Sentiment Analysis of FOMC Meeting Transcripts: Pre and Post Mexican Pesos Crisis

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Abstract

We use SentimentArc which comprises of 23 NLP sentiment analysis models, to analyze the sentiments in Federal Open Market Committee (FOMC) meeting transcript pre and post Mexican pesos crisis. While the effects of pesos crisis and other global macroeconomic fluctuations are detected by the models, FOMC seems more concerned regarding the domestic policy and events. Sentiment analysis proves to be an important tool to quickly analyze large text files.

Introduction

On December 20, 1994, the Central Bank of Mexico devalued the peso between 13 and 15 percent, resulting in an excessive flight of capital (~USD 4.6 Billion) and a severe recession. Several Latin American countries also saw their currency depreciate and depletion of foreign reserves. The United States and IMF had to intervene with a relief package to fight the crisis. FOMC makes and communicates monetary policy-related decisions and oversees the overall economy. We ran the sentiment analysis on the FOMC meeting transcript from 1994/07/06 to 1995/12/19 (six months prior to a year after the peso devaluation) to observe whether there were fluctuations in the sentiment in this period. We focus particularly on two models: Loughran McDonald and distilbertfinnews.

Background

- Sentiments expressed by policymakers have been used to estimate the central bank's objective function.[a]
- Treasury markets are more receptive to policy-related themes than the sentiment of the transcripts.[b]
- Dirichlet model has been applied to FOMC statements to predict the federal fund target rate with 93% accuracy.[c]

Methodology

Data
- FOMC Meeting Transcript (available online).

Models
- R Lexicon models using SyuzhetR (4 models).
- Heuristic models using SentimentR (8 models).
- Transformers (11 models).

Implementation
- We used SentimentArcs, a methodology and software framework for analyzing large text documents using Diachronic Sentiment Analysis.
- Transcripts are broken into semantic units (sentence) and ensemble of 23 NLP sentiment analysis models are applied.

Results

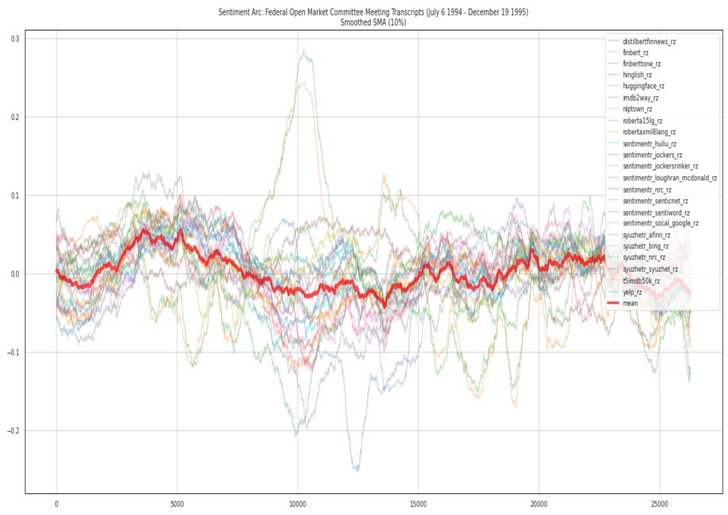

Figure 1: SentimentArcs Ensembles over 23 Sentiment Analysis Models

- The red line in Figure 1 shows the mean sentiment score based on 23 models.
- There is not a lot of variation in the mean sentiment score.
- It appears that most of the models are coherent and follow a same general trend. However, there are few exceptions (large spikes in the figure).
- Loughran McDonald model is used the most for analyzing the FOMC transcript. Here, we compare, the results from Loughran McDonald model and distilbertfinnews model.

- The window from 10000 to 15000 comprises the midpoint our transcripts. In this region, model (b) detects 3 valleys with sentiment score close to -0.01. Model (a) also captures declining sentiment for this region.
- Two models show noticeable difference in the window 15000-20000. While model (a) finds consistent negative sentiment, model (b) estimates small positive sentiment in that region. Model (b) also finds uptick in the sentiment towards the end.
- The most interesting observation is that model (a) finds negative sentiment for the whole period whereas model (b) finds small positive sentiment mostly.
- Table 1 shows that the Mexican pesos crisis was mentioned in the meeting. Most of the discussion, however, seems to be focused on domestic economy rather than the crisis.

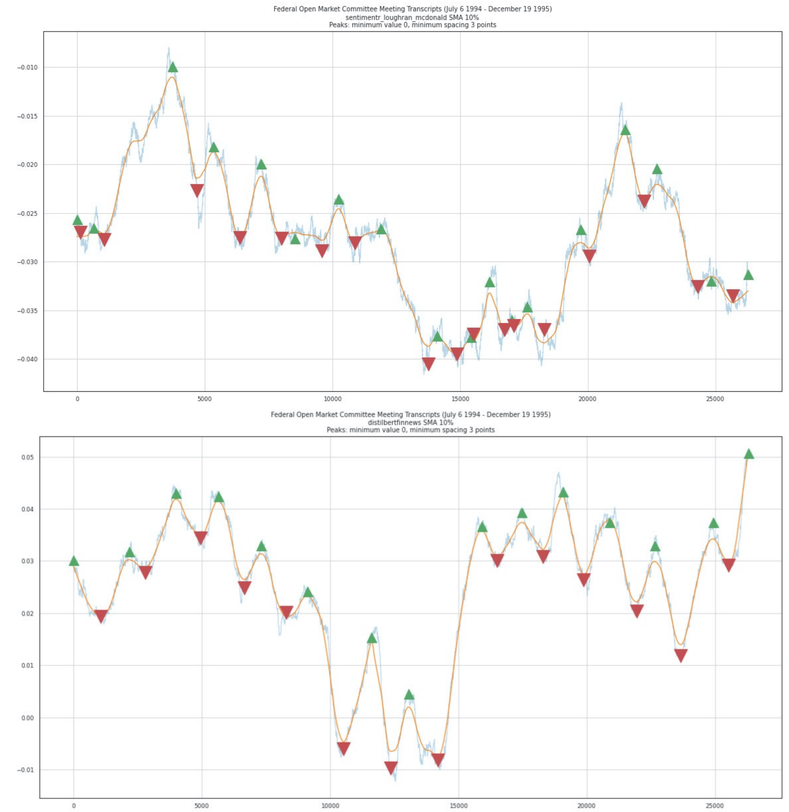

Figure 2: Efficient Exploratory Data Analysis (EDA) and Peak Detection (Loughron-McDonald (a) - top and distilbertfinnews (b)- bottom.

Model	10000-15000	20000-25000
(a)	Russia seems to be in chaos; the Middle East seems bankrupt; Latin America will speak for itself. All of these problems suggest that we have a lot of downside risks to the economy.	I suspect that there might be a lot more pressure building in the upcoming year for a stronger economy.
(b)	I think the risks in the net export sector are all on the downside.	I think politicians will not be able to resist the political backlash from the inability of the public to get services.

Table 1: Context around valleys in two different windows.

Discussion

- We analyzed the context and sentences around the valleys. We found that the sentiment scores from both models were influenced by the same context and scenarios. We could not locate any instances that caused a peak in one model whereas valley in the other.
- Even after reading the paragraphs around the peaks and valleys, we could not figure out what caused the discrepancy between two models in the window 15000-20000.
- Except for the two instances, the models did not detect that the Mexican pesos crisis caused the peaks and valleys. Those two instances are reported in Table 1.
- The consistent negative sentiment around the 10000-15000 window could have been caused by the ongoing crisis in Latin America and other global macroeconomic fluctuations.
- Model (a) required less computational power than model (b).

Further Exploration

- SentimentArc can be used to analyze the sentiments in IMF meeting transcript and press releases, and other central banks around the world.
- Sentiment scores can be used as an explanatory variables in predicting growth rate, interest rates etc.

Reference

a) Shapiro, Adam Hale, and Daniel Wilson. "Taking the fed at its word: A new approach to estimating central bank objectives using text analysis." Federal Reserve Bank of San Francisco, 2021.
b) Stegmann, Jonathan, "Federal Open Market Committee communication: at text mining analysis," 2019.
c) Rohlfs, Christopher, Sunandan Chakraborty, and Lakshminarayanan Subramanian. "The effects of the content of fomc communications on us treasury rates." *Proceedings of the 2016 Conference on Empirical Methods in Natural Language Processing*. 2016.