

# A Look at Trump-Related Oil Price Articles

Team 8

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Problem motivation

International oil prices are a key economic indicator, influenced by geopolitical events and the statements and policies of key political figures. While working on a web crawling assignment related to international oil prices, I became increasingly interested in the topic. Then, I came across a news story about Donald Trump, and I became genuinely curious about how his election might impact oil prices.

As we know, Donald Trump's remarks and potential policy changes have a significant impact on the energy market, generating significant news coverage. Analyzing the sentiment expressed in oil-related news articles mentioning Trump before and after his election could provide insight into how the market perceives his influence and potential impact on oil prices, and how this has changed.

## Literature review

This literature review attempts to examine how the actions of Donald Trump, whether through official policy decisions, press statements, or even his frequent social media posts, have influenced world oil prices. As oil is considered one of the most sensitive and politically influenced commodities in the world market, even small signals from powerful political leaders may affect prices.

Trump, in particular, was known for his outspoken communication style and strong energy-related agenda. This review synthesizes reliable academic studies, expert analyses, and real-world market reports to conceptualize the short-term and long-term effects of the behavior and policies of Trump on the movement of oil prices. The aim is to develop a solid foundation for future research in this area and to help explain how political leadership can shape economic outcomes.

From the literature, a clear pattern emerges. Trump influenced oil prices through two powerful channels:

### 1. Short-Term Effects

- His tweets, public comments, diplomatic pressure, and interview statements triggered immediate market reactions.
- Traders often responded within minutes, showing how influential presidential communication can be.

### 2. Long-Term Effects

- Trump's policy decisions, especially related to deregulation and U.S. shale oil expansion, changed the structure of global oil markets.
- Increased American production contributed to an oversupplied market, which generally lowered global oil prices.

Overall, the literature strongly supports the idea that political leadership, communication style, energy strategy, and foreign relationships all play major roles in shaping global oil prices. Trump's presidency provides a clear and unique example of how deeply politics can influence the international energy market.

## Statement of research objectives

After reviewing the literature, the following research objectives were established

1. Are there differences in topic (keywords) and tone (sentiment) between general oil

price news and Trump-related oil price news? (Using Wordcloud, Sentiment Analysis)

2. Did the volume and sentiment of oil news change following the Trump election? (Using Time Series Analysis)
3. Do the sentiment and volume of Trump-related news have a statistically significant correlation with actual oil price movements?
4. Which topic influence the most the oil price? (Clustering, LDA) And does Trump related topic have impact on oil price?

## Data and Methodology

Focusing on the Trump election (24/11), I tried to include the timeframe during which Trump-related events (Trump's shooting, Trump's inauguration) occurred.

Therefore, I scraped data from July 2024 to March 2025 from Oilprice.com.

For text data, I included the date, title, and snippet

```
Total news articles scraped: 2166
```

```
Sample data:
```

```
          date                               title #
0 2024-07-01 01:23:00 Asia's Oil Imports Declined in the First Half ...
1 2024-07-01 02:13:00 Egypt Inks $33 Billion Worth of Green Ammonia ...
2 2024-07-01 03:28:00 China's Factory Slowdown Raises Questions for ...
3 2024-07-01 05:11:00 EU Hits Record 74% Zero-Emission Power Generation
4 2024-07-01 05:59:00 Trader Sumitomo Seeks U.S. Shale Service Busin...
```

```
          snippet
0 Crude oil imports into Asia declined slightly ...
1 Egypt has signed deals worth $33 billion with ...
2 Factory activity in China slowed down further ...
3 The European Union has seen its largest share ...
4 Japanese trading firm Sumitomo will look to in...
```

```
Scraping finished.
```

For preprocessing, I used the method learned in class.

(Remove HTML tags (BeautifulSoup),

Leave only the alphabet (re.sub),

Convert to lowercase (lower),

Remove stopwords and rejoin)

```

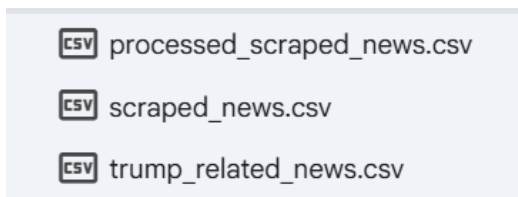
# [Step 1] HTML 태그 제거 (snippet에 남아있을 수 있음)
text = BeautifulSoup(str(text), "html.parser").get_text()
# [Step 2] 알파벳이 아닌 문자를 공백으로 변환
text = re.sub(r'[^\a-zA-Z]', ' ', text)
# [Step 3] 소문자로 변환
text = text.lower()
# 단어 단위로 분리
words = text.split()
# [Step 4] 불용어 제거
words = [w for w in words if not w in stop_words]
# [Step 5] 공백을 기준으로 단어들을 다시 합침
return " ".join(words)

```

Combine the "title" and "snippet" columns to create the "full\_text" column.

Preprocess the "full\_text" column to create the "processed\_text" column and save it as the processed\_scraped\_news.csv file.

Finally, filter only articles related to "Trump" and save it as the trump\_related\_news.csv file.



Despite Donald Trump's victory in the U.S. presidential election, America's largest wind turbine manufacturer Nordex.

	A	B	C	D	E	F
1	date	title	snippet	full_text	processed_text	
2	#####	South Kor	South Kor	South Korsouth	korea set buy	
3	#####	Oil Prices	Crude oil	Oil Prices	oil prices fall trump	
4	#####	Trump Prc	Republican	Trump Prc	trump projected wir	
5	#####	Oil Prices	Crude oil	Oil Prices	oil prices stabilize fc	

To obtain actual oil price data, I downloaded a CSV file of Brent crude oil prices from Investing.com.

날짜	종가	시가	고가	저가	거래량	변동 %
2025-03-31		74.74	73.76	74.81	73.18 23.45K	1.51%
2025-03-28		73.63	74.03	74.2	73.22 92.71K	-0.54%
2025-03-27		74.03	73.9	74.07	73.23 113.71K	0.33%
2025-03-26		73.79	73.27	74.17	73.09 185.49K	1.05%
2025-03-25		73.02	73.08	73.57	72.5 224.65K	0.90%
2025-03-24		72.37	71.7	72.57	71.26 329.03K	1.06%
2025-03-21		71.61	71.8	71.97	71.01 303.43K	0.20%
2025-03-20		71.47	70.49	71.76	70.1 364.36K	1.64%

Using the date and closing price columns, I calculated weekly oil price volatility (the standard deviation of daily prices for that week) and weekly oil price return (the percentage change from the weekly average price), which I used in my analysis.

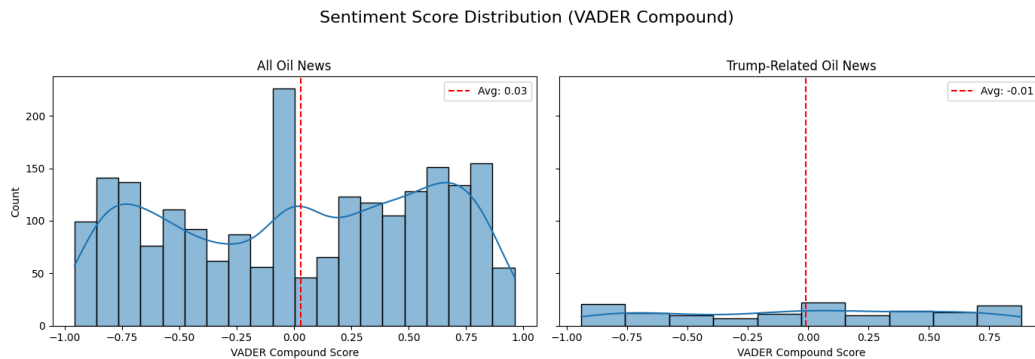


To capture the differences in tone between the two sets of articles, I did a sentiment analysis with VADER.

Average VADER Compound Score (All News): 0.0287  
Average VADER Compound Score (Trump-Related News): -0.0084

Sentiment Distribution (All News):  
vader\_sentiment  
Positive 49.03  
Negative 40.90  
Neutral 10.06

Sentiment Distribution (Trump-Related News):  
vader\_sentiment  
Positive 46.76  
Negative 43.88  
Neutral 9.35



As a result, The average score indicates that Trump-related news is relatively more negative than overall news. The distribution also shows that Trump-related news has a higher negative rate and a lower positive rate.

Additionally, to further clarify the differences between the two datasets, I conducted TF-IDF weighted sentiment correlation analysis to investigate the correlation between keywords and sentiments.

[긍정적 감성과 연관된 단어 Top 10] (점수가 높을수록 긍정 기사에 자주 등장)

- energy: 0.3720
- gas: 0.2128
- including: 0.2058
- clean: 0.2048
- transition: 0.1929
- hundreds: 0.1861
- executive: 0.1833
- natural: 0.1819
- seeking: 0.1808
- higher: 0.1779

[부정적 감성과 연관된 단어 Top 10] (점수가 낮을수록 부정 기사에 자주 등장)

- supply: -0.2235
- dip: -0.2250
- tariff: -0.2442
- threatens: -0.2484
- prices: -0.2545
- war: -0.2557
- threat: -0.3012
- threatened: -0.3349
- oil: -0.4157
- crude: -0.4711

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[5. 감성-단어 중요도: 전체 유가 뉴스에서 감성에 영향을 주는 핵심 단어]

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[전체 뉴스: 긍정적 감성과 연관된 단어 Top 10]

- energy: 0.3250
- natural: 0.2458
- gas: 0.2404
- billion: 0.1945
- boost: 0.1731
- clean: 0.1392
- assets: 0.1348
- help: 0.1316
- profit: 0.1298
- new: 0.1192

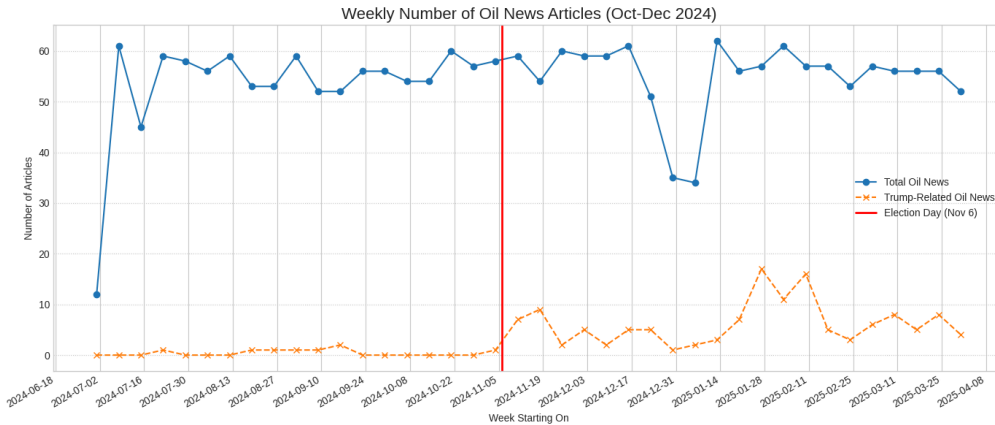
[전체 뉴스: 부정적 감성과 연관된 단어 Top 10]

- institute: -0.1351
- east: -0.1370
- war: -0.1396
- fears: -0.1440
- ending: -0.1488
- attack: -0.1517
- barrels: -0.1613
- prices: -0.1681
- oil: -0.2697
- crude: -0.4911

As a result, I found that even identical keywords, such as "energy" and "oil," had different correlations between the sentiment of Trump-related news and the sentiment of overall news.

This confirmed that there were differences between all articles and Trump-related articles in terms of keywords, sentiment, and even the correlation between specific keywords and sentiment.

Next, I conducted a time series analysis to determine whether there were changes in the volume and sentiment of oil-related news following Trump's election.



This is a time series graph of the weekly number of overall news and the weekly number of Trump-related news.

As the graph shows, the number of Trump-related articles clearly increased after Trump's election.

And I observed whether sentiment changed before and after Trump's election.



These are sentiment time series graphs for Trump-related and overall articles.

On the left are the weekly average sentiment analysis time series graphs for each article, and on the right are the moving average sentiment analysis graphs for each article.

Because it was difficult to determine the increase or decrease in sentiment simply by looking at the graph, a t-test was conducted.

```
>> 분석 대상: [트럼프 관련 뉴스]
- 선거 전 평균 감성 (N=8): 0.3382
- 선거 후 평균 감성 (N=131): -0.0295
- 변화량 (After - Before) : -0.3678
- T-statistic : 2.5011
- P-value : 3.4136e-02
★ 결론: 선거 전후 감성 차이는 **통계적으로 유의미**합니다. (p < 0.05)
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[3. T-test: 선거(11/6) 전후 감성 점수 평균 차이 검증]
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```
>> 분석 대상: [전체 유가 뉴스]
- 선거 전 평균 감성 (N=1027): 0.0007
- 선거 후 평균 감성 (N=1139): 0.0539
- 변화량 (After - Before) : 0.0533
- T-statistic : -2.1911
- P-value : 2.8555e-02
★ 결론: 선거 전후 감성 차이는 **통계적으로 유의미**합니다. (p < 0.05)
```

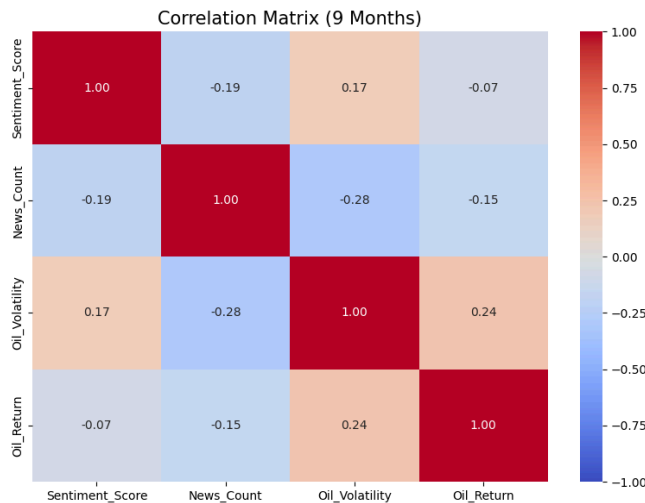
As a result, In both cases, the null hypothesis was rejected, meaning that sentiment for

Trump-related news significantly decreased and sentiment for all news significantly increased.

These shows that while the amount of Trump-related news has increased and sentiment has decreased since the election, sentiment for overall news has increased.

Next, I conducted a correlation analysis to determine whether the sentiment and coverage of Trump-related news had a statistically significant correlation with actual oil price fluctuations.

A heatmap was created using four variables: the number of weekly Trump-related articles, average sentiment score, oil price volatility, and oil price returns. Furthermore, a Pearson correlation test was performed on the number of Trump news articles with oil price volatility and the Trump news sentiment score with oil price returns.



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[통계적 가설 검증 결과 (Pearson Correlation)]
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1. [트럼프 뉴스 기사 수] vs [유가 변동성]
- 상관계수 (r): -0.2830
- P-value : 0.0768
=> 결과: 통계적으로 유의미한 관계가 발견되지 않았습니다.

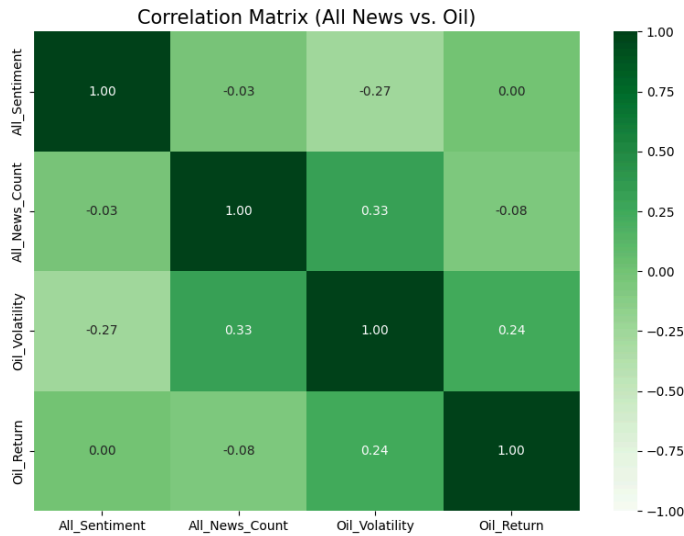
2. [트럼프 뉴스 감성 점수] vs [유가 수익률]
- 상관계수 (r): -0.0696
- P-value : 0.6694
=> 결과: 통계적으로 유의미한 관계가 발견되지 않았습니다.
  
```

As a result, There were no significant correlations between any of the variables and the Pearson correlation test also found no significant relationships.

Although I did find the results for research objective, I additionally analyzed the overall oil price-related articles and their correlations with oil prices to obtain meaningful, correlational results

A heatmap was created using four variables: the total number of weekly articles, average sentiment score, oil price volatility and oil price returns.

Furthermore, a Pearson correlation test was performed on the total number of news articles with oil price volatility and the total news sentiment score with oil price returns.

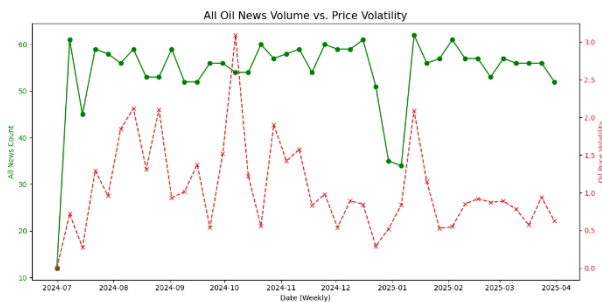
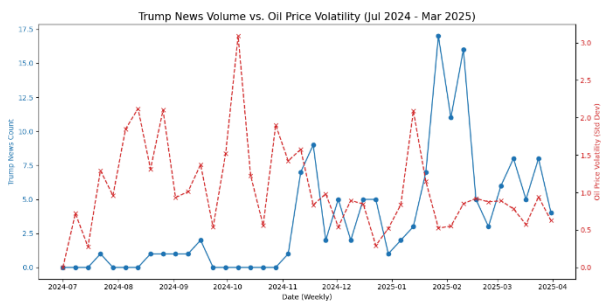


=====  
 [전체 뉴스 데이터 통계적 검증 결과]  
 =====

1. [전체 뉴스 기사 수] vs [유가 변동성]
  - 상관계수 (r): 0.3286
  - P-value : 0.0385
  - => ★ 유의미한 상관관계 발견! ( $p < 0.05$ )
2. [전체 뉴스 감성 점수] vs [유가 수익률]
  - 상관계수 (r): 0.0045
  - P-value : 0.9781
  - => 통계적으로 유의미하지 않음.

As a result, the total number of news articles and oil price volatility had the strongest correlation. Furthermore, the Pearson test results confirmed that the total number of news articles and oil price volatility had a significant correlation.

To visually confirm that there is a correlation between oil price volatility and the total number of oil price news articles, and no correlation between Trump-related news articles, I compared two time series graphs.



The left graph shows a time series graph of oil price volatility and the number of articles related to Trump.

The right graph shows a time series graph of oil price volatility and the total number of articles.

Even visually, we can see that the pattern of increase and decrease in oil price volatility is somewhat similar to the pattern of increase and decrease in the total number of oil price news.

Furthermore, I conducted Granger Causality test to verify whether this correlation was due to the number of articles affecting oil price volatility.

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[1. 그레인저 인과관계 검정: 뉴스 기사 수 -> 유가 변동성]
=====

Granger Causality
number of lags (no zero) 1
ssr based F test:      F=0.7409 , p=0.3951 , df_denom=36, df_num=1
ssr based chi2 test:  chi2=0.8026 , p=0.3703 , df=1
likelihood ratio test: chi2=0.7945 , p=0.3728 , df=1
parameter F test:    F=0.7409 , p=0.3951 , df_denom=36, df_num=1

Granger Causality
number of lags (no zero) 2
ssr based F test:      F=1.2436 , p=0.3015 , df_denom=33, df_num=2
ssr based chi2 test:  chi2=2.8641 , p=0.2388 , df=2
likelihood ratio test: chi2=2.7613 , p=0.2514 , df=2
parameter F test:    F=1.2436 , p=0.3015 , df_denom=33, df_num=2

Granger Causality
number of lags (no zero) 3
ssr based F test:      F=1.2560 , p=0.3071 , df_denom=30, df_num=3
ssr based chi2 test:  chi2=4.6473 , p=0.1995 , df=3
likelihood ratio test: chi2=4.3778 , p=0.2235 , df=3
parameter F test:    F=1.2560 , p=0.3071 , df_denom=30, df_num=3

Granger Causality
number of lags (no zero) 4
ssr based F test:      F=0.8731 , p=0.4929 , df_denom=27, df_num=4
ssr based chi2 test:  chi2=4.6566 , p=0.3244 , df=4
likelihood ratio test: chi2=4.3791 , p=0.3571 , df=4
parameter F test:    F=0.8731 , p=0.4929 , df_denom=27, df_num=4
=====
```

As a result, I confirmed that the number of articles published 1~4 weeks ago does not have a significant impact on oil price volatility.

Based on this result and my intuition, I speculate that the correlation is caused by increased volatility in oil prices, which leads to more articles being written.

## Analysis result

1. Wordcloud and sentiment analysis revealed differences in topic (keywords) and tone (sentiment) between overall oil price news and Trump-related oil price news. Furthermore, TF-IDF weighted sentiment correlation analysis revealed differences in the correlation between specific keywords and sentiment.
2. Time series analysis revealed that the number and sentiment of oilprice news articles changed after Trump's election.
3. Correlation analysis revealed that the number of Trump-related oil news articles was not correlated with oil price volatility, but the total number of news articles was correlated with volatility. Furthermore, Granger causality test revealed that the number of news articles did not cause volatility.
4. Clustering and LDA revealed topics that were correlated to Brent oil price, some topic related to Trump even had some weight.

## Expected Original Contribution

1. We empirically analyzed the relationship between oil prices and not only Trump's personal remarks but also the tone of the news media that processes and reports them.
2. Rather than simply listing time series, we statistically verified the structural change (T-test) centered on the event of 'election'.
3. We indirectly confirmed that oil price volatility affects the number of articles using correlation analysis and Granger causality test.
4. To have relevant topic, we wisely choose the good number of cluster and topic thanks to Elbow and silhouette algorithm, so could see topics that were correlated to oil price.

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