

Social Media Influence on Stocks

Biotech Blues

Nasdaq Biotechnology Index



Sources: FactSet; Getty Images (photo)
THE WALL STREET JOURNAL.



Hillary Clinton



Hillary Clinton
@HillaryClinton

Follow

Price gouging like this in the specialty drug market is outrageous. Tomorrow I'll lay out a plan to take it on. -H
twitter.com/nytimes/status...

10:56 AM - 21 Sep 2015

2,215 2,506

Trump tweets about steel automobile - Google Search

In One Tweet, Kylie Jenner Wiped Out \$1.3 Billion of Snap's Market Value

By [Justina Vasquez](#)

February 22, 2018, 8:49 AM PST Updated on February 22, 2018, 2:33 PM PST

Trump's Tweets

CNN Money

Companies

Markets

Tech

Media

U.S. ▼

Trump's latest tweet takes down Amazon stock and the Nasdaq

by [David Goldman](#) @DavidGoldmanCNN

🕒 April 3, 2018: 4:48 PM ET

 Recommend 0



Questions We Wanted to Answer

- What are the sentiments of Trump's tweets regarding a certain key terms?
- Do these sentiments have any impact on stock markets?
 - If present, how long do these impacts last?
- Which sectors are most impacted by these tweets?
- What is the Impact of the # of Likes & Retweets?

Data Sources

Data Sources

- Twitter API
 - Obtained 1 year's worth of Data
- Alpha Vantage API
- Yahoo
- Nasdaq

Narrowing The Scope

- Filtered By Keyword
 - Tariffs, Taxes... etc..
- Ran Sentiment Analysis and focused on the two extremes
- Decided on stock Indexes



List of Key Words for Filtering the tweets

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

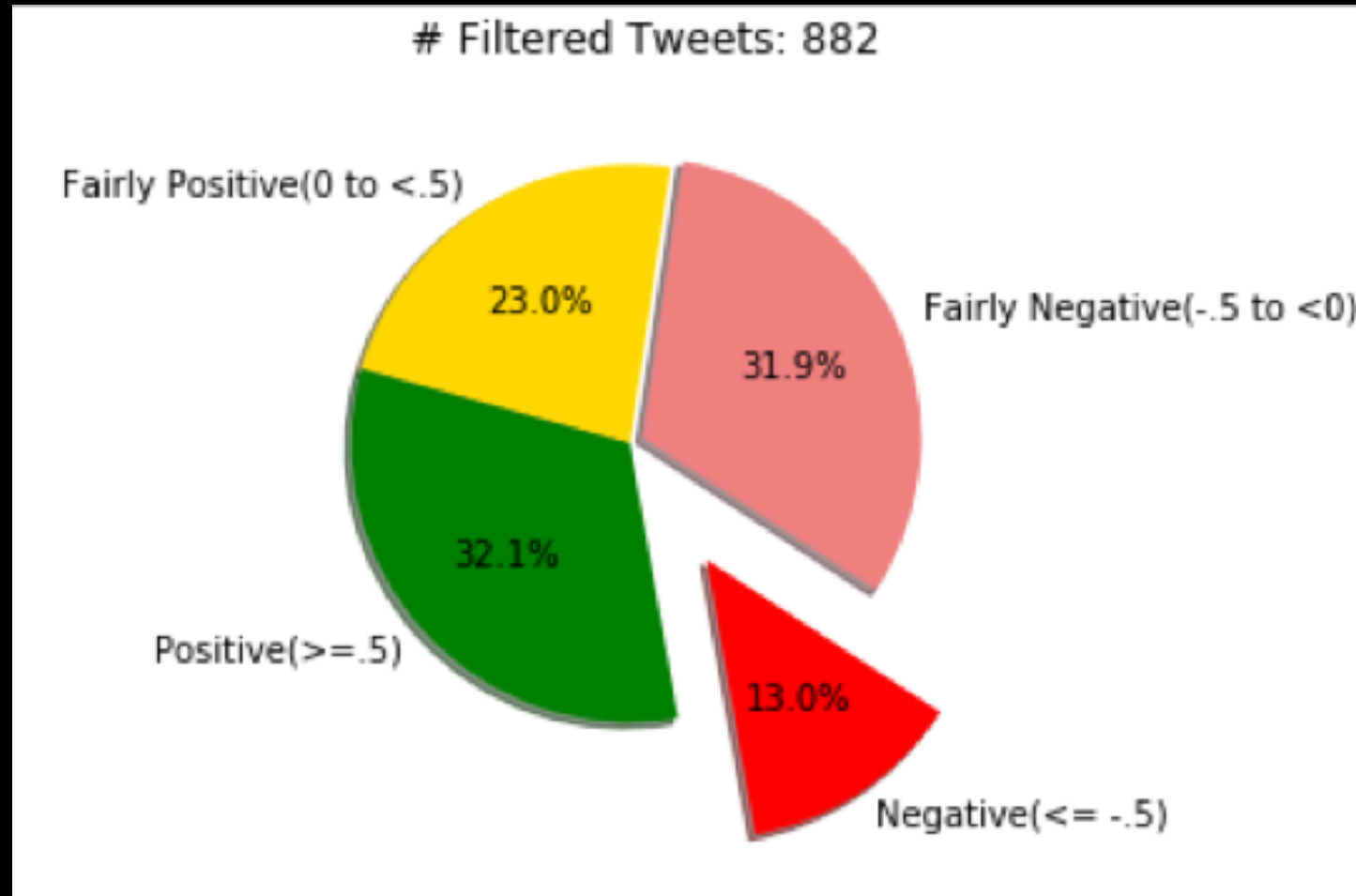
- Expanded the list of key words
- Dropped certain key words

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

What are the sentiments of Trump's tweets regarding a certain key terms?

index	Tweet	Keyword_x	Date	Retweets	Likes	Positive	Negative	Neutral	Compound
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
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
8	"corporations have never made as much money as..."	[jobs, jobs]	2017-08-01	16023	75961	0.117	0.000	0.883	0.4199
10	"dow passes 23,000 for the first time, fueled ..."	[earnings]	2017-10-17	10852	44333	0.216	0.000	0.784	0.5106
11	"iran hides behind its assertion of technical ..."	[nuclear]	2017-10-18	11226	40706	0.000	0.227	0.773	-0.6124
12	"the real big story that affects everybody in ..."	[tax]	2018-06-21	11617	47247	0.143	0.081	0.775	0.3818
13and has been horrible on virginia economy....	[economy]	2017-11-07	6740	33605	0.000	0.296	0.704	-0.5848

Filtered Tweets



Further Filtered Tweets – Based on Different Criterion to Get Different Data Sets for Comparison with Stock Market Analysis

Criteria 1	Extreme Compound Score ≥ 0.5 and ≤ -0.5
Criteria 2	Negative Score > 0.1
Criteria 3	Positive Score > 0.1
Criteria 4	Number of Likes
Criteria 5	Number of Retweets
Criteria 6	Revised method of filtering tweets

The choice of the criteria impacts the filtered data set and analysis.....

Stock Market Analysis

<u>Stock Indices</u>	<u>Sector Indices</u>	<u>API / CSV Data</u>	<u>Analysis</u>
S&P 500	# 1. Banking	Opening Price	% Same day change in price
Nasdaq	# 2. Biotechnology	Closing Price	% One day / next day change in price
Dow Jones	# 3. Healthcare		% Two day change in price
	# 4. Housing		
	# 5. Industrials		
	# 6. Insurance		
	# 7. Oil & Gas		
	# 8. Semiconductor		
	# 9. Telecom		
	#10. Utility		

Stock Market Analysis

Date	S&P500 Open	S&P500 Close	DJ Open	DJ Close	NAS Open	NAS Close	Bank_Open	Bank_Close	Biotech_Open	...	Utility_Close	S&P500 Same- Day Change	S&P500 1-Day Change	S&P500 2-Day Change
2013-07-01	1609.78	1614.96	14911.5996	14974.9600	3430.4800	3434.4900	2221.090088	2249.080078	1860.430054	...	485.890015	0.32	-0.05	0.03
2013-07-02	1614.29	1614.08	14974.9600	14932.4102	3430.6899	3433.3999	2248.560059	2265.409912	1862.780029	...	485.839996	-0.01	0.08	1.10
2013-07-03	1611.48	1615.41	14923.7305	14988.3701	3420.2700	3443.6699	2256.489990	2272.570068	1854.880005	...	485.359985	0.24	1.02	1.55
2013-07-05	1618.65	1631.89	14995.4600	15135.8398	3468.4800	3479.3799	2294.760010	2327.399902	1882.619995	...	482.869995	0.82	0.53	1.25
2013-07-08	1634.20	1640.46	15137.2197	15224.6904	3493.8101	3484.8301	2335.919922	2328.719971	1909.739990	...	489.160004	0.38	0.72	0.74

Statistical Analysis

Twitter Sentiment Analysis Data

Set 1 - Compound Sentiment Score

Set 2 - Negative Sentiment Score

Set 3 - Positive Sentiment Score

Set 4 – Number of Likes

Set 5 – Number of Retweets

Set 6 – Revised Criteria

Stock Market Analysis Data

Stock Index Performance

- Same day change
- Next day change
- Two day change

Correlation

Sector Performance

- Same day change
- Next day change

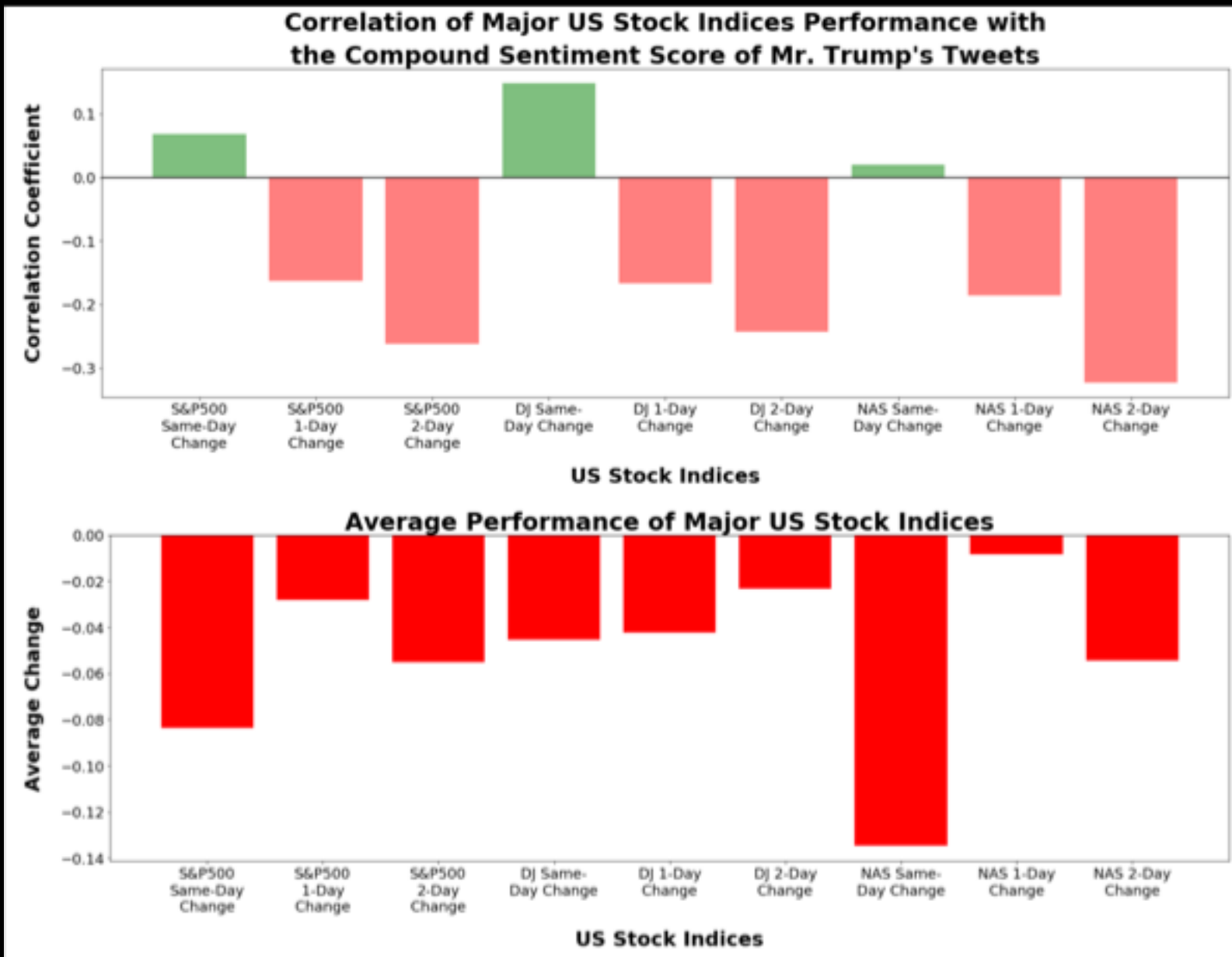
Statistical Analysis

Indices	Correlation_Compound Score	Average Change
S&P500 Same-Day Change	0.067473	-0.083704
S&P500 1-Day Change	-0.162672	-0.028333
S&P500 2-Day Change	-0.261707	-0.055370
DJ Same-Day Change	0.147835	-0.045741
DJ 1-Day Change	-0.166237	-0.042407
DJ 2-Day Change	-0.242828	-0.023333
NAS Same-Day Change	0.019409	-0.134630
NAS 1-Day Change	-0.185597	-0.008519
NAS 2-Day Change	-0.322390	-0.054630

Sectors	Correlation_Compound Score	Average Change
Banking Same-Day Change	-0.035306	-0.035926
Biotech Same-Day Change	0.011579	0.031111
Healthcare Same-Day Change	0.039891	0.007037
Housing Same-Day Change	-0.072325	-0.154259
Industrial Same-Day Change	0.029702	-0.181481
Insurance Same-Day Change	0.102944	-0.002963
Oil Same-Day Change	-0.228653	0.022222
Semiconductor Same-Day Change	-0.031836	-0.276111
Telecom Same-Day Change	-0.033130	-0.105185
Utility Same-Day Change	0.022954	0.131296

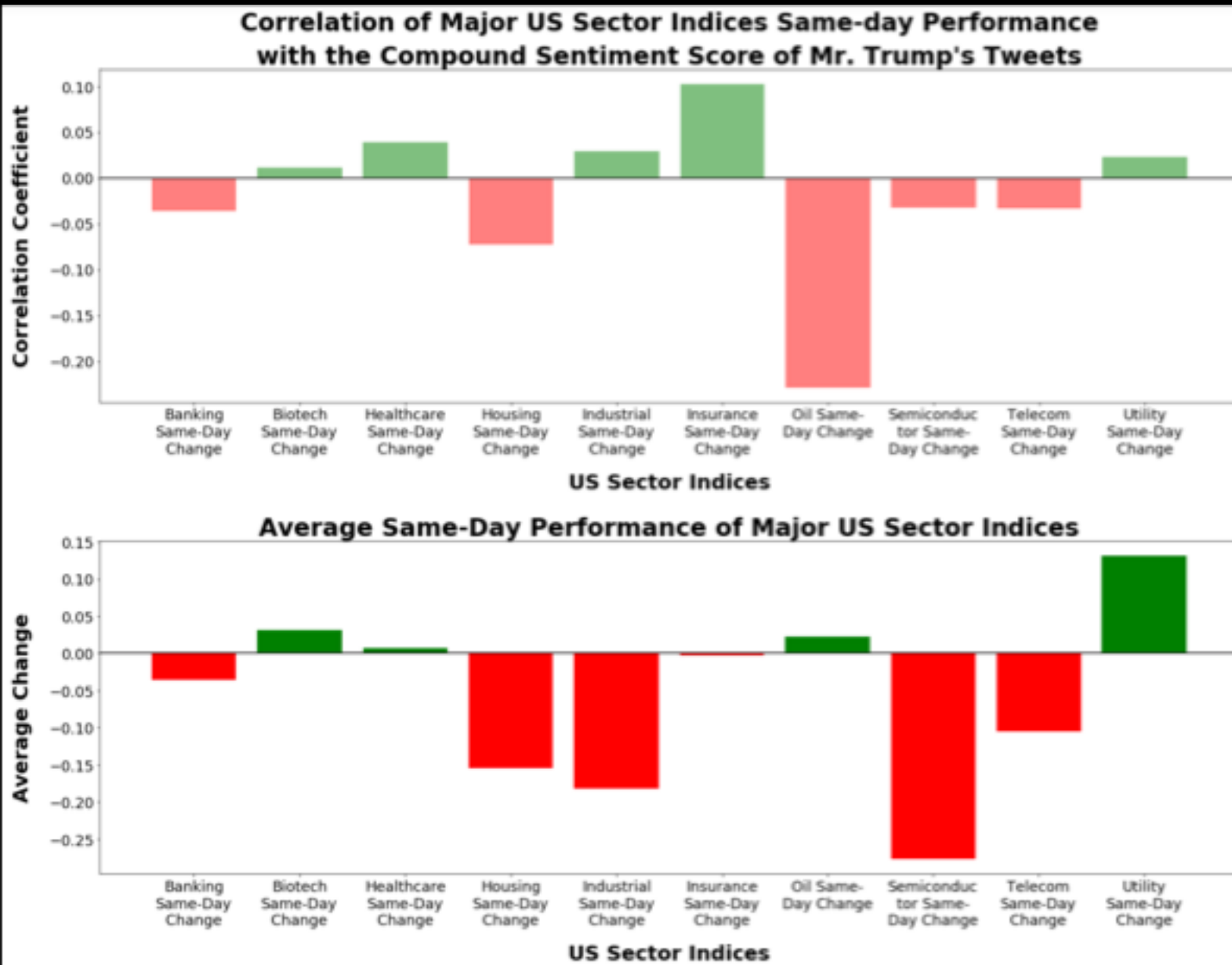
Our Findings

1.Compound Sentiment Score vs. Stock Indices Performance



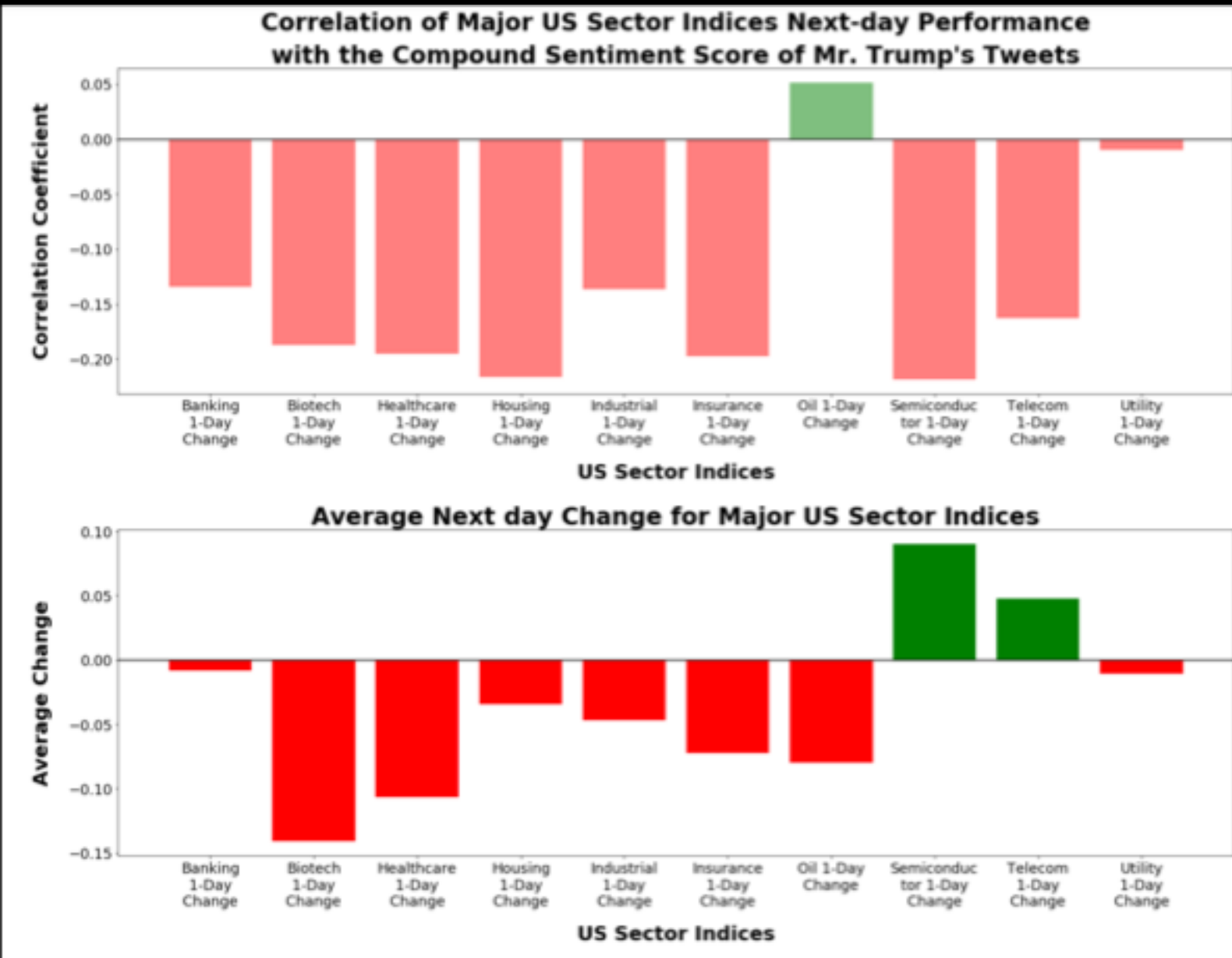
- The bars in **Green color** show the positive correlation between same day stock index performance and compound sentiment score of Mr. Trump's tweets.

2. Compound Sentiment Score vs. Sector Performance



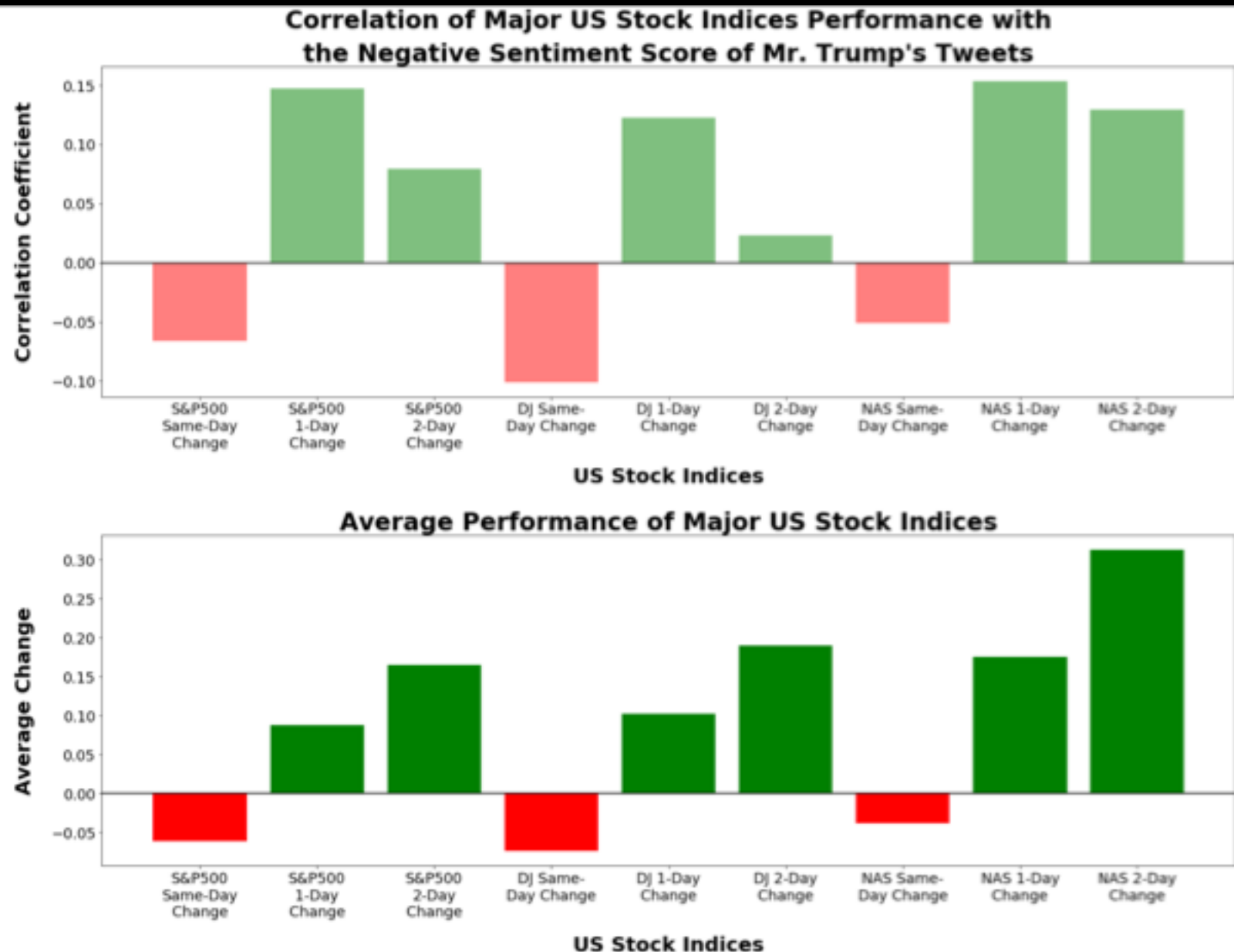
- The bars in **Green color** show the positive correlation between same day sector performance and compound sentiment score of Mr. Trump's tweets.
- We found positive correlation for Biotech, Healthcare, Industrials, Insurance and Utility sectors.

2.1- Based on Compound Sentiment Score vs. Sector Performance



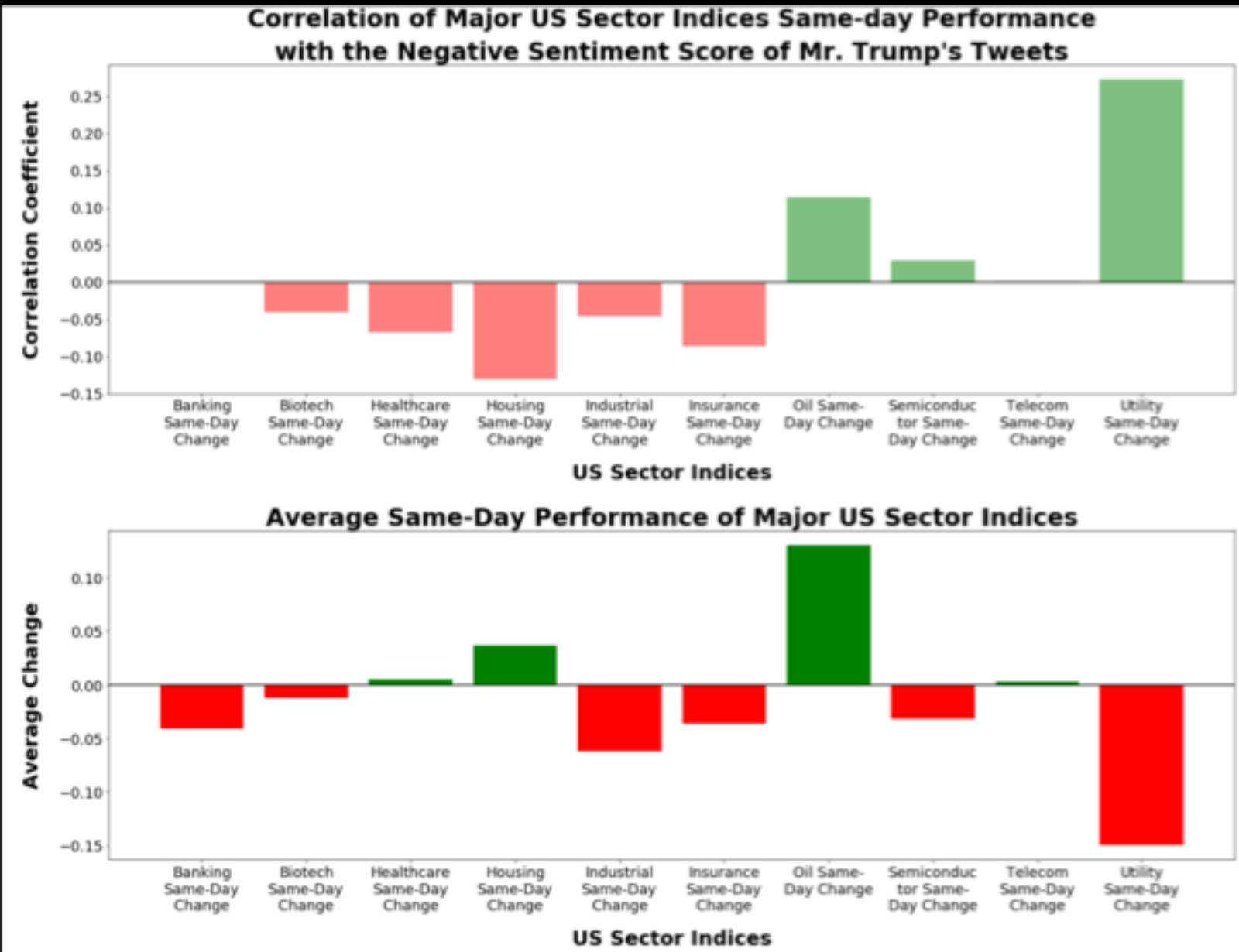
- We found no positive correlation between one day sector performance and Mr. Trump's Tweets for most sectors.

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.

4. Based on Negative Sentiment Score vs. Sector Performance



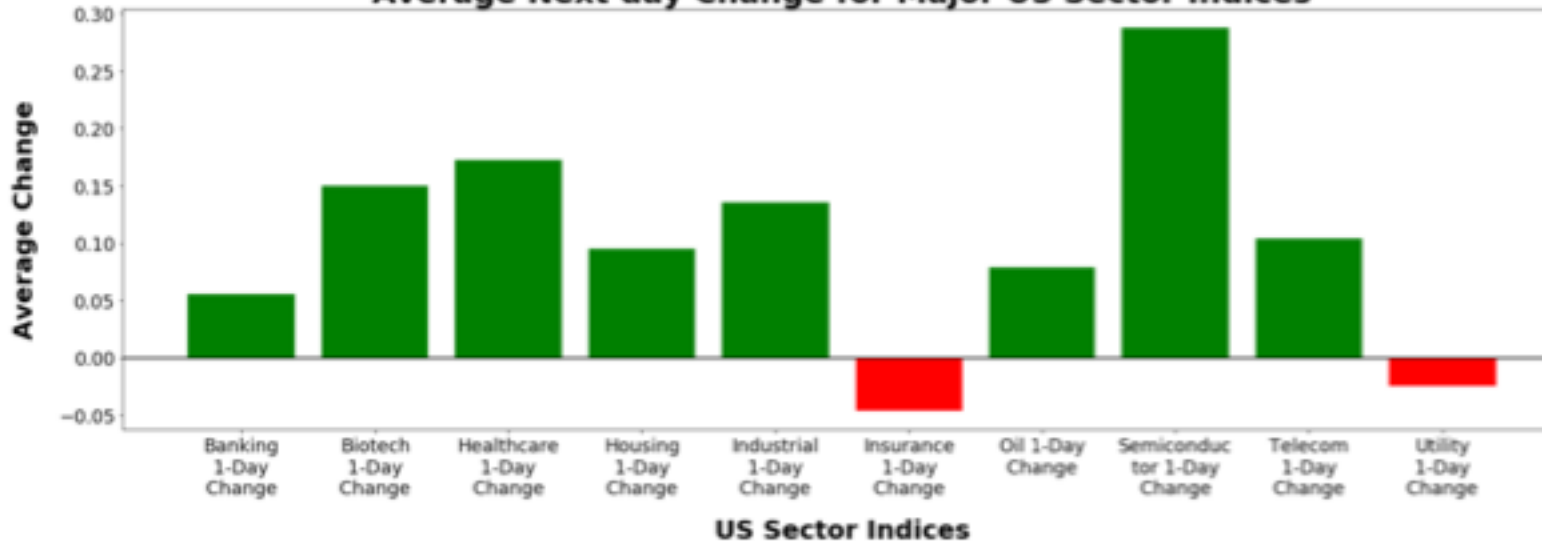
- The bars in **Green color** show the positive correlation between same day sector performance and negative sentiment score of Mr. Trump's tweets.
- We found positive correlation for Oil & Gas, Semiconductors and Utility sectors.

4.1 Based on Negative Sentiment Score and Sector performance

Correlation of Major US Sector Indices Next-day Performance with the Negative Sentiment Score of Mr. Trump's Tweets



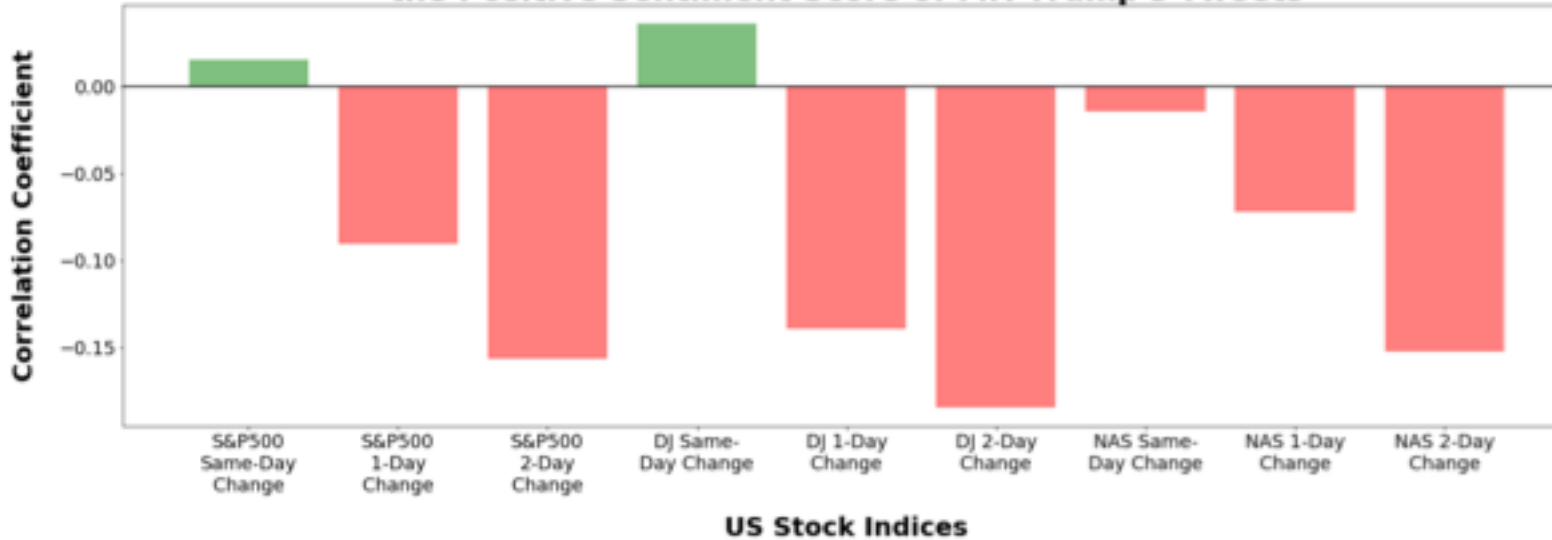
Average Next day Change for Major US Sector Indices



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

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

Correlation of Major US Stock Indices Performance with the Positive Sentiment Score of Mr. Trump's Tweets



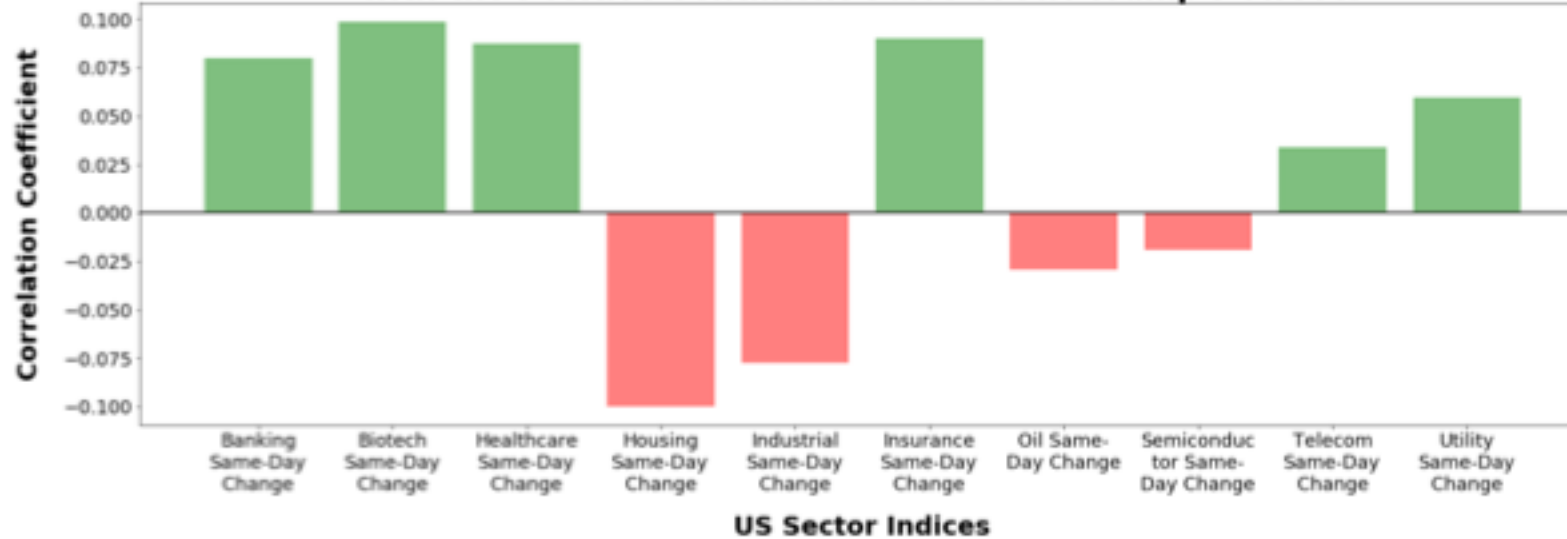
Average Performance of Major US Stock Indices



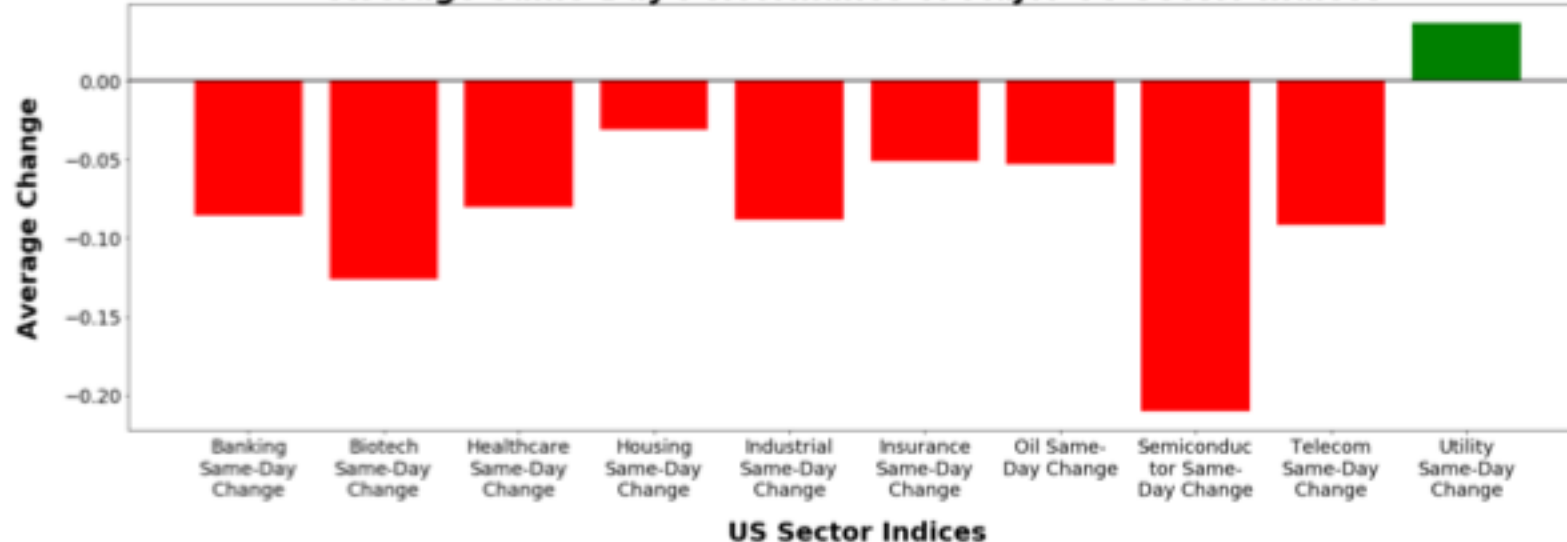
- The bars in **Green color** show the positive correlation between same day stock index performance and positive sentiment score of Mr. Trump's tweets.

6. Based on Positive Sentiment Score vs. Sector Performance

Correlation of Major US Sector Indices Same-day Performance with the Positive Sentiment Score of Mr. Trump's Tweets



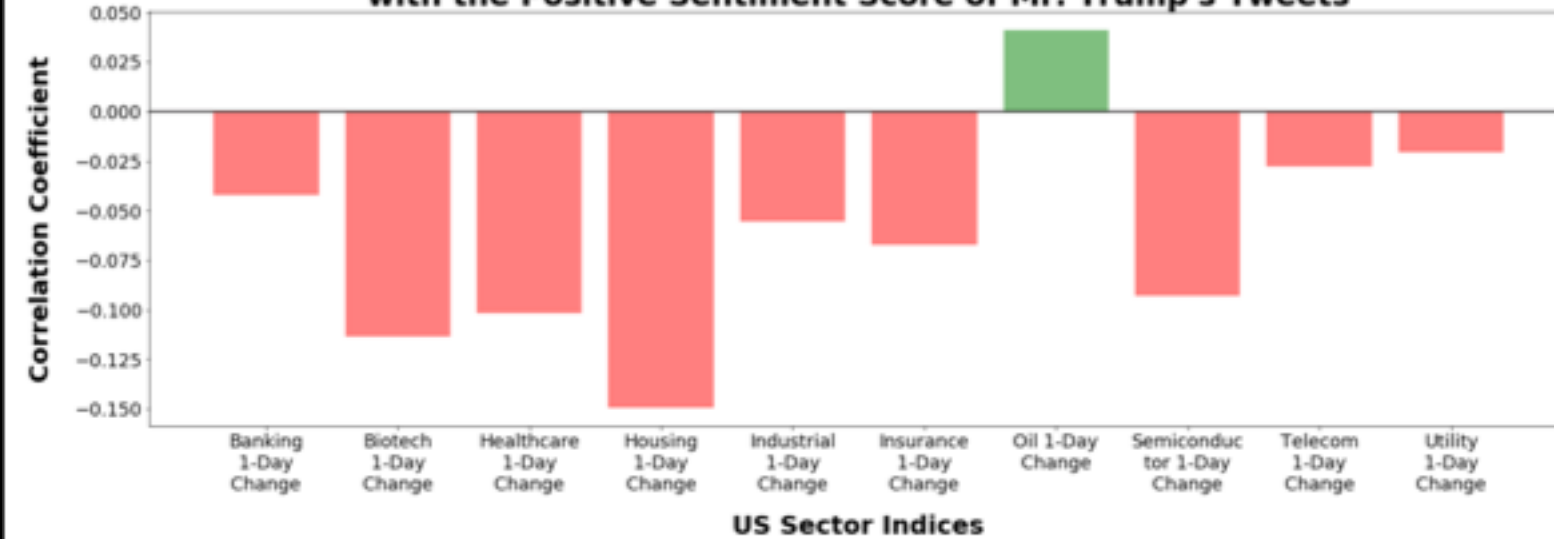
Average Same-Day Performance of Major US Sector Indices



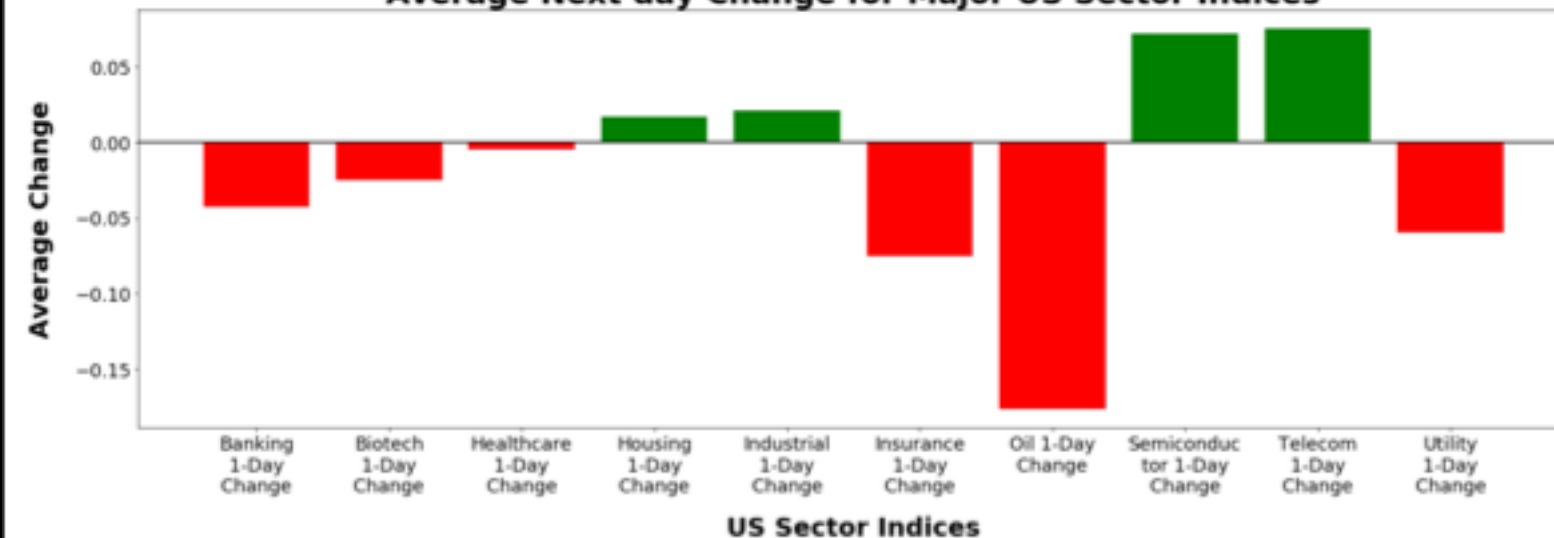
- The bars in **Green color** show the positive correlation between same day sector performance and positive sentiment score of Mr. Trump's tweets.
- We found positive correlation for Banking, Biotech, Healthcare, Insurance, Telecom and Utility sectors.

6.1 Based on Positive Sentiment Score vs. Sector Performance

Correlation of Major US Sector Indices Next-day Performance with the Positive Sentiment Score of Mr. Trump's Tweets

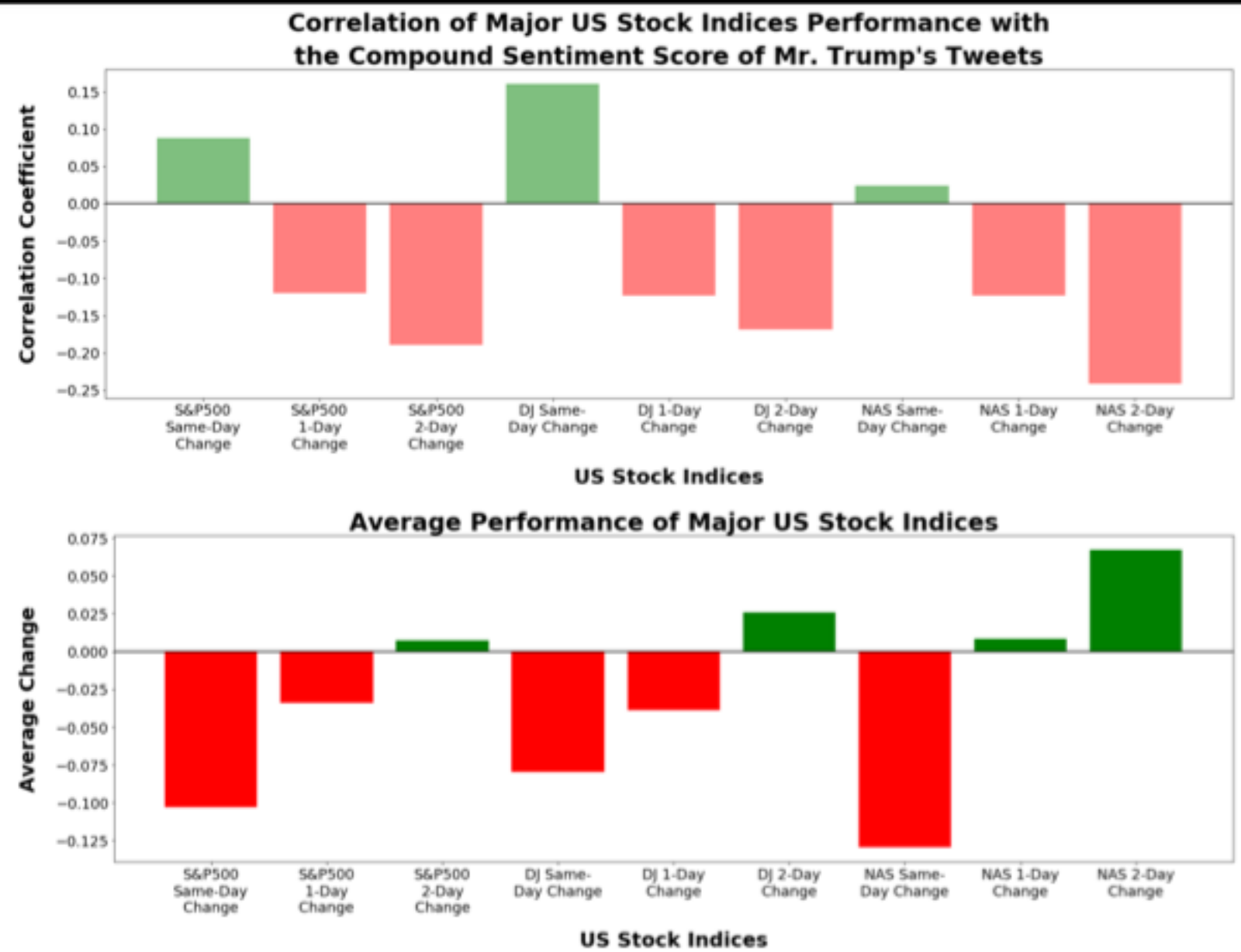


Average Next day Change for Major US Sector Indices



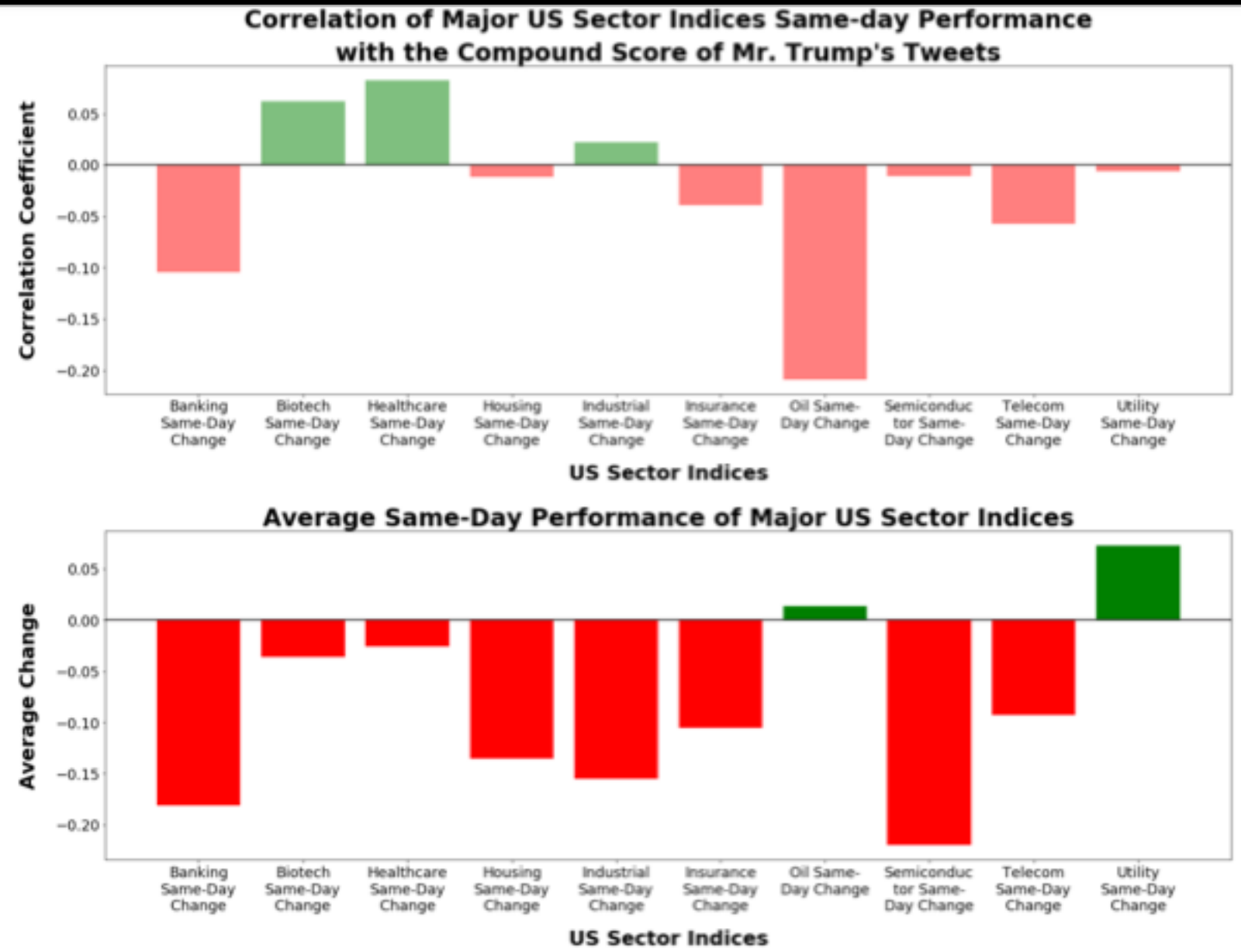
- We found no positive correlation between one day sector performance and Mr. Trump's Tweets for most sectors.

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



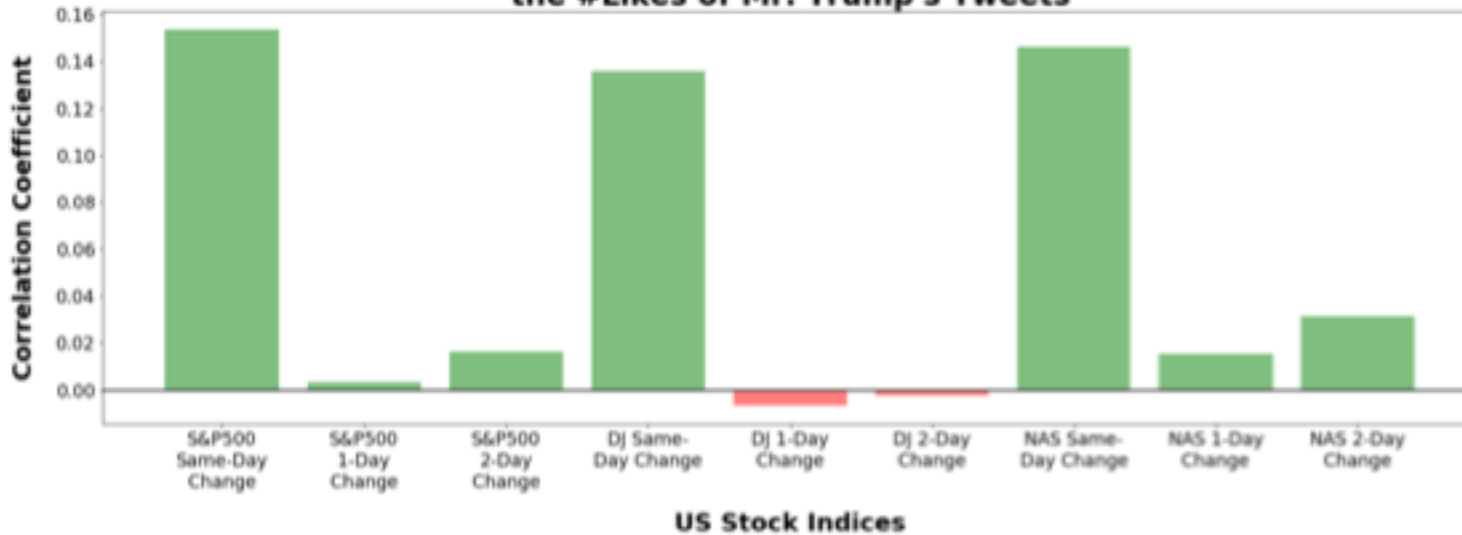
- The bars in **Green color** show the positive correlation between same day sector performance and compound sentiment score of Mr. Trump's tweets.
- We also noticed higher correlation scores compared to our initial compound score analysis findings.

What about Likes and Retweets?

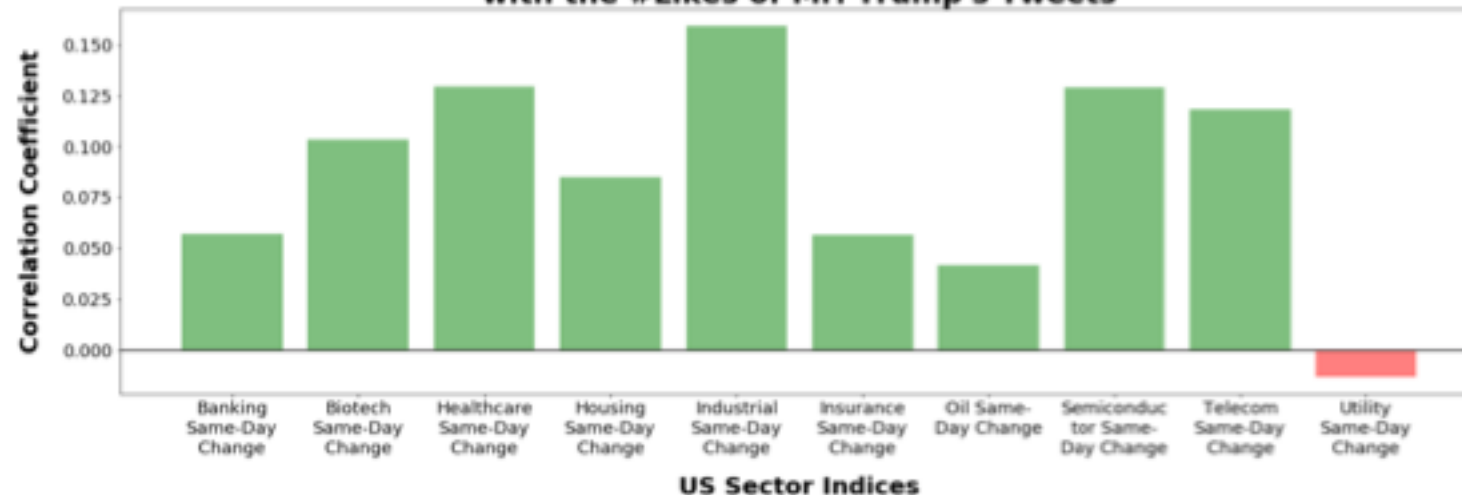
Correlation Based on Likes

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

Correlation of Major US Stock Indices Performance with the #Likes of Mr. Trump's Tweets



Correlation of Major US Sector Indices Same-day Performance with the #Likes of Mr. Trump's Tweets



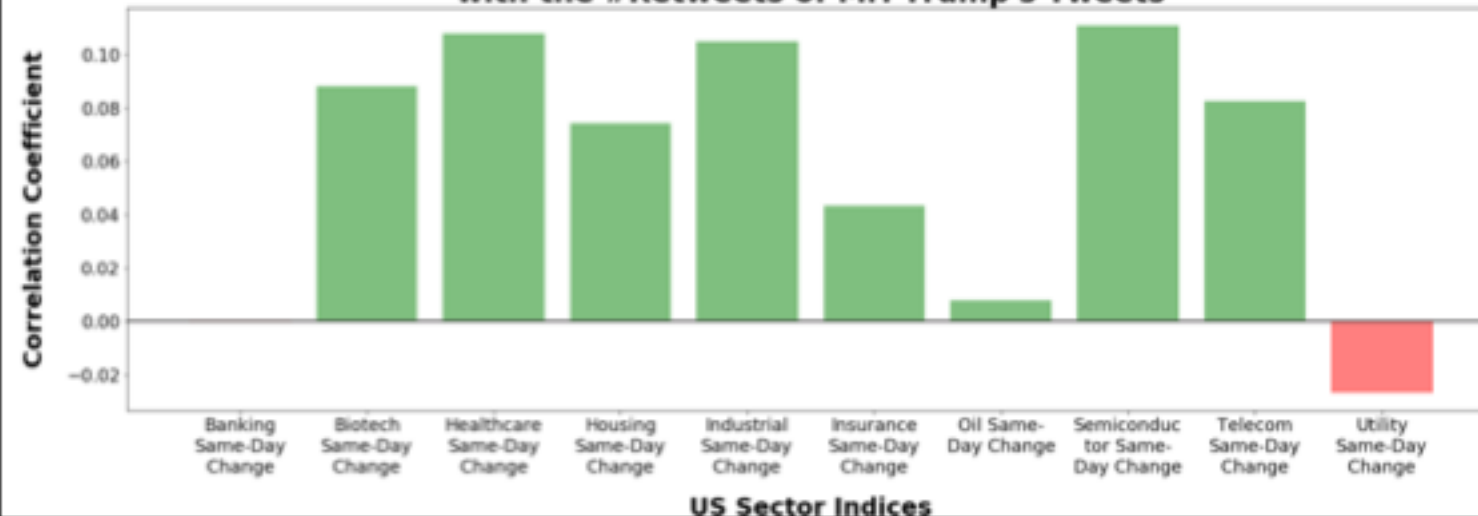
Correlation Based on #Retweets

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

Correlation of Major US Stock Indices Performance with the #Retweets of Mr. Trump's Tweets

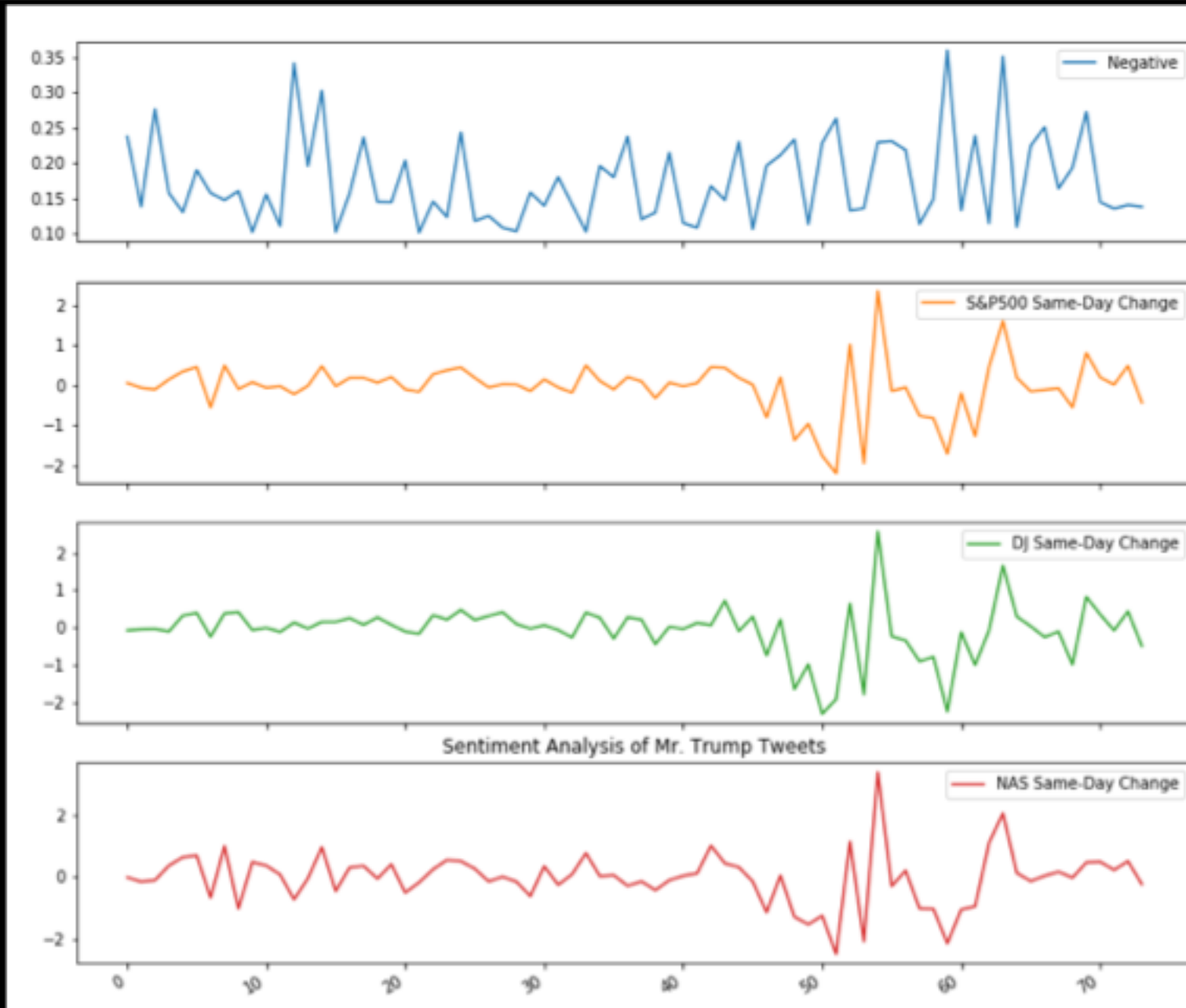


Correlation of Major US Sector Indices Same-day Performance with the #Retweets of Mr. Trump's Tweets

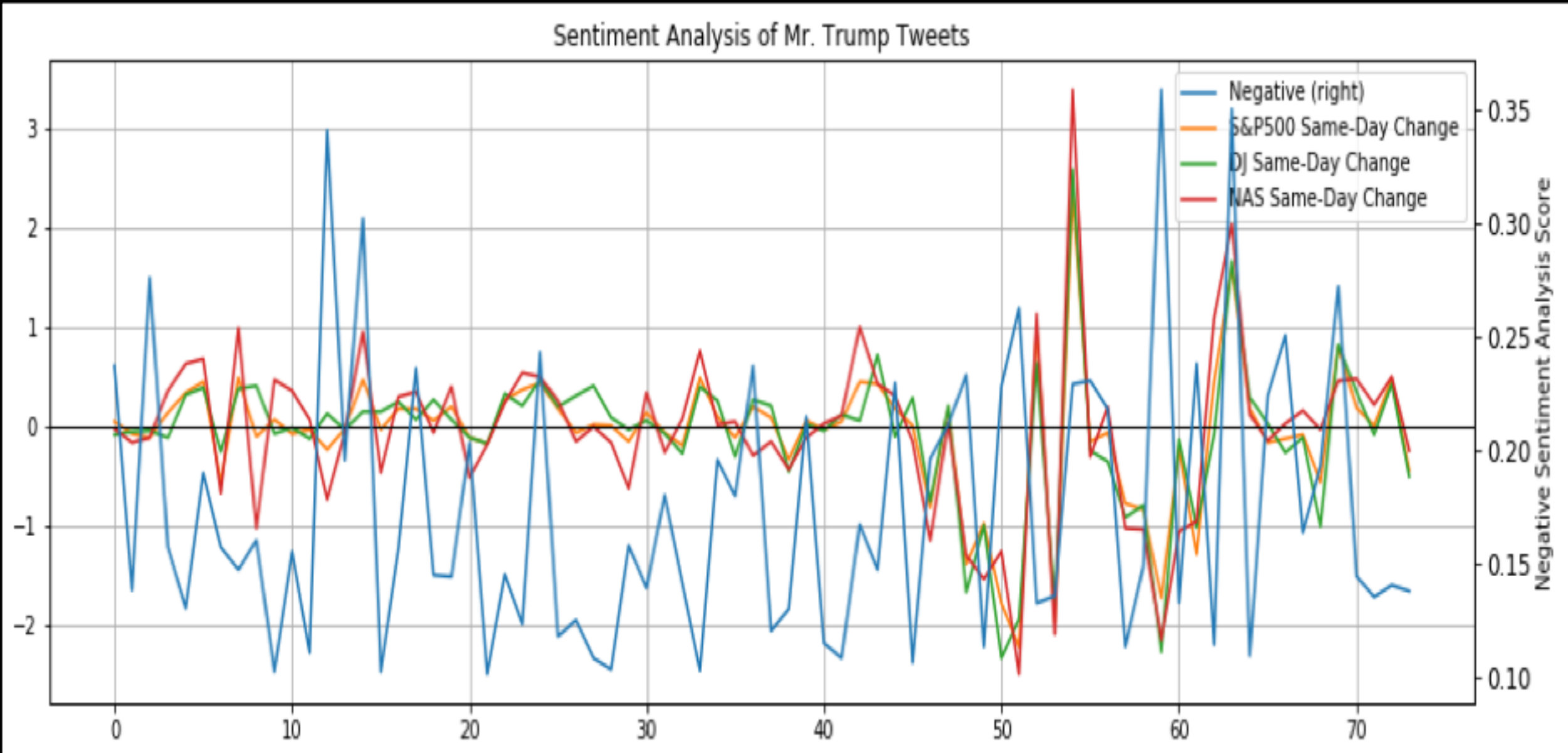


Our Other Interesting Findings

9. Negative Sentiment Score vs. Stock Index Performance



10. Negative Sentiment Score vs. Stock Index Performance



Largest Gains

Same Day

	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
Event													
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

	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
Event													
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

	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
Event													
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

	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
Event													
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)

SUMMARY

Questions?

