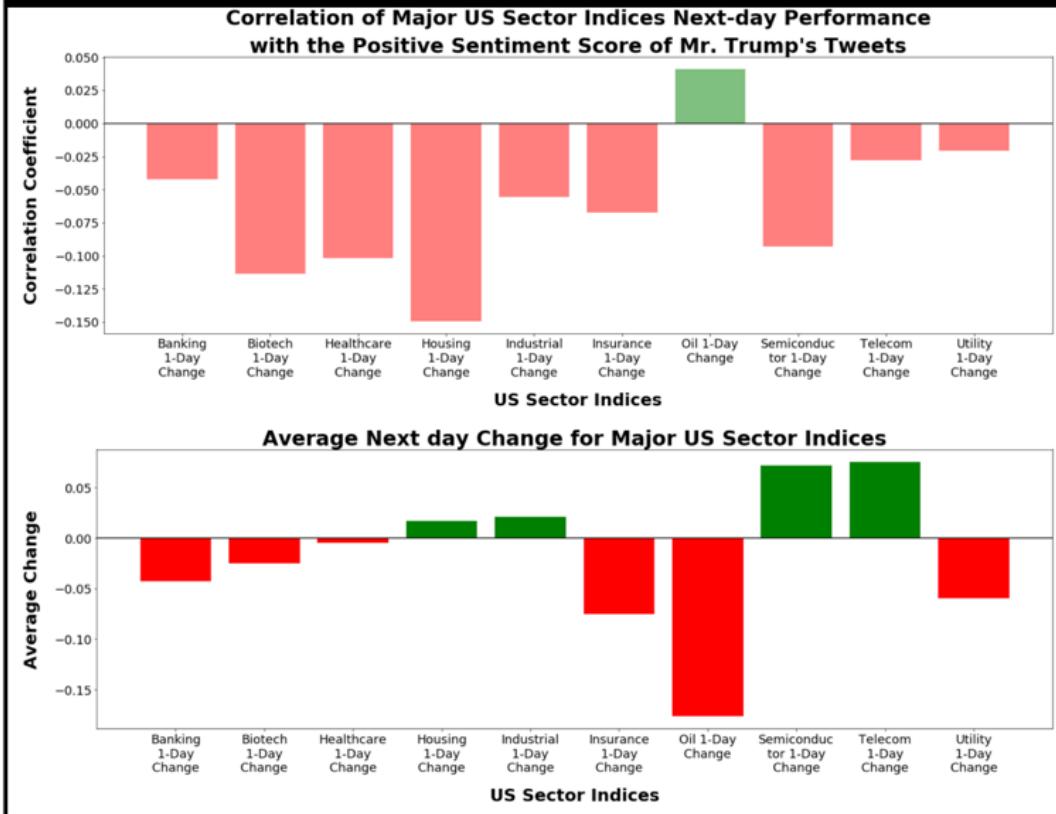
- We found positive correlation between one day sector performance and Mr. Trump's Tweets for most sectors.

## 6. Based on Positive Sentiment Score vs. Sector Performance



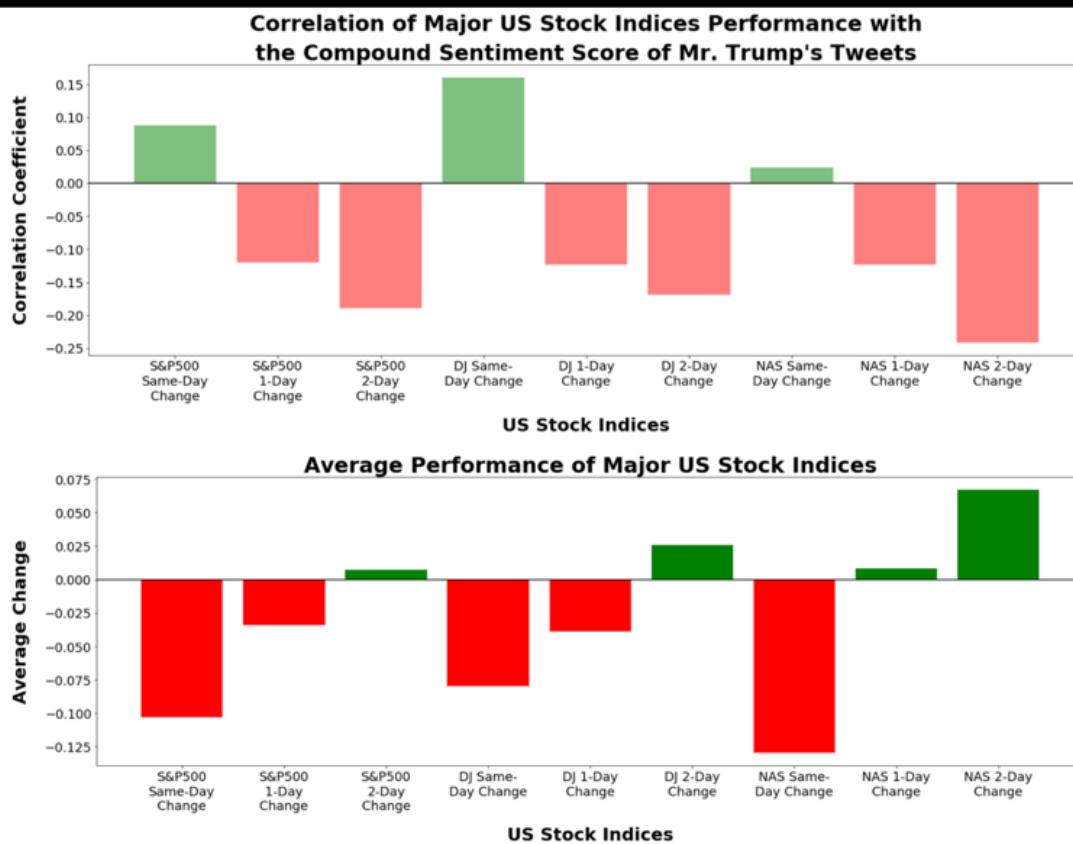
- The bars in **Green color** show the positive correlation between same day sector performance and positive sentiment score of Mr. Trump's tweets.
- We found positive correlation for Banking, Biotech, Healthcare, Insurance, Telecom and Utility sectors.

## 6.1 Based on Positive Sentiment Score vs. Sector Performance



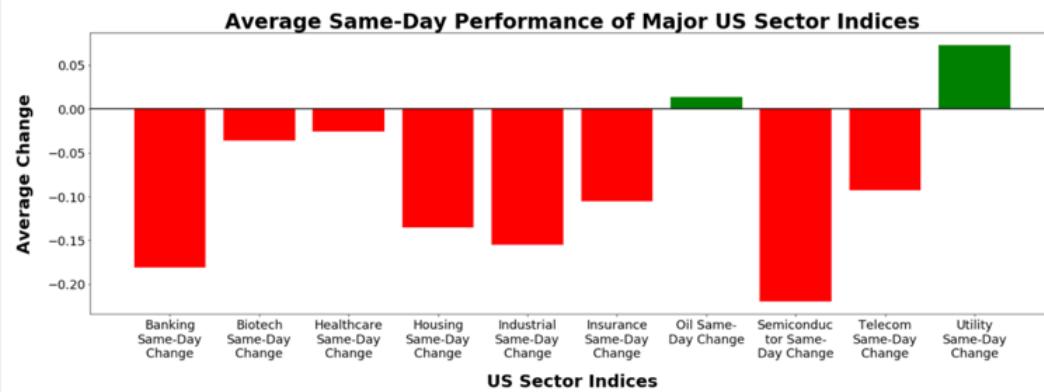
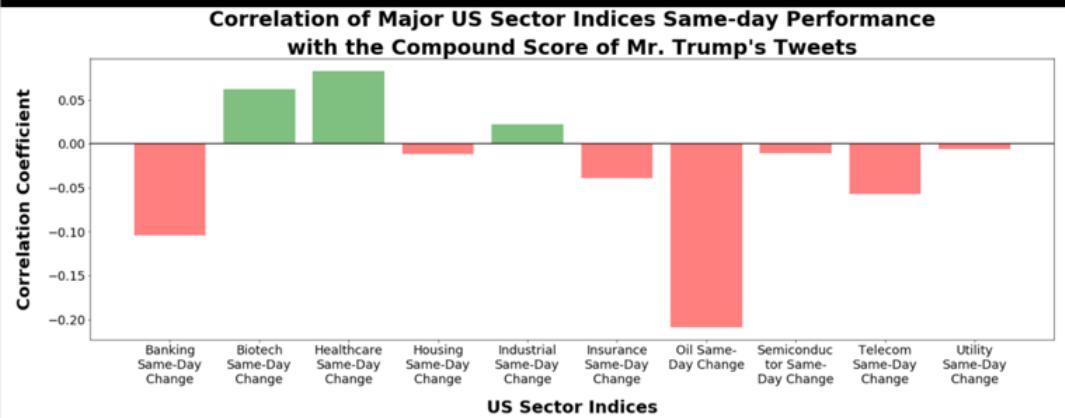
- We found no positive correlation between one day sector performance and Mr. Trump's Tweets for most sectors.

## 7. Based on Revised Compound Score vs. Stock Indices Performance



- The bars in **Green color** show the positive correlation between same day stock index performance and compound sentiment score of Mr. Trump's tweets.
- We also noticed higher correlation scores compared to our initial compound score analysis findings.

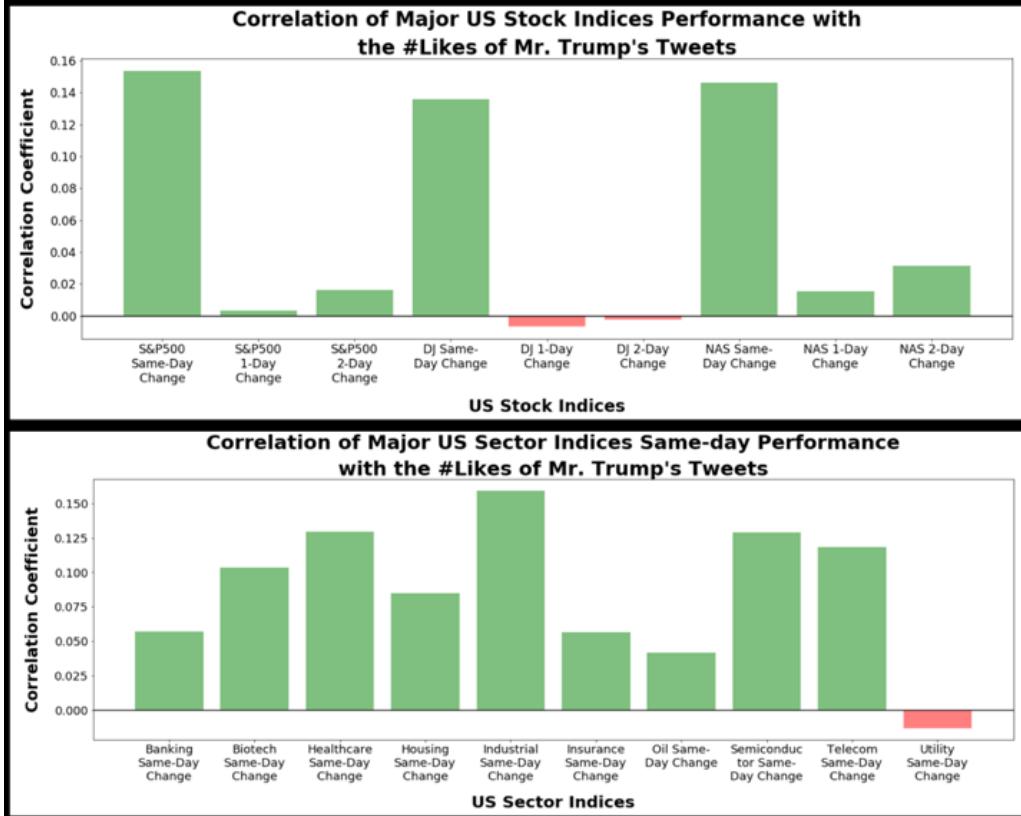
## 8. Revised Compound Score vs. Sector Performance



- The bars in **Green color** show the positive correlation between same day sector performance and compound sentiment score of Mr. Trump's tweets.
- We also noticed higher correlation scores compared to our initial compound score analysis findings.

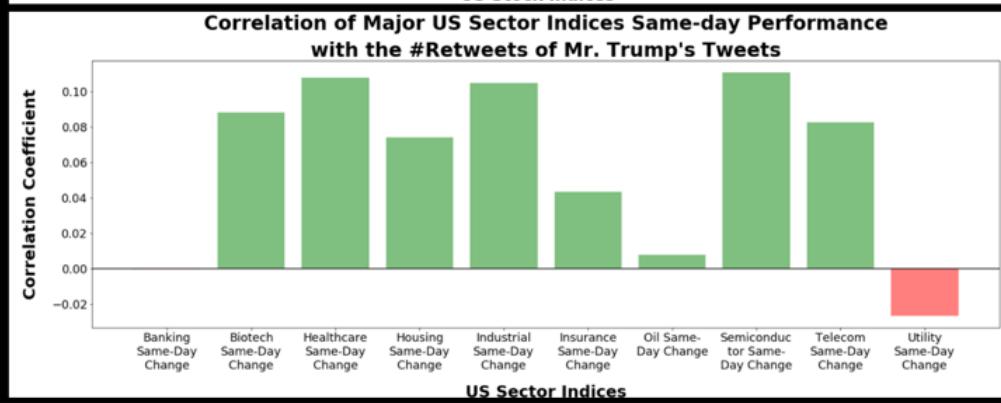
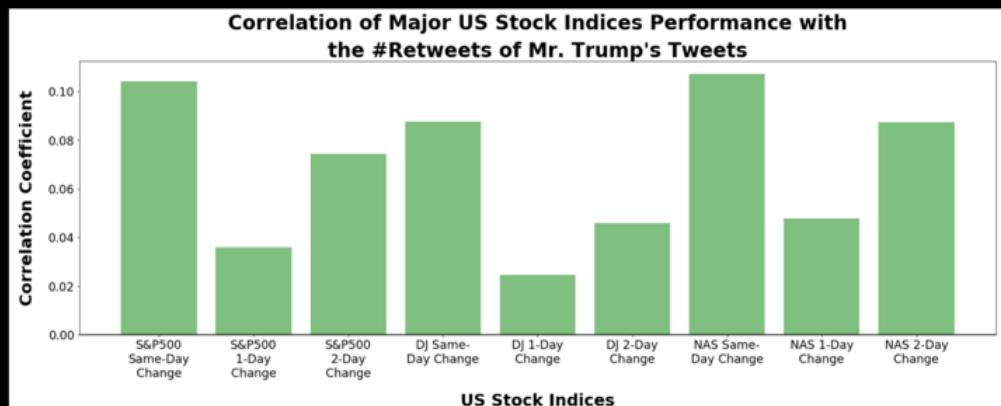
## Q.5 Is impact dependent on number of likes or retweets?

### Correlation Based on Likes



- The bars in **Green color** show the positive correlation between same day stock index performance and # of Likes from Mr. Trump's tweets.

# Correlation Based on #Retweets



- The bars in **Green color** show the positive correlation between same day stock index performance and # of Retweets from Mr. Trump.