

Summary on assignment 2

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In this project, our team set out to analyze the sentiment of the FOMC meeting minutes, press conferences and speech transcripts to assess whether the statements leaned more hawkish or dovish. Our main goal was to explore any potential connections between these sentiments and subsequent market behavior. To accomplish this, we followed an approach that began with parsing, scraping and other types of gathering data. We collected FOMC statements directly from the Federal Reserve's website and financial market information from Yahoo Finance. The FOMC statements were processed to extract key details, such as the date and the text content, while the market data was used to calculate average percentage changes over the following three days. We employed two distinct methods for sentiment analysis: cosine similarity analysis and the word lists' IDF approach focused on determining the significance of each term within the broader context of the text.

After obtaining the sentiment scores, we conducted regression analyses for both methods to investigate the relationships between these scores and four target market indicators: the 1-Year Yield Percentage Change (3-day average), the dollar index Percentage Change (3-day average), the 10-Year to 2-Year Spread Percentage Change (3-day average), and the Growth-Value Spread Percentage Change (3-day average).

The results from the regression analysis using cosine similarity (Table-1) showed very low rsquared values for all target variables, which suggested that the hawkish and dovish sentiments derived from the FOMC statements did not effectively explain fluctuations in the market. The rsquared values were nearly zero, indicating a weak connection between the sentiment scores (independent variables) and the market indicators (dependent variables). Regarding t-values, The hawkish factor had t-values ranging from approximately -1.46 for DXY percentage change to 0.96 for the growth-value spread. This indicates a lack of statistically significant relationships, as none of the t-values for hawkish sentiment surpass the threshold of significance. The same holds true for the dovish factor, where the t-values range from approximately -1.51 to 1.51., which shows that sentiment similarity does not have a meaningful or statistically significant impact on any of the financial variables tested. In particular, the highest t-value, 1.51, corresponds to the dovish factor's impact on the DXY percentage change. Although this t-value is higher than others, it still does not reach a level indicative of statistical significance This shows that the dovish sentiment's influence is weak in relation to DXY changes.

Table-1

	1Y Yield Change avg	DXY Change avg	10Y-2Y Spread Change avg	Growth-Value Spread Change avg
rsquared	0.001603	0.001706	0.002242	0.000834
hawkish_factor_tvalue	0.748604	-1.459204	0.805714	0.963276
dovish_factor_tvalue	-1.065213	0.082300	1.367815	-0.254094

Similarly, when we applied the TF-IDF method, we found slightly improved t-values for both hawkish and dovish sentiments. Here, the highest t-value among the hawkish factors was about 1.37 for the growth-value spread, still below the threshold of significance. The highest absolute t-value observed for the dovish sentiment was around -1.46 for DXY percentage change, again falling short of statistical significance. The generally low t-values for all variables confirm that neither hawkish nor dovish sentiments have a robust or reliable impact on short-term movements in these financial indicators. Nevertheless, the overall results remained consistent with those from the cosine similarity analysis, showing that significant correlations were still lacking. The rsquared values were marginally higher than those from the cosine similarity method but still indicated a weak relationship.

Table-2

	1Y Yield Change avg	DXY Change avg	10Y-2Y Spread Change avg	Growth-Value Spread Change avg
rsquared	0.001318	0.003350	0.003635	0.002897
tfidf_neg_tvalue	0.748497	-1.460407	0.806277	0.964272
tfidf_pos_tvalue	0.943779	1.507188	0.901079	-1.506483

In conclusion, our examination of the FOMC meeting minutes using both sentiment analysis techniques demonstrated that the extracted hawkish and dovish sentiments did not have a strong correlation with changes in key financial metrics. The consistently low rsquared values suggest that other factors might be at play when it comes to influencing market movements.

Given these results, it seems that merely extracting sentiment from FOMC statements might not serve as a reliable predictor of market trends. Future research could benefit from incorporating additional data sources or exploring different sentiment analysis techniques to improve predictive accuracy. Additionally, investigating the potential lag effects of sentiments on market performance could provide deeper insights into this complex relationship. A potential way to improve the accuracy of our results could be by using custom NLP models specifically trained on FOMC statements. Unfortunately, due to time constraints, we were unable to implement this approach.