

Text analysis on Data from Twitter using API Calling

Healthcare in US

Project Definition

1. Target

3 stocks in sector of Healthcare in US

2. Period

2 week of December (from 02 Dec 2019 to 16 Dec 2019)

3. Data collection

Using API calling to collect data from Twitter

4. Text analysis

most common words

wordcloud

sentiment detection



yahoo!finance

Search for news, symbols or companies

Johnson & Johnson (JNJ)

NYSE - Nasdaq Real Time Price. Currency in USD

141.75

+0.37 (+0.26%)

Buy

As of 3:57PM EST. Market open.

Summary

Company Outlook

Chart

Conversations

Statistics

Historical

Previous Close

141.38

Market Cap

373B

Open

141.73

Bid

141.96 x 1000

Ask

141.97 x 800

Day's Range

141.49 - 142.85

52 Week Range

121.00 - 144.98

Volume

3216560

Avg. Volume

7,153,709

Market Cap

373B

Beta (5Y Monthly)

0.70

PE Ratio (TTM)

27.04

EPS (TTM)

5.24

Earnings Date

Jan 22, 2020

Forward Dividend & Yield

3.80 (2.69%)

Ex-Dividend Date

2019-11-25

1y Target Est

150.78

1D

5D

1M

6M

YTD

1Y

5Y

Max

Nov 18

114.58

Merck & Co., Inc. (MRK)

NYSE - Nasdaq Real Time Price. Currency in USD

89.30

+0.11 (+0.12%)

Buy

At close: 3:59PM EST

Summary

Company Outlook

Chart

Conversations

Statistics

Historical

Previous Close

89.19

Market Cap

227B

Open

89.65

Bid

89.45 x 1300

Ask

89.46 x 800

Day's Range

89.18 - 89.99

52 Week Range

70.89 - 89.99

Volume

6602059

Avg. Volume

8,076,646

Market Cap

227B

Beta (5Y Monthly)

0.53

PE Ratio (TTM)

24.95

EPS (TTM)

3.58

Earnings Date

Feb 5, 2020

Forward Dividend & Yield

2.44 (2.74%)

Ex-Dividend Date

2019-12-13

1y Target Est

97.56

1D

5D

1M

6M

YTD

1Y

5Y

Max

Nov 18

114.58

Medtronic plc (MDT)

NYSE - Nasdaq Real Time Price. Currency in USD

114.58

+1.06 (+0.93%)

Buy

At close: 4:00PM EST

Summary

Company Outlook

Chart

Conversations

Statistics

Historical Data

Profile

Financials

Analysis

Options

Previous Close

113.52

Market Cap

154B

Open

114.07

Bid

114.72 x 1100

Ask

114.74 x 1800

Day's Range

114.01 - 114.97

52 Week Range

81.66 - 114.97

Volume

2845812

Avg. Volume

4,030,431

Market Cap

154B

Beta (5Y Monthly)

0.61

PE Ratio (TTM)

32.54

EPS (TTM)

3.52

Earnings Date

Feb 18, 2020

Forward Dividend & Yield

2.16 (1.92%)

Ex-Dividend Date

2019-12-26

1y Target Est

121.90

1D

5D

1M

6M

YTD

1Y

5Y

Max

Nov 18

114.58

Target

JNJ twitter profile



**Johnson & Johnson**
11.7K Tweets







Following

Johnson & Johnson
@Johnson_bio
BioPortfolio's Johnson & Johnson channel is a global digest of the latest news, research, reports and clinical trials by J&J
📍 London [bioportfolio.com/johnson-and-jo...](#) 📅 Joined March 2011
29 Following 170 Followers
Not followed by anyone you're following

Tweets

Tweets & replies

Media

Likes



**Johnson & Johnson**
11.7K Tweets



Following

Johnson & Johnson
@Johnson_bio
BioPortfolio's Johnson & Johnson channel is a global digest of the latest news, research, reports and clinical trials by J&J
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29 Following 170 Followers
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Tweets

Tweets & replies

Media

Likes



**Johnson & Johnson** ✓
13.6K Tweets







Following

Johnson & Johnson ✓
@JNJNews
Updates and information for the media from our Corporate Communication team
[jnj.com](#) 📅 Joined February 2009
2,529 Following 183.6K Followers
Followed by Johnson & Johnson, Merck, and 2 others you follow

Tweets

Tweets & replies

Media

Likes



**Johnson & Johnson** ✓
13.6K Tweets



Following

Johnson & Johnson ✓
@JNJNews
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Tweets

Tweets & replies

Media

Likes

MRK twitter profile

Merck

7,882 Tweets

Following

Merck

@Merck

We have always been and always will be inventing for the single greatest purpose: Life. Intended for U.S. residents only. FLS: bit.ly/1Oc7M6l

Kenilworth, NJ merck.com/privacy Joined April 2009

1,009 Following **175.2K** Followers

Tweets

Tweets & replies

Media

Likes

Merck

5,171 Tweets

Following

Merck

@merckgroup

A leading science and technology company in healthcare, life science, performance materials. Not intended for US&CA visitors. merckgroup.com/imprint

Darmstadt, Germany merckgroup.com Joined August 2010

357 Following **16.2K** Followers

Tweets

Tweets & replies

Media

Likes

MDT twitter profile

←**Medtronic**
3,854 Tweets

Medtronic

⋮

Following

Medtronic
@Medtronic

A global healthcare solutions company — committed to improving lives through our medical technologies, services, and solutions. bit.ly/2ApMbnK

Minneapolis medtronic.com Joined July 2009

392 Following 58.7K Followers

Followed by Medtronic Cardiac and Johnson & Johnson

Tweets

Tweets & replies

Media

Likes

←**Medtronic Cardiac**
3,291 Tweets

Medtronic

⋮

Following

Medtronic Cardiac
@MDT_Cardiac

Medtronic welcomes physicians and clinicians living in the US to learn more about our cardiac devices and therapies. For important safety info visit:
manuals.medtronic.com Joined October 2012

93 Following 7,787 Followers

Followed by Medtronic

Tweets

Tweets & replies

Media

Likes

1. API Calling : tweepy

consumer_key, consumer_secret, access_token, access_token_secret

2. Get User information: get_user()

Id

name

Screen_name

Location

url

Description...

3. Exact tweets: user_timeline()

Data Collection

Tweets collected

0	On #WorldAIDSDay, #JNJ is proud to share the powerful story of employee Fernando Salinas, who shortly after adoptinâ€¦ https://t.co/oXRGNrI06e	
1	"I did what many wouldn'tâ€¦"I removed my gloves and touched the patients.â€¦ â€¦" @5BFilmâ€™s Alison Paolercio, a nurse whoâ€¦ https://t.co/zefy5jBu23	
2	"The way to deal with the shame and trauma, in part, is to talk about it and find ways to heal."â€¦"@Lavernecox, the fâ€¦ https://t.co/3X179mO4i7	
3	Meet Dr. @SchuitemakerH, the trailblazing HIV researcher who leads viral vaccine programs at @JanssenGlobal. Aheadâ€¦ https://t.co/aNBAKCWRhG	
4	#DYK before BAND-AID® Brand adhesive bandages, home cooks treated cuts & nicks with strips of gauze they had to tieâ€¦ https://t.co/RmhGGi6OOB	
5	Ahead of #WorldAIDSDay, #JNJ is proud to share the story of @5BFilm's Cliff Morrison & champion nurses on the frontâ€¦ https://t.co/VQy7Mxr0IW	
6	RT @Ethicon: Strategic acquisitions & partnerships are crucial to our mission to advance lung surgery. Through our acquisition of Auris Heaâ€¦	
7	The Lung Cancer Initiative at #JNJ is working to develop solutions that aim to prevent, intercept, and cureâ€¦ https://t.co/m3JEB4Mvk1	
8	#JNJ is proud to join Emmy-nominated actress & activist @LaverneCox in the crusade to #makeHIVhistory. In honor ofâ€¦ https://t.co/UtmY3DUWkU	
9	When four millennial #JNJ scientists noticed they were experiencing common skin dilemmas like fine lines & dark spoâ€¦ https://t.co/Rab13bH9tq	
10	As families across the U.S. prepare for #Thanksgiving, go back in @JNJHistory and learn about the Laurel Club, an aâ€¦ https://t.co/h54C3IR28p	
11	@HeartRiteHealth Hi there. Thanks for your interest in doing business with Johnson & Johnson. We ask that you visitâ€¦ https://t.co/SxI0R4HVzd	
12	RT @JNJHistory: #JNJ has always inspired its employees to volunteerâ€¦"from our Laurel Clubâ€™s local efforts in the early 1900s, to todayâ€™s Gloâ€¦	
13	Empowering nurses to develop & move their innovative ideas to propel patient care is just one way #JNJ champions nuâ€¦ https://t.co/6QnfKzFBJq	
14	From generous work-family time to subsidized childcare expenses, #JNJ is helping ensure families of all shapesâ€¦ https://t.co/poCM49gITF	
15	#DYK trillions of microorganisms called the microbiome co-exist in and on your bodyâ€¦"and could transform skin in surâ€¦ https://t.co/WEZ2I97kRD	
16	RT @USGLC: Thrilled to have @JNJCares as the sponsor for tonightâ€™s #USGLCtribute dinner musical guests, the @ACChoir! These dynamic musiciaâ€¦	
17	@JanssenGlobal Learn more about the many innovative ways #JNJ is working to build a diverse workforce: https://t.co/csT5mn1dVi #BelongatJNJ	
18	"We can only achieve gender parity by having men & women partnering in the journey. We need to take bolder actionsâ€¦"â€¦ https://t.co/XEQy1FGAQL	
19	RT @JanssenEMEA: "Be intentional about your decisions - every time you make one ask yourself, is this a chance to advance diversity & incluâ€¦	

NLTK

Provides a set of diverse natural languages algorithms. Consists of the most common algorithms such as tokenizing, part-of-speech tagging, stemming, sentiment analysis, topic segmentation, and named entity recognition.

1. Tokenization

- Sentence Tokenization
- Word Tokenization

2. Frequency Distribution

- `most_common()`

3. Remove 'noise' words

- Set stopwords
- Remove Stopwords

3 Most Common Words

JNJ

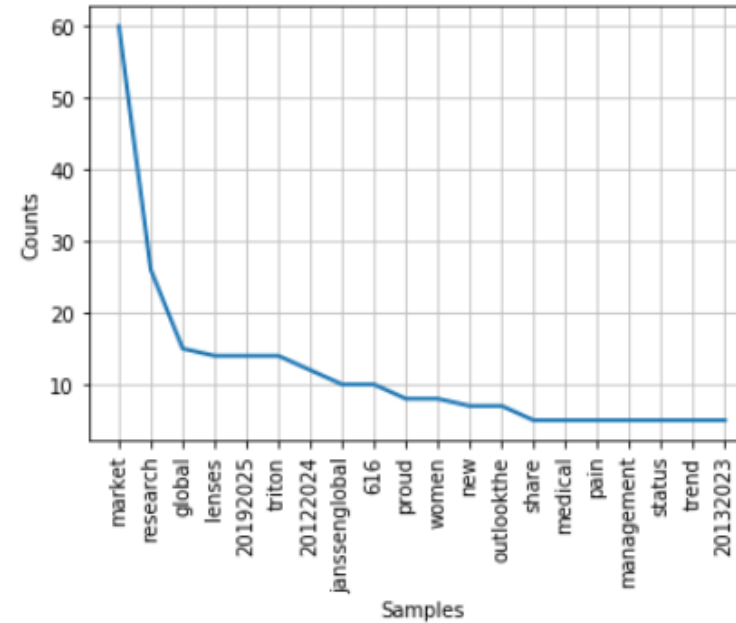
3 Most Common Words

1. Market
2. Research
3. Global

```
#Most common words in JNJ tweets  
JNJ_fdist.most_common(5)
```

```
[('market', 60),  
 ('research', 26),  
 ('global', 15),  
 ('lenses', 14),  
 ('20192025', 14)]
```

```
#Plot frequency distribution of tweets from JNJ  
JNJ_fdist.plot(20,cumulative=False)  
plt.show()
```



MRK

3 Most Common Words

1. Diabetes

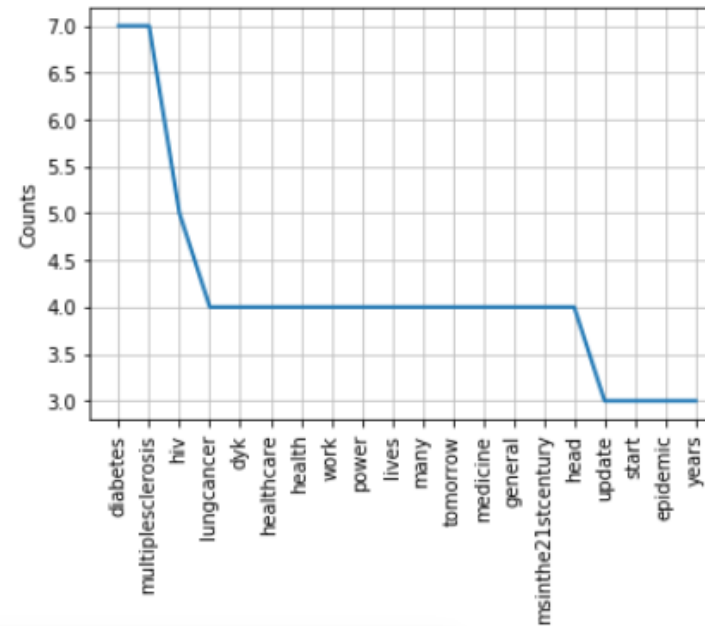
2. Multiplesclerosis

3. HIV

```
#Most common words in MRK tweets  
MRK_fdist.most_common(7)
```

```
[('diabetes', 7),  
 ('multiplesclerosis', 7),  
 ('hiv', 5),  
 ('lungcancer', 4),  
 ('dyk', 4),  
 ('healthcare', 4),  
 ('health', 4)]
```

```
#Plot frequency distribution of tweets from JNJ  
MRK_fdist.plot(20,cumulative=False)  
plt.show()
```



MDT

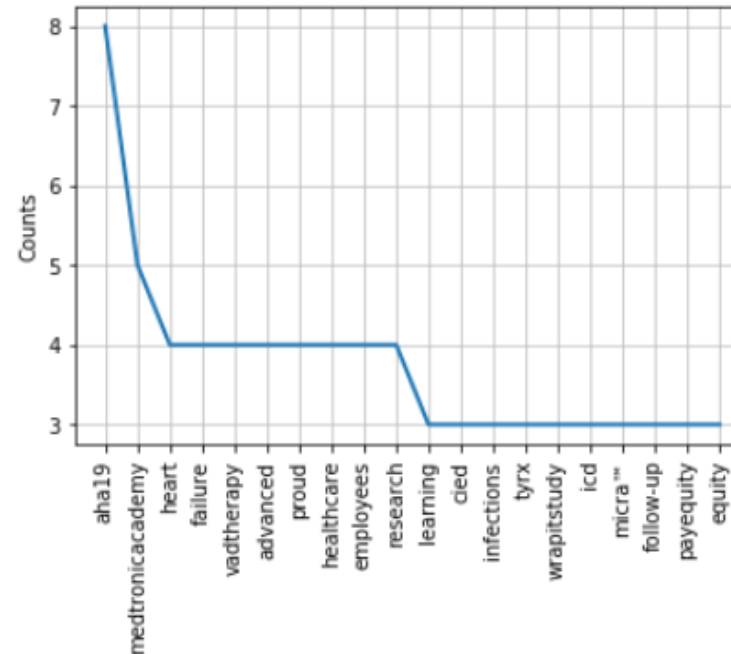
3 Most Common Words

1. AHA2019*
2. MedtronicAcademy
3. Heart failure

```
#Most common words in MDT tweets  
MDT_fdist.most_common(5)
```

```
[('aha19', 8),  
 ('medtronicacademy', 5),  
 ('heart', 4),  
 ('failure', 4),  
 ('vadtherapy', 4)]
```

```
#Plot frequency distribution of tweets from JNJ  
MDT_fdist.plot(20,cumulative=False)  
plt.show()
```



* AHA19: American Heart Association's 2019 Annual Scientific Sessions

Wordcloud

Functionality to create pretty word clouds, visualize differences and similarity between documents, and avoid over-plotting in scatter plots with text.

1. Prepare data

- Tokenize
- Remove URLs, RTs, and twitter handles

2. Set stopwords

3. Plot wordcloud

Wordcloud



JNJ

3 Most

Common Words

1. Market
2. Research
3. Global

Vader Sentiment Analysis (Valence Aware Dictionary and sEntiment Reasoner)

A lexicon and rule-based sentiment analysis tool

Specifically attuned to sentiments expressed in social media. VADER uses a combination of A sentiment lexicon is a list of lexical features (e.g., words) which are generally labelled according to their semantic orientation as either positive or negative.

1. Prepare data

- Tokenize
- Remove URLs, RTs, and twitter handles

2. Print polarity_scores

3. Summarize the scores

Sentiment Analysis

```
#Detect sentiment using Vader
```

```
sid = SentimentIntensityAnalyzer()
for sentence in MDT[1]:
    print(sentence)
    ss = sid.polarity_scores(sentence)
    for k in sorted(ss):
        print('{0}: {1}'.format(k, ss[k]), end='')
    print()
```

```
We're committed to working with public and private organizations to help address the full range of factors affectin...
compound: 0.5859,
neg: 0.0,
neu: 0.769,
pos: 0.231,
For more than 30 years, we have been committed to addressing the global challenges of the HIV epidemic but our work...
compound: 0.1779,
neg: 0.0,
neu: 0.876,
pos: 0.124,
We have the secret ingredient to formulating a great #Thanksgiving: a dash of gratitude for all our patients, emplo...
compound: 0.8126,
neg: 0.0,
neu: 0.67,
pos: 0.33,
```

```
#summarize the score
```

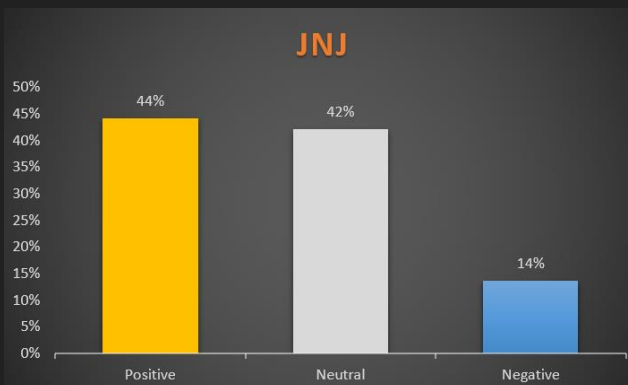
```
MDT_summary = {"positive":0,"neutral":0,"negative":0}
for x in MDT[1]:
    ss = sid.polarity_scores(x)
    if ss["compound"] == 0.0:
        MDT_summary["neutral"] +=1
    elif ss["compound"] > 0.0:
        MDT_summary["positive"] +=1
    else:
        MDT_summary["negative"] +=1
print(MDT_summary)
```

```
{'positive': 40, 'neutral': 20, 'negative': 6}
```

Sentiment Analysis

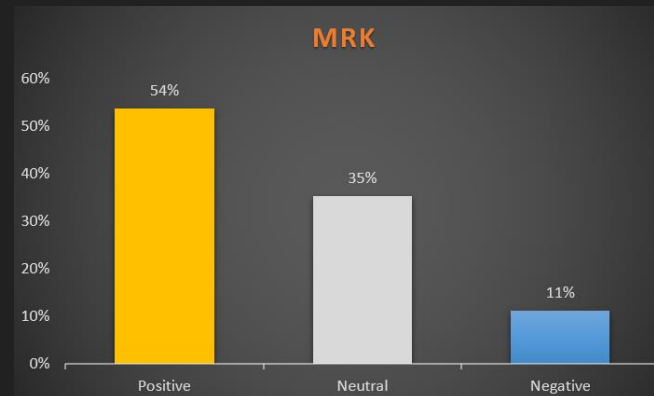
○ JNJ

- Positive : 42
- Neutral : 40
- Negative : 13



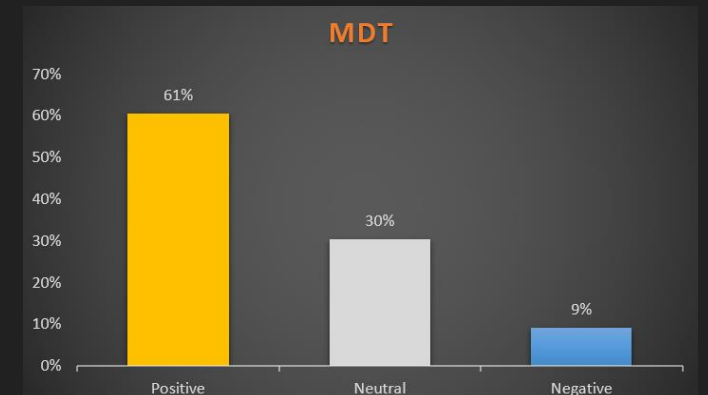
○ MRK

- Positive : 58
- Neutral : 38
- Negative : 12

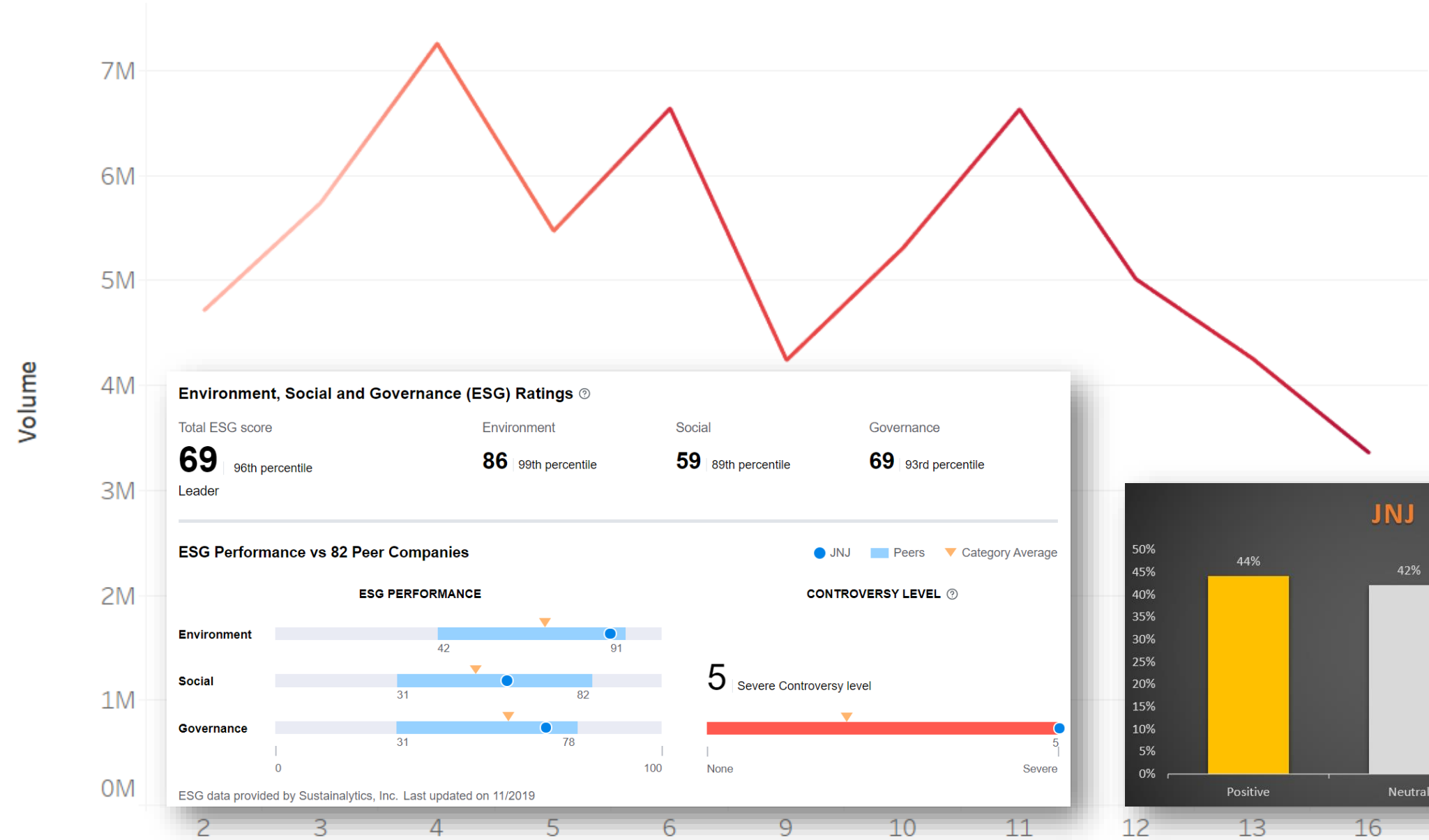


○ MDT

- Positive : 40
- Neutral : 20
- Negative : 6



Stock volume and price of JNJ



SUM(High)

137.450 142.850

Environment, Social and Governance (ESG) Ratings

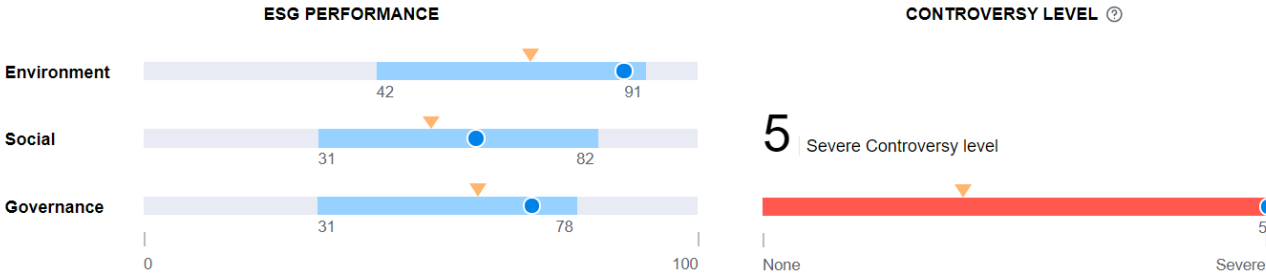
Total ESG score **69** 96th percentile
Leader

Environment **86** 99th percentile

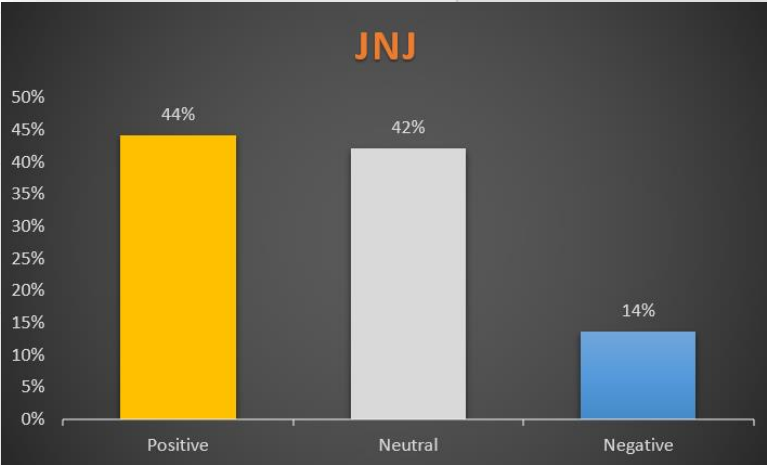
Social **59** 89th percentile

Governance **69** 93rd percentile

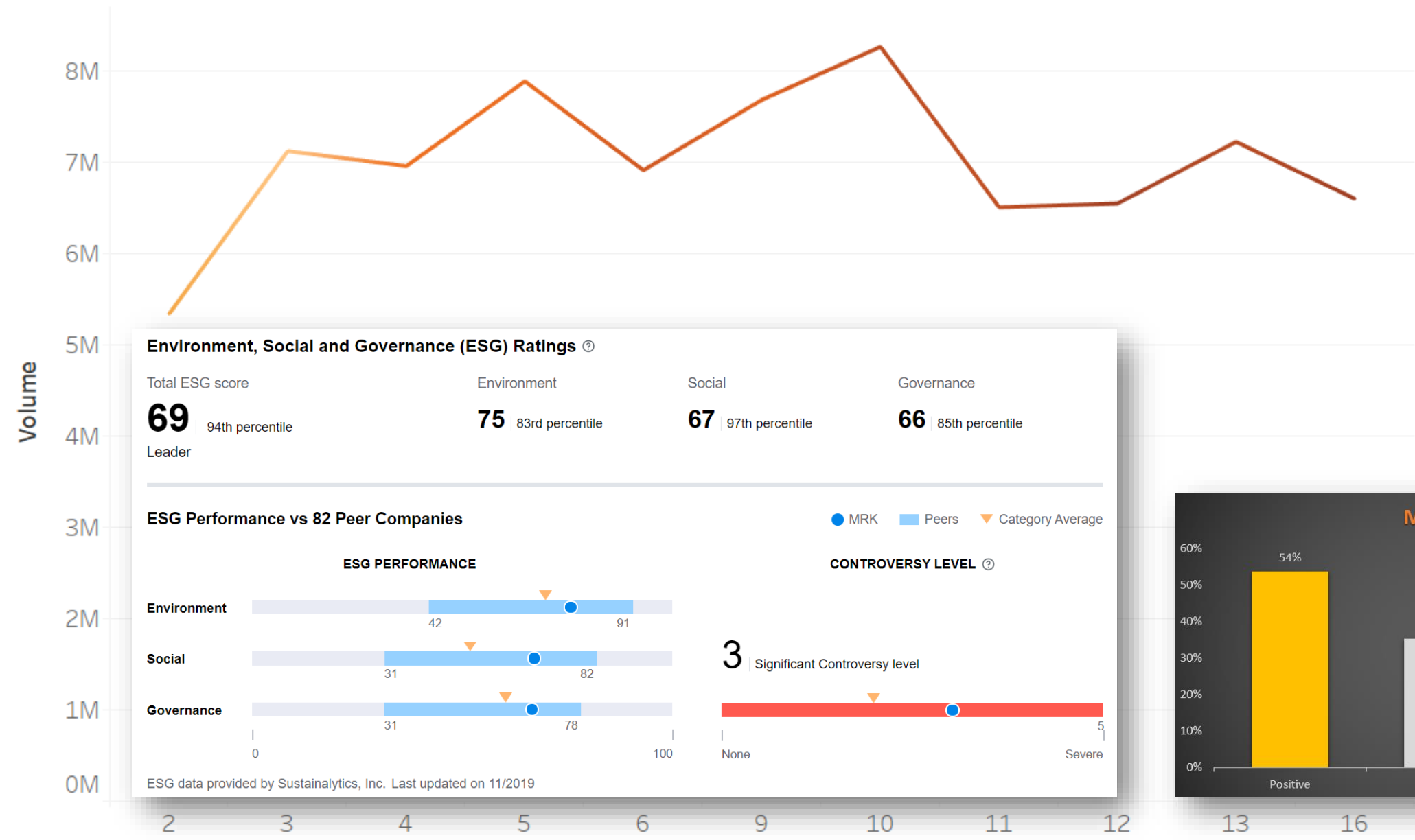
ESG Performance vs 82 Peer Companies



ESG data provided by Sustainalytics, Inc. Last updated on 11/2019



Stock volume and price of MRK



SUM(High)

87.470 89.990

Environment, Social and Governance (ESG) Ratings

Total ESG score
69 | 94th percentile
Leader

Environment	75 83rd percentile	Social	67 97th percentile	Governance	66 85th percentile
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ESG Performance vs 82 Peer Companies

● MRK ■ Peers ▼ Category Average

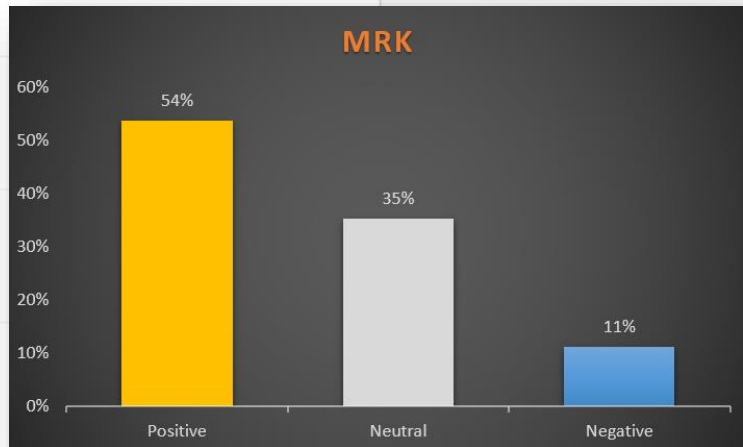
Category	MRK	Peers	Category Average
Environment	91	42	55
Social	82	31	55
Governance	78	31	55

Controversy Level

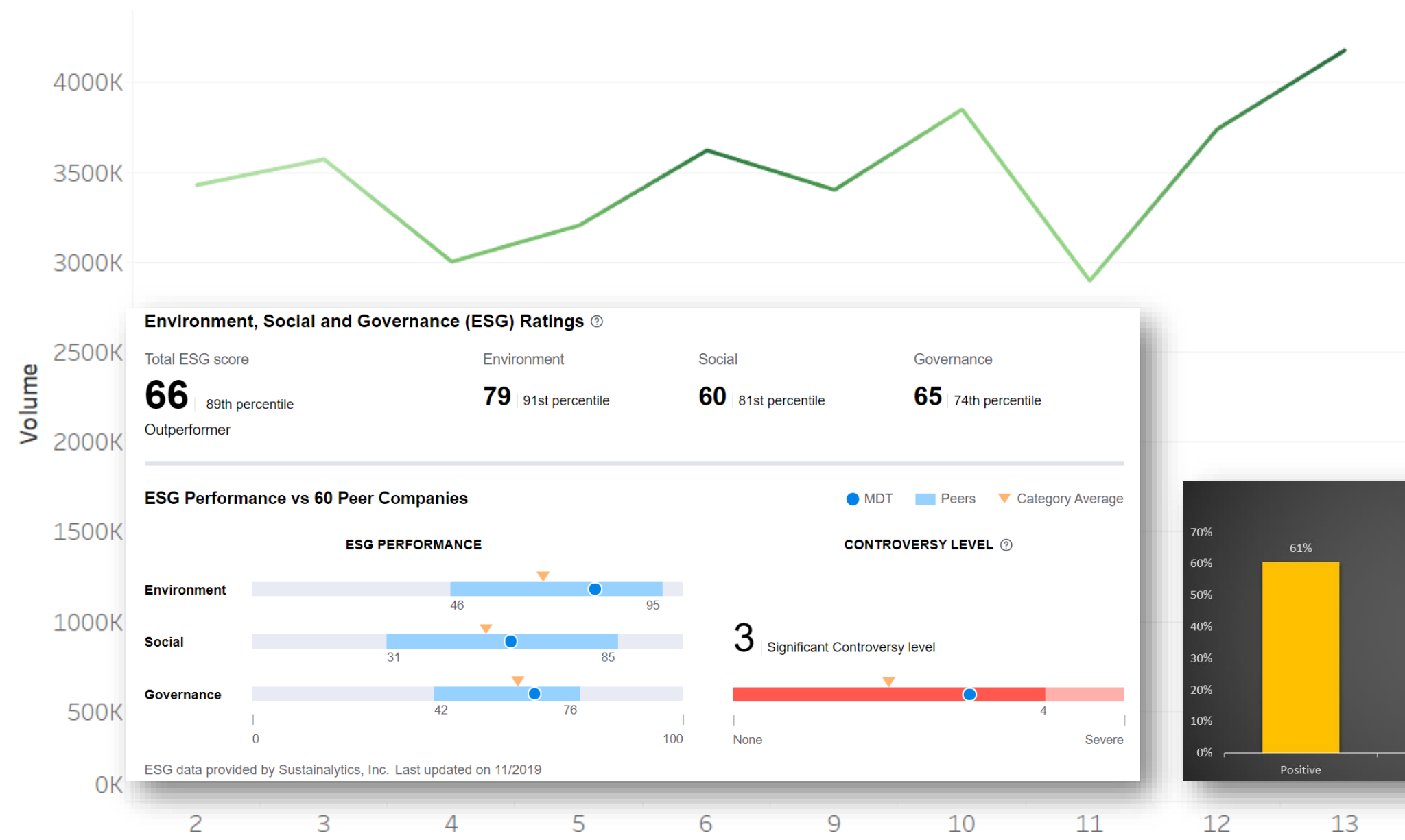
3 | Significant Controversy level

None | Severe

ESG data provided by Sustainalytics, Inc. Last updated on 11/2019

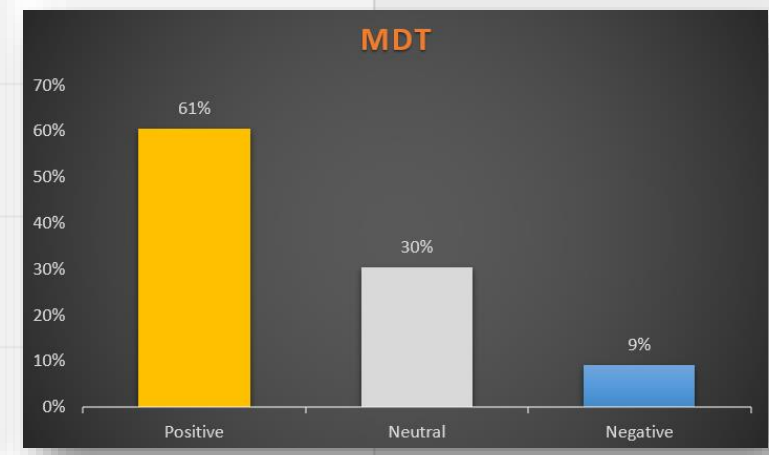
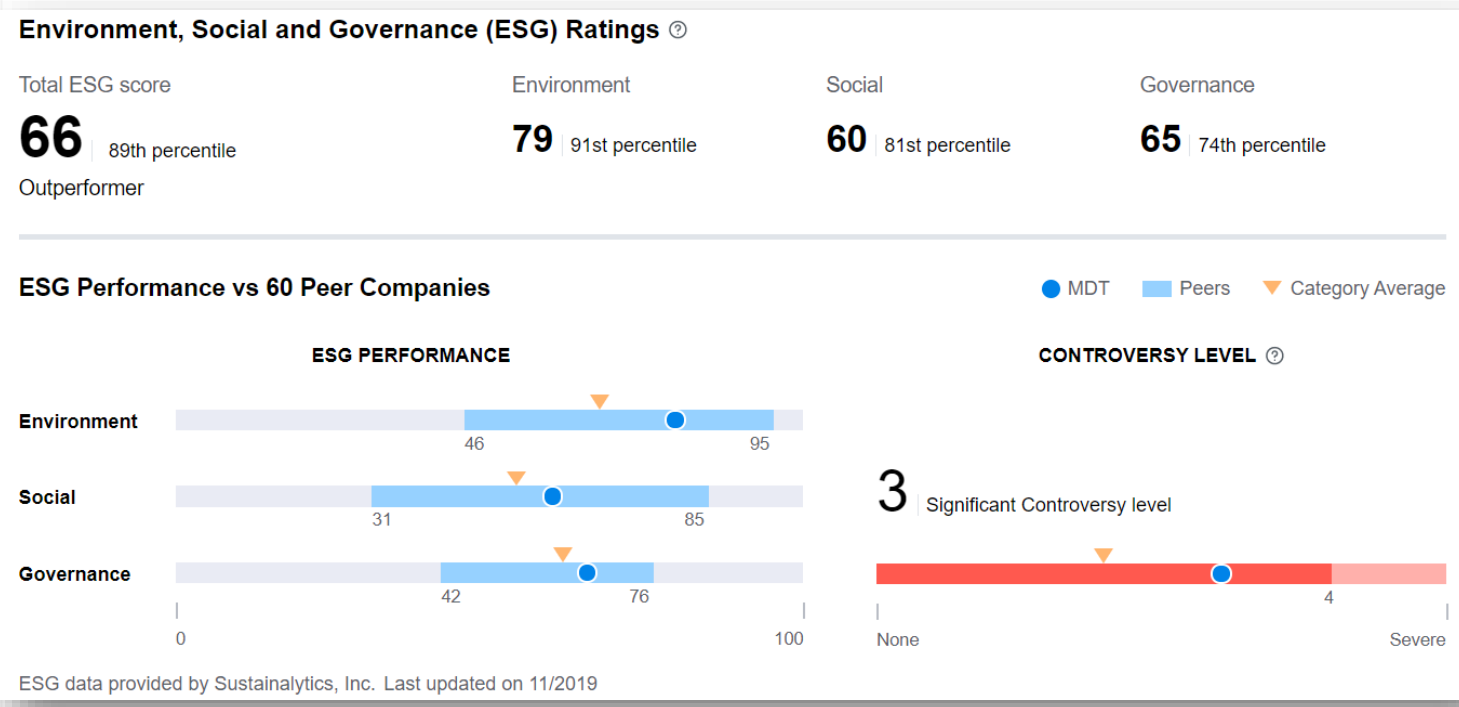


Stock volume and price of MDT



SUM(High)

111.530 113.890





Thank you

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