

FOMC SENTIMENT INDEX

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Project Objective

Can the sentiment in the policy statements (press releases) made by the Chair of the Federal Reserve Board (FRB) after each of the he Federal Open Market Committee (FOMC) meetings carry meaningful signal on the financial markets?

This research project aims to build an index that measures the overall sentiments in one of the most important US economic policy institutions, namely the FOMC meeting statements. The objective is that such an index can be used to learn overall sentiment by the policy makers on the economic and market conditions.

- Currently, sentiment analysis on FOMC speeches is a novel approach, with no existing research projects in this domain.
- The availability of speeches from the year 2000 ensures that there are no immediate limitations in terms of data access.
- The proposed sentiment analysis will be beneficial for investigating the relationship between FOMC sentiment and financial market conditions through regressions and other analyses.
- The work will benefit anyone seeking insights into financial market conditions and their correlation with FOMC sentiments.
- Anticipated risks are minimal, with the main challenge being data cleaning, which may require some time and effort.
- The project is feasible within the 11-week timeframe, as sentiment analysis was chosen over topic modeling for quicker completion.
- By the midterm, data cleaning and preprocessing will be completed, and preliminary sentiment values may be available.
- During the final demonstration, all research results will be presented. An FOMC sentiment index is constructed by averaging sentiment values of each sentence in policy statements.

Technical Approach

1

DATA COLLECTION

- The sample of statements for this project covers all the available statements made by the FOMC since 2000.
- The data collected has 202 statements corresponding to the period between January 2000 and June 2023.

2

PREPROCESSING

- Cleaning and preprocessing text data is an important step before performing sentiment analysis.
- Tokenization: This process breaks the text into individual words or tokens.

3

QUALITATIVE & QUANTITATIVE REVIEW

- Read papers that explain and discuss BERT and FinBERT and reviewed a subset of the statements for understanding the context.
- FinBERT is designed to conduct sentiment analysis of Financial text based on pre-trained language models. Results are a numerical score representing the sentiment conveyed in the text.

4

SENTIMENT ANALYSIS & AVERAGING

- FinBERT produces five sentiment values. Three values represent the probabilities that the text is either positive, negative, or neutral.
- FinBERT also calculates a compound score as the positive probability minus the negative probability.
- FinBERT provides a ternary sentiment prediction which is based on the highest of the three probabilities.

5

FOMC INDEX CONSTRUCTION

- I used FinBERT's compound score to assign a numeric value of sentiment for each sentence in a FOMC statement.
- FinBERT provides us with a sentiment score between -1 and +1 for each sentence in our sample of FOMC statements for a given statement date.

6

ANALYSIS & INTERPRETATION OF RESULTS

- Results are discussed in future slides.
- I used Consumer Price Index for All Urban Consumers: All Items in U.S. City Average for comparison of my results

Research & Innovation

- Conducting sentiment analysis specifically on FOMC speeches as there is no existing research project in this domain.
- Creating a historical index of FOMC sentiment based on aggregated sentiment scores
- The FOMC index can serve as a tool for assessing the overall sentiment of FOMC members and provide a comprehensive view of sentiment trends over time. This can allow for potentially revealing patterns related to economic conditions and policy decisions.
- Investigating the relationship between the FOMC-SI and key economic variables, such as GDP growth and stock market performance, through regression analysis .
- Applying sentiment analysis to study the link between FOMC sentiment and financial market conditions.

Architecture

Statements to Sentences

| | Date | Statement | Statement_sentence |
|-----|------------|---|---|
| 0 | 2000-02-02 | The Federal Open Market Committee voted today ... | [The Federal Open Market Committee voted today... |
| 1 | 2000-03-21 | The Federal Open Market Committee voted today ... | [The Federal Open Market Committee voted today... |
| 2 | 2000-05-16 | The Federal Open Market Committee voted today ... | [The Federal Open Market Committee voted today... |
| 3 | 2000-06-28 | The Federal Open Market Committee at its meeti... | [The Federal Open Market Committee at its meet... |
| 4 | 2000-08-22 | The Federal Open Market Committee at its meeti... | [The Federal Open Market Committee at its meet... |
| ... | ... | ... | ... |
| 197 | 2023-02-01 | Recent indicators point to modest growth in sp... | [Recent indicators point to modest growth in s... |
| 198 | 2023-03-22 | Recent indicators point to modest growth in sp... | [Recent indicators point to modest growth in s... |
| 199 | 2023-05-03 | Economic activity expanded at a modest pace in... | [Economic activity expanded at a modest pace i... |
| 200 | 2023-06-14 | Recent indicators suggest that economic activi... | [Recent indicators suggest that economic activ... |
| 201 | 2023-07-26 | Recent indicators suggest that economic activi... | [Recent indicators suggest that economic activ... |

202 rows x 3 columns

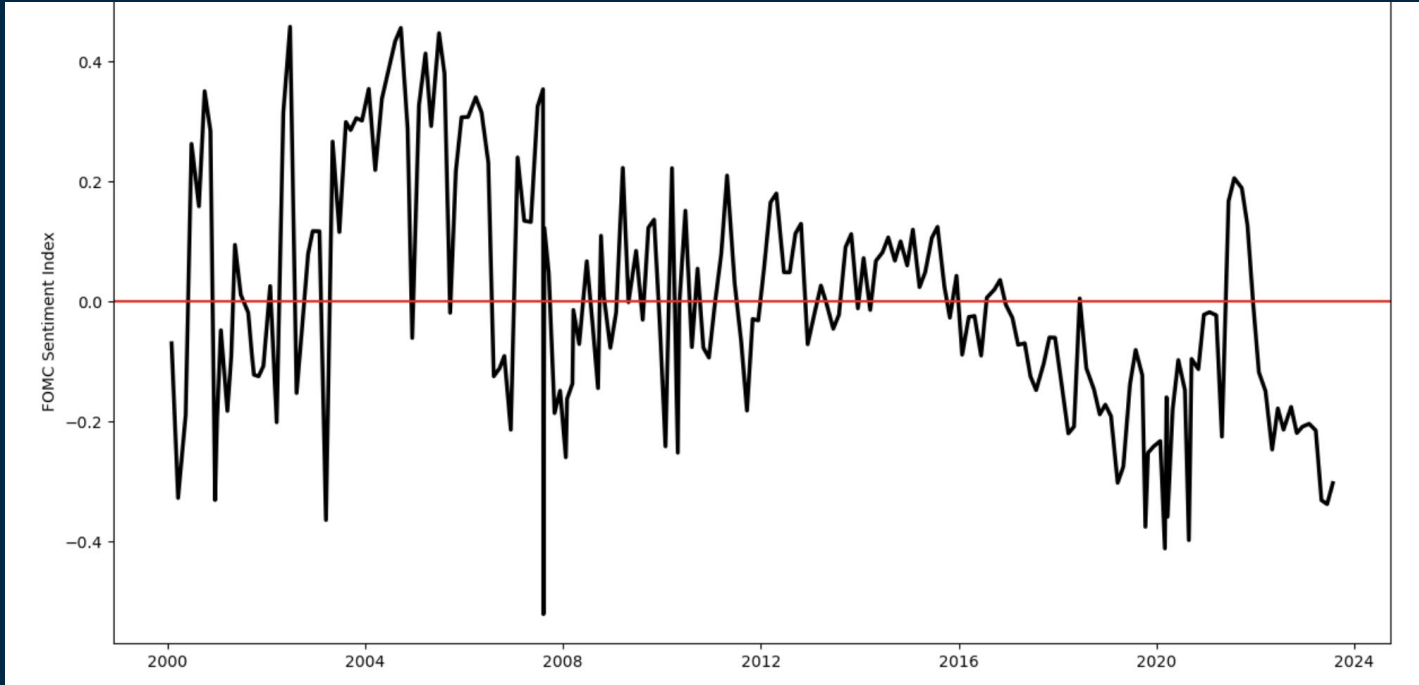
Statements to Sentences with FOMC Sentiment Index

| | Date | Statement | Statement_sentence | FOMC Sentiment Index |
|-----|------------|---|---|----------------------|
| 0 | 2000-02-02 | The Federal Open Market Committee voted today ... | [The Federal Open Market Committee voted today... | -0.070471 |
| 1 | 2000-03-21 | The Federal Open Market Committee voted today ... | [The Federal Open Market Committee voted today... | -0.328228 |
| 2 | 2000-05-16 | The Federal Open Market Committee voted today ... | [The Federal Open Market Committee voted today... | -0.189806 |
| 3 | 2000-06-28 | The Federal Open Market Committee at its meeti... | [The Federal Open Market Committee at its meet... | 0.261819 |
| 4 | 2000-08-22 | The Federal Open Market Committee at its meeti... | [The Federal Open Market Committee at its meet... | 0.157842 |
| ... | ... | ... | ... | ... |
| 197 | 2023-02-01 | Recent indicators point to modest growth in sp... | [Recent indicators point to modest growth in s... | -0.204597 |
| 198 | 2023-03-22 | Recent indicators point to modest growth in sp... | [Recent indicators point to modest growth in s... | -0.215664 |
| 199 | 2023-05-03 | Economic activity expanded at a modest pace in... | [Economic activity expanded at a modest pace i... | -0.331972 |
| 200 | 2023-06-14 | Recent indicators suggest that economic activi... | [Recent indicators suggest that economic activ... | -0.338476 |
| 201 | 2023-07-26 | Recent indicators suggest that economic activi... | [Recent indicators suggest that economic activ... | -0.303405 |

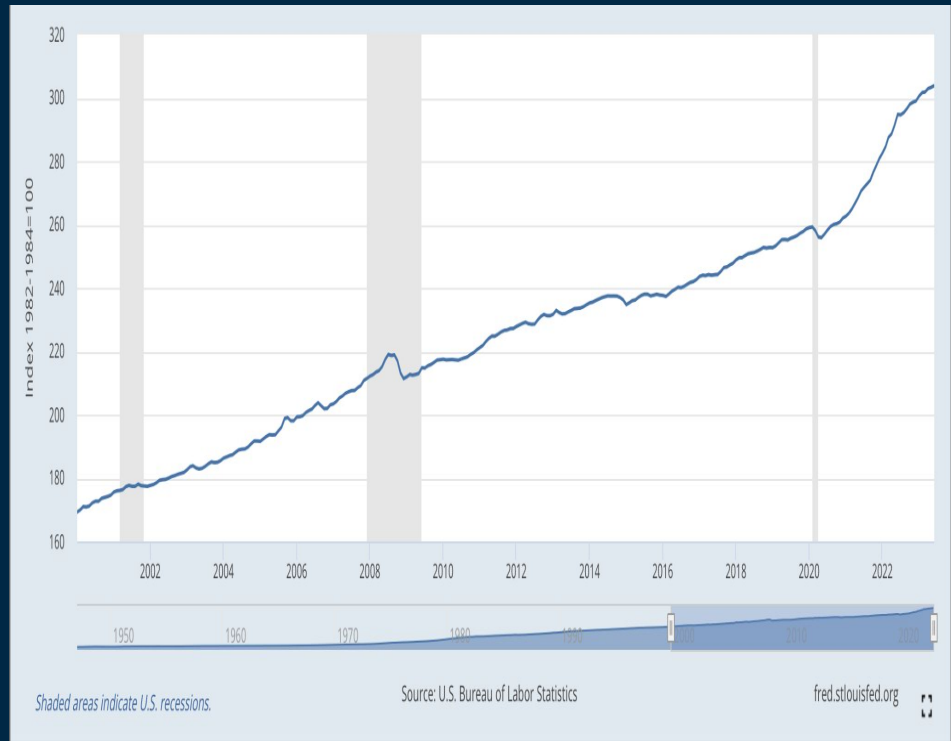
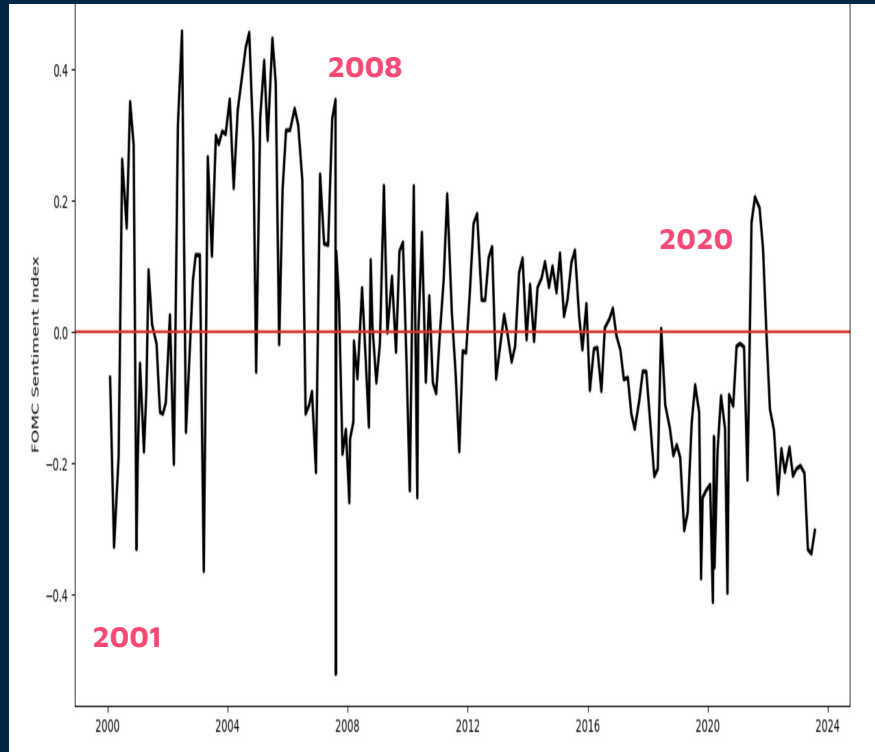
202 rows x 4 columns

mean -0.002320

Results – FOMC Sentiment Index



Results – A Comparison to Consumer Price Index for All Urban Consumers: All Items in U.S. City Average



Results – Description of FOMC Sentiment Index

```
count      202.000000  
mean       -0.002320  
std        0.195040  
min        -0.521709  
25%        -0.139679  
50%        -0.020916  
75%        0.116388  
max        0.456939  
Name: FOMC Sentiment Index, dtype: float64
```


Interpretation and Analysis of Results

Scale Description:

- A sentiment index of -1:
Extremely positive sentiment.
- A sentiment index close to -1:
Very positive sentiment.
- A sentiment index close to 0:
Neutral sentiment.
- A sentiment index close to 1:
Very negative sentiment.
- A sentiment index of 1:
Extremely negative sentiment.

FOMC index is -0.002320, it falls very close to neutral sentiment, indicating a nearly balanced or indifferent sentiment in the FOMC speeches.

The sentiment expressed in the speeches is neither overly positive nor negative, but rather neutral with a slightly positive bias.

Results – Index Over Time Linked to Major Economic Events



Conclusion

I develop a notebook that can be used to implement FinBERT in my data in order to calculate FOMC-SI for each FOMC meeting date. I implemented FinBERT in my data and constructed the FOMC-SI and explored the index over time to link it to some major economic events such as COVID-19 induced recession in 2020 and the Great Financial Crisis during 2007-2008. I used the FOMC-SI to link it to some key economic variables such as economic activity including GDP growth and stock market performance measures via regressions.

Future Work

- Create a sentiment analysis model trained on more relevant financial text.
- Training a domain-specific sentiment analysis model using financial data can potentially lead to more accurate and contextually relevant sentiment predictions for financial documents like FOMC speeches, economic reports, company earnings calls, news articles, and social media posts related to the financial market.
- This will allow for a more accurate and contextually meaningful sentiment analysis tool for financial applications.

The background is a solid dark blue. It is decorated with various geometric elements: small squares in teal, orange, and pink, and thin white vertical lines of varying lengths. These elements are scattered across the frame, creating a modern, minimalist aesthetic. The text 'THANK YOU!' is centered in a bold, white, sans-serif font.

THANK YOU!