Project Proposal

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GWU Summer project class

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# Project Proposal/Title: FOMC Sentiment Index

## 1. What are you going to do?

## 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? In other words, to what extent the sentiment in these statements may signal information on the economic conditions and hence, can be informative on how policies perceived by the market participants? To this end, the project aims to build an FOMC sentiment index that rely on sentiment analysis of the text data of Chair’s statements post FOMC meetings.

## Planned Approach

The sample of statements for this project is planned to cover all the available statements made by the FRB Chairs since 2000. Prior to 2000, Chairs did not issue a press statement. Since there are 8 FOMC meetings in a year, this should give us roughly 180 texts of statements. These statements are publicly available and can easily be downloaded from <https://www.federalreserve.gov/monetarypolicy/fomc_historical_year.htm>.

For each sentence in each statement in the sample of policy statements, I plan to measure sentiment using FinBERT, a language model developed by Araci (2019) from BERT (Devlin et al., 2018). FinBERT is specifically designed to measure sentiment of financial text. I plan to average sentiment values of each sentence in each of the policy statements and hence, construct a historical index of FOMC sentiment index.

## FinBERT

BERT is a state-of-the-art pre-trained machine learning model capable of understanding sentences alongside the context in which they are be- ing applied. BERT is pre-trained on the Toronto BookCorpus (containing 800M words) and Wikipedia articles (containing 2.5B words). BERT converts words into vectors, and reads the text bidirectionally to classify sentences given the context in which words are being used. This unique ability to understand contextual representation, and doing so in both directions of the text allows BERT to significantly outperforms other machine-learning-based and dictionary- based models in tasks like text prediction and sentiment calculation. Furthermore, it can be pre-trained further and then fine-tuned to better understand a desired context, like financial jargon. For this project, I do not plan to pre-train the model as my text data is rather limited and hence, will use FinBERT instead. FinBERT is a refined version of BERT that is designed to understand text in the context of Financial sentiment. FinBERT is pre-trained using a large corpus of financial texts and fine-tuned with a dictionary of financial words and phrases from Malo et al. (2014). One advantage of FinBERT for this project is that it was pre-trained using longer texts, so it splits sentences individually and then calculates sentiment on each one of them. This will allow me to average sentiment measures for each sentence in each policy statement and build an index which I will call FOMC sentiment index. This index can be used for a number of purposes including investigating the link between the FOMC sentiment and the financial market conditions via regressions among other uses.

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

## How is it done today? Current Limitations?

Currently, there are many research projects using sentiment analysis however there is not any sentiment analysis on FOMC speeches. Additionally, the speeches from year 2000 are readily available therefore there will not be any current limitations.

## What is your idea to do something better?

This will be useful as the index can be used for a number of purposes including investigating the link between the FOMC sentiment and the financial market conditions via regressions among other uses.

## Who will benefit from your work? Why?

Anyone who would like to know more about and gain insights from the financial market conditions.

## What risks do you anticipate?

Currently, there are no major risks. Data cleaning may take some time.

## Out of pocket costs? Complete within 11 weeks?

This project is feasible within the given time. I decided to do sentiment analysis instead of topic modeling in order to finish within 11 weeks.

## Midterm results?

By midterm I will be done with data cleaning and data preprocessing. I could also potentially have should have sentiment values.

## Final Demonstration?

By the final demonstration I will be able to display all my results from my research. I plan to average sentiment values of each sentence in each of the policy statements and hence, construct a historical index of FOMC sentiment index.

## References

Araci, D. (2019). Finbert: Financial sentiment analysis with pre-trained language models. CoRR abs/1908.10063.

Devlin, J., M. Chang, K. Lee, and K. Toutanova (2018). BERT: pre-training of deep bidirectional transformers for language understanding. CoRR abs/1810.04805.

Malo, P., A. Sinha, P. Takala, P. Korhonen, and J. Wallenius (2014, 04). Good debt or bad debt: Detecting semantic orientations in economic texts. Journal of the American Society for Information Science and Technology.