

NLP Analysis of Jackson Hole Federal Reserve Speeches

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Background and Methods

The Federal Reserve plays a critical role in U.S. monetary policy, and speeches by Fed chairs provide insight into economic priorities across different periods. This study analyzes Federal Reserve chair speeches from the annual Jackson Hole Convention from 2016 to 2025. These documents span the tenures of Janet Yellen and Jerome Powell, to examine shifts in economic focus (such as the feds inflation and employment dual mandate) and sentiment on conditions over time. Nine speeches were collected from every year containing periods of post-financial crisis recovery, pre-pandemic stability, COVID-19 disruption, and recent disinflationary pressures. Each speech transcript was processed using the Textastic NLP framework, a custom text analysis tool that cleaned the text, removed stop words, and calculated word frequencies and sentiment polarity scores using TextBlob. The framework generated visualizations including Sankey diagrams mapping speeches to key terms, treemap subplots showing top words per speech, comparative bar charts and trend lines of economic terminology, and sentiment analysis bars revealing the overall tone of each address. These Visualizations help paint of picture of how economic language and conversation has shifted overtime with changing landscapes.

Findings:

The Sankey diagram reveals distinct shifts in Fed communication priorities over time. Inflation has dominated the conversation across most speeches, with particularly heavy flows from Powell's 2022-2025 speeches, reflecting intense focus on price stability during post-Covid inflationary pressures. Labor has become increasingly pressing in recent years, with notable emphasis in Powell's later tenure, suggesting heightened attention to employment and the dual mandate. Financial concerns, prominent in Yellen's 2016-2017 speeches, are rarely mentioned now as post-2009 crisis concerns have largely passed. The word frequency tree-maps confirm this shift, showing Yellen's focus on "financial," "banks," "capital," and "markets" transitioning to Powell's emphasis on dual mandate "inflation," "price," and "labor." The trend line analysis quantifies these patterns, with inflation mentions spiking from 13 in 2016 to 53-57 in recent years, while financial terminology plummeted from 65 in 2017 to near zero by 2025. Notably, dual mandate terms show positive correlation, with inflation and labor mentions increasing together in recent years. Sentiment analysis reveals Powell 2019 had the most positive tone at 0.144 during pre-pandemic stability, while Powell 2023 showed the lowest at 0.070 during aggressive tightening, demonstrating how communication tone adapts to economic conditions.

Text-to-Word Sankey Diagram (Chronological Order)

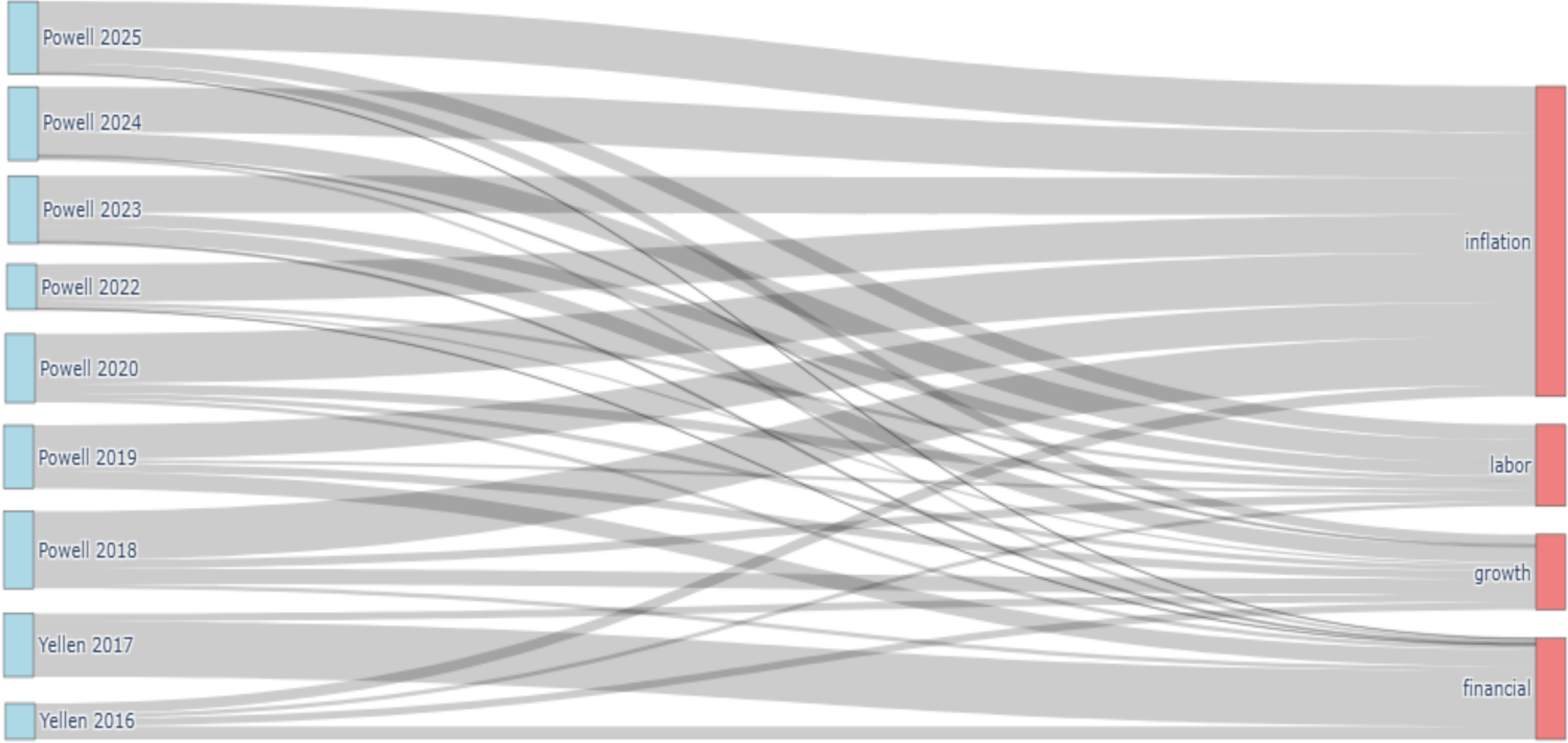


Figure 1 Text-to-Word Sankey Diagram: Mapping Fed Speeches to key economic terms
Using four key economic terms with a focus on the labor and inflation dual mandate, this diagram shows the emphasis each speech places on different economic priorities. The width of each flow represents the frequency each term appears in speeches. Speeches that map heavily to "inflation" reflect periods of price stability concerns, while those emphasizing "labor" indicate focus on employment mandates. Speeches mapping to "growth" suggest attention to economic expansion, and those connecting to "financial" reflect concerns about financial markets and stability. The chronological ordering reveals how Fed communication priorities have shifted overtime.

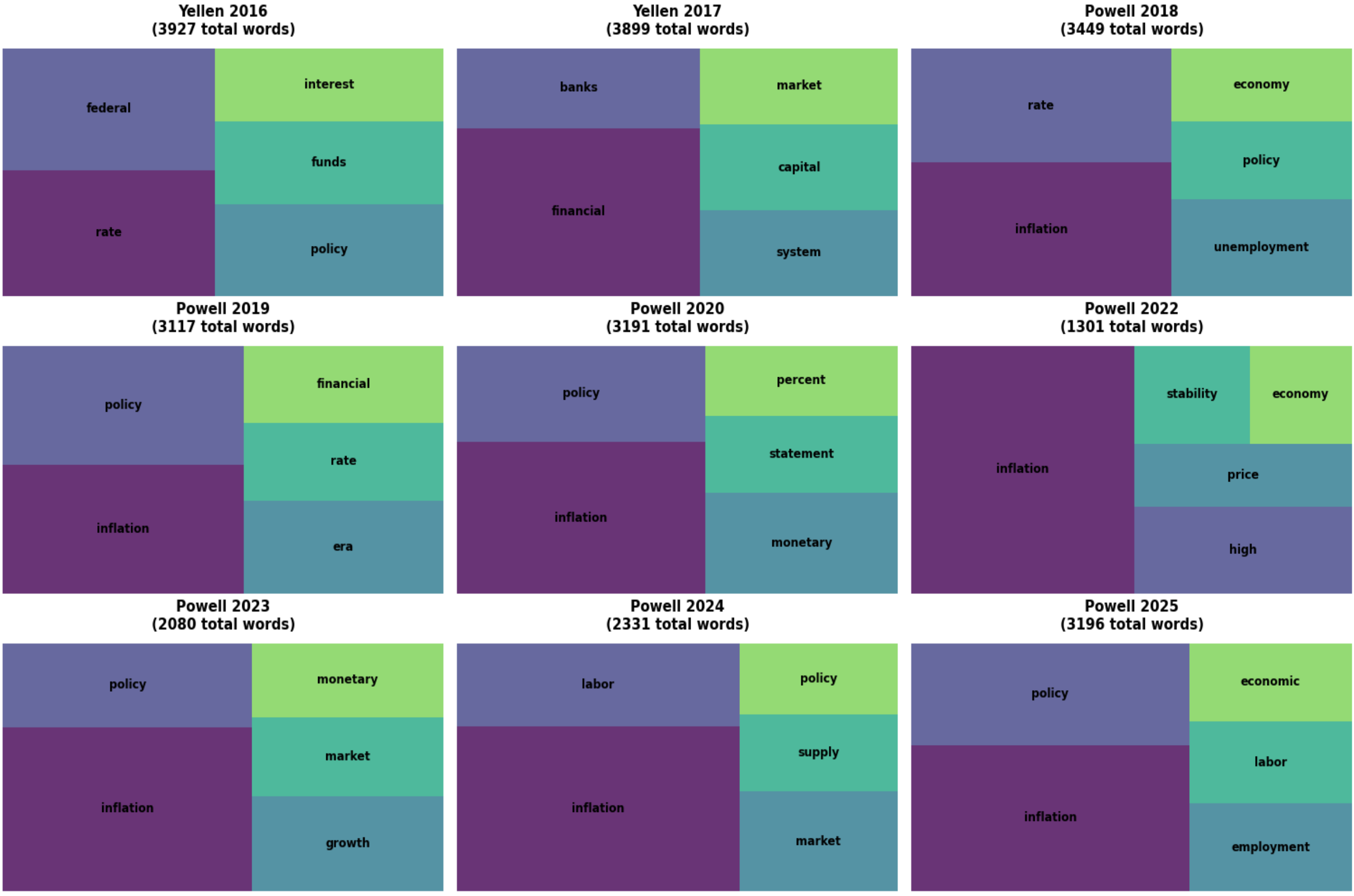


Figure 2 Word Frequency Treemaps: Top Five Terms in Federal Reserve Speeches:
Using Treemap box visualizations, this figure displays the top five most frequent words in each Federal Reserve chair speech from 2016 to 2025, with stop words removed. The size of each box represents the relative frequency of that word within the respective speech, while the total word count is displayed in the subtitle. Speeches dominated by terms like "federal," "policy," and "rate" reflect typical monetary policy discussions, while those featuring "inflation," "labor," and "employment" highlight dual mandate priorities. Speeches emphasizing "financial," "banks," and "capital" indicate focus on financial system stability and market conditions especially years closer to 2009.

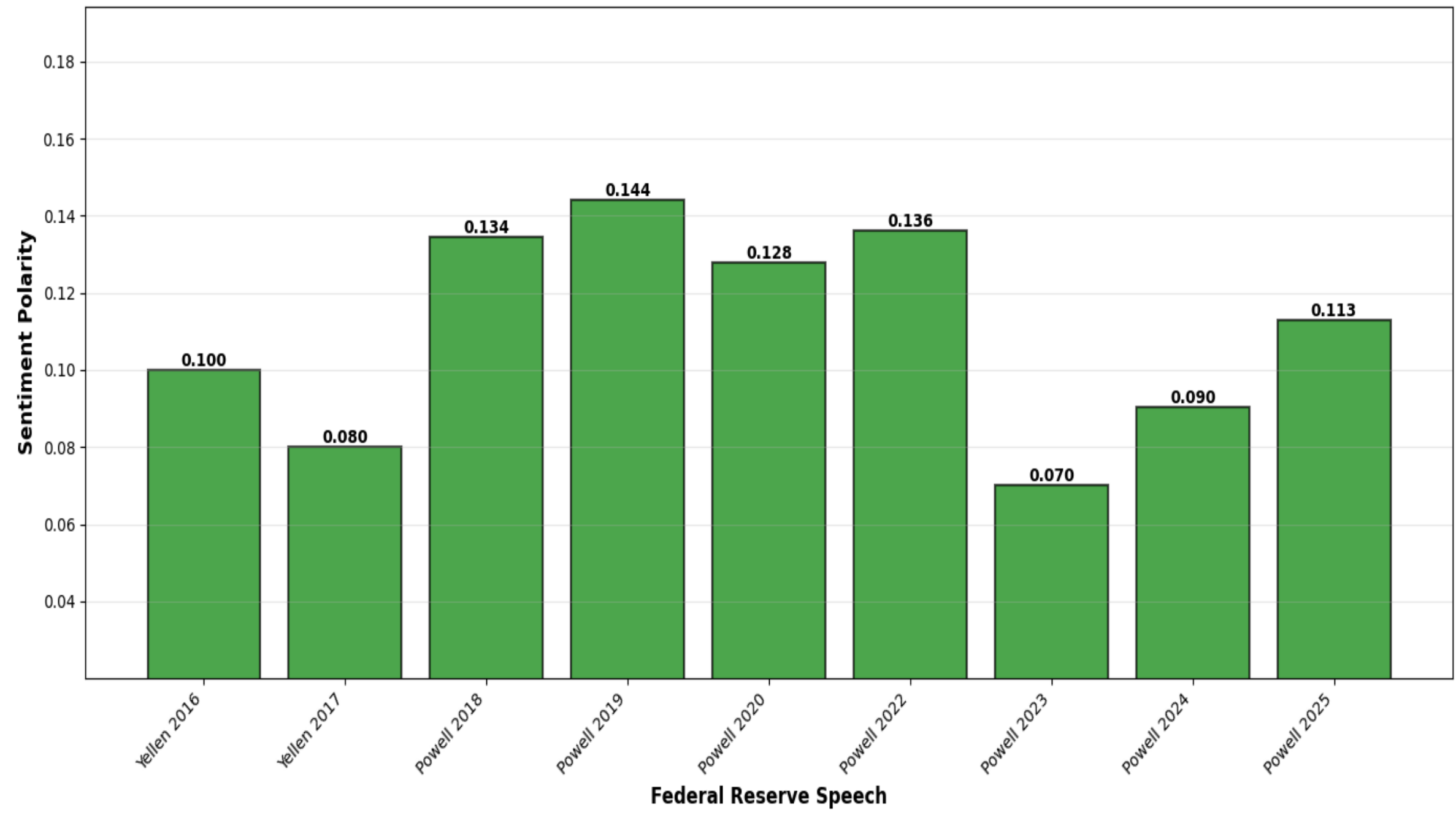
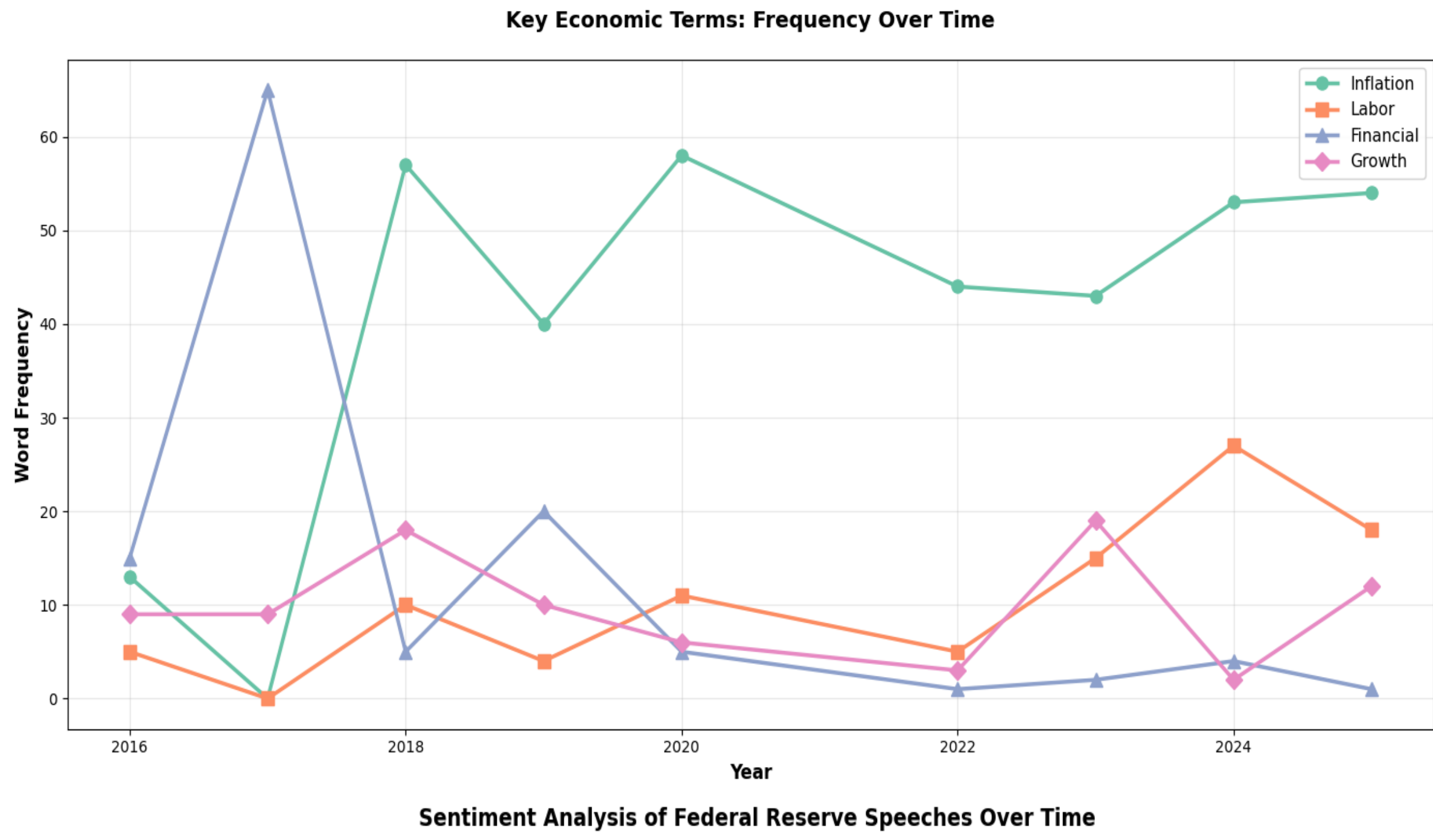


Figure 3 Trend Analysis: Key Economic Terms Frequency Over Time
Tracking four key economic mandate terms across Federal Reserve chair speeches from 2016 to 2025, this line graph shows how Fed communication priorities have evolved in response to changing economic conditions. The diverging trends illustrate the Fed's shifting focus from financial stability concerns to inflation and unemployment management. This line graph collects the figure twos finding into a single timeline that is more intuitive to see comparatively how different speeches language differ from each other.

Figure 4 Sentiment Analysis: Communication Tone Across Federal Reserve Speeches
Using Text Blob sentiment analysis which counts the positive, neutral and negative words for rating, this bar chart displays the sentiment polarity of each Federal Reserve chair speech from 2016 to 2025, where values range from -1 (negative) to +1 (positive). All speeches show positive sentiment, indicating optimistic or confident communication tone across both chair tenures. The fluctuating sentiment scores suggest that Fed communication tone may adapt to prevailing economic conditions to guide markets with forward guidance.

Conclusions Next Steps:

This analysis demonstrates how Federal Reserve communication has evolved from 2016 to 2025, shifting from financial stability concerns to dominant focus on inflation and dual mandate priorities. The Textastic framework successfully captured these transitions through word frequency, sentiment, and visualizations showing trends overtime. Future work could implement deeper sentiment analysis rather than word frequency by examining tone surrounding individual economic terms like "inflation" and "labor" within their sentences. Additionally, correlating these sentiment scores with historical Federal Funds Rate data could uncover whether the Fed's communication tone regarding key economic indicators corresponds with actual monetary policy decisions.