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Federal Reserve Speeches and Sovereign Credit Risk

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Abstract

We examine the spillover effect of Federal Reserve Board of Governors' speeches on sovereign credit risk and find that the tone of speeches negatively impacts sovereign credit spreads. Speeches that are forward-looking have a stronger impact. Cross-sectionally, the impact is stronger for countries with high external debt and those with high exchange rate stability. We further decompose the sovereign credit spread to examine the impact of speeches on the credit risk premium and find a significant positive impact on it. Our results indicate that while Fed speeches contain important information about economic conditions in the US, they can have a major influence on the perceived creditworthiness of other countries as well.

Keywords: Federal Reserve Speeches; Speech Tone; Sovereign Credit Risk; Credit Default Swaps

JEL classification: G12, G14, G18, M41

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1 Introduction

Sovereign credit default swap (CDS) spreads have long served as an essential financial indicator for assessing the creditworthiness and risk associated with sovereign debt. These spreads reflect the market’s perception of a sovereign government’s credit risk, with higher spreads indicating greater perceived default risk and increased borrowing costs. As a result, understanding the factors that influence CDS spreads is crucial for policymakers, investors, and researchers alike.¹ The role of central banks in shaping financial market outcomes is of major importance and the Federal Reserve, in particular, holds a prominent position due to its significant influence on not just domestic, but also international financial markets [Albagli et al., 2019]. These range from cross-border capital flows [Bruno and Shin, 2015] to bond yields [Gilchrist et al., 2014] to financial market outcomes in general [Fischer, 2015, Aizenman et al., 2016, Ehrmann and Talmi, 2020, Swanson, 2021]. In other words, there is substantial evidence that the Federal Reserve’s monetary policy decisions, interest rate changes, and public statements have far-reaching implications for various asset classes, including sovereign debt.

Recognizing the critical role of the US Federal Reserve in shaping expectations and yields in global financial markets, we explore how the tone and content of Federal Reserve Board of Governors’ speeches influence the pricing of sovereign risk. We are able capture the tone of Fed speeches better by incorporating two innovations in financial text analysis: i) usage of the

¹Carr and Wu [2007], Hilscher and Nosbusch [2010], Longstaff et al. [2011], Dieckmann and Plank [2012], Benzoni et al. [2015], Augustin [2018], Augustin et al. [2022] are some prominent studies which investigate sovereign credit spreads and their determinants.

sentence as a unit of analysis, which helps us identify and assign polarity to ngrams; and ii) by using ‘valence shifters’, which are adjectives, adverbs and adversative conjunctions which modify and qualify the meaning of sentences but have been relatively ignored in literature. Further, we augment the extant financial dictionaries [Loughran and McDonald, 2011] by including terms and phrases from the dictionaries in Apel and Grimaldi [2014] and Apergis and Pragidis [2019] which characterize text based on central bank communication.

To empirically investigate this relationship, we employ a comprehensive dataset encompassing CDS spread movements for a diverse set of 10 emerging and 10 advanced sovereign issuers.² We offer comprehensive evidence that positive speeches from the Federal Reserve Board of Governors correspond to a significant reduction in the 5-year sovereign CDS spreads indicating improved market perception of creditworthiness. Conversely, negative speeches are associated with an amplification of the 5-year CDS spreads, reflecting heightened investor concerns about potential defaults. Our findings contribute to the literature on central bank communication and its impact on international financial markets, providing valuable insights for policymakers, market participants, and investors seeking to understand the cross-border transmission of central bank communication effects. We also find that this impact is especially strong for speeches that are more forward-looking, consistent with the importance of forward-looking communication in anchoring future expectations of economic agents [Ehrmann and Fratzscher, 2007]. Further, we find that cross-sectionally, the impact of Fed speeches is more

²The full list of countries used in this study are included in Table A1.

pronounced for countries with a higher external debt-to-GDP ratio and countries with high levels of exchange rate stability. These results indicate that countries which are reliant on overseas factors—external debt and close procyclical policy alignment with the US respectively—are especially sensitive to the information and content embedded in Fed speeches. Finally, we also show that our results are not driven by the changes in the US term premium, and that the impact of Fed speeches is channeled via their influence on sovereign credit risk premia. We also demonstrate that the technique of tone quantification used in this study outperforms the popular LM dictionary-based “bag-of-words” approach [Loughran and McDonald, 2011] as well as FinBERT—a leading machine learning-based tone quantification technique [Huang et al., 2023]. Both these techniques show no significant relation between Fed speeches and CDS spreads. Further, our study’s results are robust to the inclusion of confounding effects of FOMC communication, and those related to macroeconomic announcement dates of the sample economies. While our benchmark results investigate the spreads of the 5-year sovereign CDS, we show that the inclusion of 1-year, 3-year, 7-year and 10-year sovereign CDS spreads are similarly impacted by the tone of Fed speeches.

Albagli et al. [2019] is the closest study to our paper and it examines the impact of US monetary policy shocks on sovereign bond yields. However, we differ from its analysis in two ways: i) we examine the impact of the tone of the speeches delivered by the Federal Reserve Board of Governors and not monetary policy shocks per se, and ii) we examine the impact of Fed speeches on sovereign CDS spreads rather than bond yields. The reason for investigat-

ing the CDS spread is that it is a more direct proxy for sovereign default risk and is more liquid compared to bonds, especially those of emerging countries.

The findings of this study hold significant implications for policymakers, market participants and researchers. Understanding how the tone of Federal Reserve speeches can directly influence sovereign credit risk spreads may provide valuable insights into the effectiveness of central bank communication in managing market expectations and enhancing financial stability. Moreover, this research contributes to the broader literature on the role of central banks in shaping financial markets outcomes and the interplay between monetary policy and sovereign credit risk. This is especially pertinent as we show that the tone of Fed speeches impacts countries heterogeneously: CDS spreads of nations with more external debt, and those with high exchange rate stability are more strongly impacted more than their counterparts. Similarly, the topic and content of Fed speeches also carries differential implications for sovereign CDS spreads: forward-looking speeches have a much higher impact than other speeches.

The paper is organized as follows: Sections 2 and 3 specify the data sources and methodology. Section 4 discusses the results of the impact of speech tone on CDS spread followed by Section 5 which presents the robustness results. Finally, Section 6 offers concluding remarks.

2 Methodology

2.1 Quantifying the tone of Fed’s BoG speeches

We adapt the tone quantification methodology as introduced in the sequence of papers [Loughran and McDonald \[2011\]](#), [Apel and Blix Grimaldi \[2012\]](#), [Apergis and Pragidis \[2019\]](#) and further extended in [Anand et al. \[2022\]](#) which applies a sentence-based, multi-clausal, valence shifter-based approach to the speeches of the European Central Bank and the national central banks of major European countries.³

Consistent with the approach outlined in the above studies, we decompose Fed BoG speeches into their constituent sentences. The tone of the speech is the average tone across sentences. We look for two categories of words in each sentence: valence shifters (adjectives, adverbs, adversative conjunctions); and polar words (positive/negative) words/phrases. Polar words are taken from the LM dictionary [[Loughran and McDonald, 2011](#)] and the phrases are extracted according to [Apel and Blix Grimaldi \[2012\]](#) and [Apergis and Pragidis \[2019\]](#). Such phrases/verb-noun combinations are identified as ngram units ($2 \leq n \leq 5$) within the sentence and are categorized as either positive or negative. For example, phrases such as “larger growth”, or “higher employment” are treated as positive and others such as “increase in unemployment”, “fall in output” and “decrease in growth” are classified as negative.

Further, we augment the dictionary by assigning weights to ‘valence

³We note that this approach is distinct from the other well-known sentiment quantification techniques such as [Da et al. \[2015\]](#) and [Bali et al. \[2018\]](#).

shifters’: adjectives, adverbs and (adversative) conjunctions which modify the meaning of sentences and impart polarity to words and phrases ignored in the LM dictionary [Schulder et al., 2018]. These valence shifters come in four types: amplifiers (e.g., “absolutely”, “acutely”, “very”), de-amplifiers (e.g., “barely”, “faintly”, “few”), negators (e.g., “not”, “cannot”) and adversative conjunction (e.g., “despite”, “but”). The amplifiers, de-amplifiers, and adversative conjunction are given a weight of 0.8: positive for an amplifier, negative for a de-amplifier, negative for the words before adversative conjunction; and positive for the words after adversative conjunction. The negators are given a value of -1 . Weights are consistent with prior literature but we additionally verify our results by varying the weight of valence shifters from 0.5 to 0.9 and confirm that our findings continue to hold.⁴

In comparison to the sentence-level ngram approach and augmented LM dictionary, the popular bag-of-words (unigram) with LM dictionary approach can lead to incorrect quantification of tone. As an illustration, consider the following hypothetical sentences below:

1. We expect to witness an increase in employment.
2. We expect to witness a *slight* increase in employment.
3. We expect to witness a *major* increase in employment.
4. We expect to witness *not much* increase in employment.
5. We expect to witness a *large* increase in employment *although* demand has *fallen*.

⁴Table A2 in the appendix contains the full list of valence shifters for Fed speeches in our sample.

Clearly, all sentences enumerated above are quite different in their connotation. For all hypothetical example sentences presented above, the unigram LM dictionary methodology assigns a score of 0. This is because valence shifters ('slight', 'major', 'not much', 'large') are ignored, and words like 'increase' are assigned zero weight since its impact on connotation is ambiguous: 'profit increase' has a positive connotation, while 'unemployment increase' has a negative connotation. However, our approach is correctly able to distinguish between the sentences owing to weights granted to valence shifters, and due to the usage of the 3-gram 'demand has fallen' in the last sentence.

For a more realistic example from one of the sample speeches, we reproduce the following extract, from the speech of Mark Olson delivered on May 25, 2006.

“The reports on first-quarter earnings have been quite positive, and available measures of credit quality, such as credit ratings and loan defaults, show few signs of stress.”

Based on our methodology, the sentence is divided into clusters with respect to polar words/phrases such as:

1. *The reports on first-quarter earnings have been **quite positive**,*
2. *and available measures of credit quality, such as credit ratings and loan **defaults**, show **few** signs of **stress**.*

Thus, the above sentence is divided into two clusters with **quite** being a valence shifter to the polar word 'positive' in the first cluster; and **few**

being a valence shifter (de-amplifier) to the polar word ‘stress’ in the second cluster.

The tone is calculated is as follows:

$$\text{Cluster 1: } (+0.8)[=\text{quite}] + (+1)[=\text{positive}] = +1.8$$

$$\text{Cluster 2: } (-1)[=\text{default}] + (+0.8)[=\text{few}] + (-1)[=\text{stress}] = -1.2$$

$$\text{Sentence: } \frac{(+1.8)[=\text{first cluster}] + (-1.2)[=\text{second cluster}]}{17} = +0.035$$

3 Data

The data for speeches of the Board of Governors of the US Federal Reserve are downloaded from the US Federal Reserve website, spanning the duration from January 2006 to December 2020.⁵ In our sample, there are a total of 757 speeches delivered by the Board of Governors (~ 4 speeches per month) out of which, about 570 have a negative tone, and only 187 display a positive tone.

We download data for the 5 year sovereign CDS spreads for all 20 countries from the Markit database.⁶ The choice of the set of 20 countries used in this study is dictated primarily by the availability of data for all variables.

The control variables are divided into two categories: speech level controls and macroeconomic controls. The macroeconomic controls are further divided into two categories: for the US and for other countries. Macroeconomic controls for the US include the US volatility index (VIX), the US 10

⁵Link: <https://www.federalreserve.gov/newsevents/speeches.htm>

⁶5 year CDS spreads are the more liquid and highly traded. Results are robust for 1, 3, 7, and 10 year spreads as well.

year bond yield, and the US term spread (the spread between 10 year and 3 month bond yield).⁷ These variables have been shown to have a global impact in an array of studies [Gilchrist et al., 2014, Bruno and Shin, 2015, Albagli et al., 2019]. In addition, we control for macroeconomic variables for each country in the sample: the debt-to-GDP ratio (quarterly), inflation rate (monthly), reserves (monthly), and the market capitalization of the benchmark stock index (daily) of each country. These variables have been shown to impact CDS spreads as per Hilscher and Nosbusch [2010]. All variables and data sources are defined in detail in Table 1.

Table 2 presents the summary statistics for the Fed BoG speech tone and other relevant text-related characteristics, as well as the sovereign CDS term spread (in Panel B) and sovereign CDS risk premia (in Panel C). We find that the mean and median speech tone are negative, consistent with the fact that a vast majority of speeches are negative in tone (570 out of 865). About one-third of the words used in Fed’s speeches are ‘complex words’ (words more than 2 syllabi), and the average speech sentence contains about 30 words. The mean CDS spread across the range of countries in our sample is 91.3 basis points, while the mean credit risk premium calculated as the (log) difference between risk neutral and physical expectations of future CDS spreads in accordance with Friewald et al. [2014] (elaborated in section 4.3) is 0.88.

Insert table 2 around here.

Table 3 presents the correlation between all speech-related and macroeco-

⁷All variables at the daily frequency.

conomic control variables used in this study. This is done primarily to allay concerns regarding multicollinearity among the explanatory variables. The two speech-related variables: ‘%CW’ (percentage of complex words) and ‘AWPS’ (average words per sentence) show very little correlation with macro-controls. Among macroeconomic controls also, the correlations are quite modest. The highest correlation is observed among the variables ‘Debt ratio’ and ‘Market cap’ at 0.28, while that for ‘Reserves’ and ‘Market cap’ is -0.26 . All other variables have even lower levels of correlations with each other.

Insert table 3 around here.

Figure 1 presents the time series of the tone of Fed’s BoGs’ speeches. For a large majority of the sample, the Fed’s Board of Governors’ speeches display a negative tone. In fact, from the period 2007:07 (the beginning of the Great Recession) to 2011:01 (the middle of the Eurozone debt crisis), we find that almost all Fed speeches were uniformly negative in their tone.

Insert figure 1 around here.

4 Results and analysis

In this section, we estimate the impact of the tone of Fed’s Board of Governors’ speeches on CDS spreads. We also present analyses investigating the impact of Fed speeches stratified according to country and speech-level characteristics.

4.1 Impact of speeches on sovereign CDS spreads

We investigate the impact of the tone of Fed’s Board of Governors’ speeches on the sovereign CDS spreads across countries. We specify the following panel regression model to capture the impact of Fed’s speech tone on CDS spreads:

$$Y_{i,t} = a_0 + a_1 Fed_Tone_t + \sum_j a_j^i \times Controls_j^i + \lambda_c + \mu_t + u_{i,t} \quad (1)$$

where $Y_{i,t}$ is the 5-year sovereign CDS spread at time t , for country i ; Fed_Tone_t is the contemporaneous Fed speech tone, and its coefficient a_1 is the estimate of interest in our study. For example, for a given Fed BoG speech delivered on, say, March 20, 2012, the corresponding 5-year CDS spread for a given country i , on the left hand side will be that for March 20, 2012. All the control variables are matched as per the given frequency, i.e., for the same day as the speech or else for the same month and/or quarter (as specified in section 3). The regressions are then run in a panel setting with fixed effects for country and time (date of the speech).

Controls are divided into three categories: time-based controls, speech-based controls, and macroeconomic controls. Time-based controls include the day of the week and month dummies, in line with [Hayo et al. \[2008\]](#) and [Cieslak et al. \[2019\]](#); speech-based controls include ‘average words per sentence’ (AWPS) and ‘percentage of complex words’ (%CW), both of which are critical components of text readability metrics such as the Fog index [[Anand et al., 2022](#)]; macroeconomic controls include global factors like VIX, US 10-year bond yield, and the US term spread (US 10-year bond yield – US

3-month bond yield); and country-specific factors such as the total debt-to-GDP ratio, the inflation rate, terms of trade volatility, reserves and market cap.⁸ Our choice of global and local macroeconomic controls are in line with papers such as [Doshi et al. \[2017\]](#) and [Dieckmann and Plank \[2012\]](#). We also employ robust standard errors clustered at the country and year level to account for potential heteroskedasticity in residuals. We include four specifications in columns 1–4: using only the speech controls; with the speech and US macroeconomic controls; with the speech and country-level macroeconomic controls; and with the full set of controls including the speech, the US macro and the country-level macro controls.

Table 4 presents results for the impact of Fed BoG’s speech tone on 5-year sovereign CDS spreads for the full set of countries. We find that an increase (decrease) in the positivity of the tone of Fed speeches is associated with a significant concurrent fall (rise) in sovereign CDS spreads across all specifications uniformly. In other words, Fed’s speeches’ tone and CDS spreads are negatively related: positive speeches tend to reduce sovereign CDS spreads, while negative speeches amplify them (all else equal). Economically, a 0.1 unit rise in the Fed speech tone—equivalent to a unit interquartile range movement—lowers the 5-year CDS spread in the range of 3.2–9.6 basis points, which represents around 3.5–10.5% of the overall mean spreads. The results are robust to the inclusion of speech level controls (column 1), U.S. macroeconomic controls (column 2), country level macroeconomic controls (column 3), as well as all controls (column 4). The sign of the coefficients for the control variables is also in line with prior studies such as [Doshi et al. \[2017\]](#) and

⁸Detailed definitions of all variables can be found in Table 1.

Dieckmann and Plank [2012] with debt, inflation, terms of trade volatility, and US VIX as positively associated with CDS spreads, and reserves being negatively associated.

Insert table 4 about here.

4.2 Impact of speeches based on speech and country-characteristics

The 20 countries in our sample have quite different macroeconomic and financial characteristics which can influence the impact of Fed speeches on their CDS spreads. Further, the type of content in Fed speeches can also impact spreads disparately. Therefore, we examine the impact of Fed speeches on the CDS spread of these countries based on two important macroeconomic characteristics: external debt and exchange rate stability; and on one important speech characteristic: the extent of its forward-looking content.

A nation’s external debt and its impact on a wide variety of variables—ranging from fiscal deficit to economic growth opportunities—have been the subject of many notable studies in the past [Tornell and Velasco, 1992, Adam and Bevan, 2005]. Further, since sovereign debt has been shown to impact CDS spreads [Doshi et al., 2017], the volume of external debt (an important component of sovereign debt) could presumably influence CDS spreads as well. In other words, we attempt to answer the question: Among two otherwise identical countries, which one’s CDS spreads will depend more on

the tone of speeches delivered by Federal Reserve’s Board of Governors? We specify a dummy variable for high debt which takes the value 1 when the debt for a particular country is higher than 90th percentile of all countries in a particular year.⁹ We then add this dummy and its interaction with Fed speech tone in the equation (1). Our results show that sovereign spreads of countries with high external debt to GDP ratio are much more sensitive to the tone of Fed speeches than their low external debt to GDP ratio counterparts.

Similarly, regarding exchange rates, the Mundell–Fleming paradigm provides a framework which indicates that the reaction of central banks of small open economies to the monetary stance of the Fed determines the equilibrium of foreign yields and exchange rates [Mundell, 1960, Fleming, 1962, Mundell, 1963]. The larger the interest rate differential between an open economy and the Fed’s policy stance, the larger the fluctuation in the exchange rate for the former. In other words, the more actively a domestic central bank intervenes in the foreign exchange market to keep the exchange rate steady, the more closely the domestic interest rate tends to follow the Fed’s policy. Recent research such as Obstfeld et al. [2019] has highlighted the importance of the exchange rate in propagating global disturbances, with a greater effect on those economies that have a more stable (fixed) exchange rate system. In a similar vein, we examine the role of exchange rate stability on the impact of Fed speeches on CDS spreads. We define the dummy at the 90th percentile for each year. We divide nations into two categories based on the exchange rate stability index of Aizenman et al. [2013]. The study

⁹The results are robust to other classification as well.

develops an index—normalized between 0 and 1—using the annual standard deviations of the monthly log-change in the home and base countries’ exchange rates. Higher values of this index indicate more stable movement of the exchange rate against the currency of the base country.

Finally, [Ehrmann and Fratzscher \[2007\]](#) have noted the importance of forward-looking statements with respect to central bank communication. In particular, forward-looking speeches can be used for anchoring the expectation of economic agents and are less likely to be endogenous. To quantify the impact of forward-looking Fed speeches, we consider the set of speeches that feature an above 90th percentile proportion of terms associated with forward-looking statements and examine their impact on the CDS spread across sample economies.¹⁰ To identify forward-looking communication, we look for specific words and phrases which are generally used to convey pre-meditated plans and actions taken from related prior literature [[Li, 2010](#), [Anand et al., 2022](#)]. We calculate the frequency of such words and phrases for each speech in our sample and consider the set of speeches for which the frequency is above the mean, leading to a final sample of 316 (out of 865) forward-looking-speeches.

Table 5 presents the results for the impact of the Fed BoG speech tone on the 5 year CDS spread of countries with respect to external debt, exchange rate stability and forward looking speeches.

Insert table 5 about here.

¹⁰The results are robust to categorization with respect to above/below median, as well as that based on other high/low quantile classifications.

Column 1 presents the results for the impact of high external debt. There is a significant negative relationship between CDS spreads and the Fed tone, i.e., Fed speeches with negative tone correspond to a significant rise in countries' sovereign CDS spreads. This benchmark result, however, is economically more significant for the set countries with high external debt-to-GDP ratios. In other words, we find that spreads of countries with high proportions of external debt are more impacted by the speeches of the Federal Reserve compared with their low external debt counterparts. In particular, a 0.1 unit reduction in the positivity of the Fed tone—a unit interquartile range movement—for a country with an especially high external debt-to-GDP ratio corresponds to a rise in CDS spreads of about 5.4 basis points, or about 60% of the overall mean spread.

Column 2 presents the impact of the Fed tone on sovereign CDS spreads on the basis of exchange rate policy. We find that for both set of countries—high as well as low exchange rate stability—the impact of the tone of Fed speeches is significantly negative, which mirrors the benchmark results reported in Table 4. However, the economic significance of the results is far more pronounced for the set of countries with high exchange rate stability. In particular, for a 0.1 unit reduction in the positivity of the Fed tone—a unit interquartile range movement—for a country with an especially high exchange rate stability corresponds to a rise in CDS spreads of about 11 basis points, or about 120% of the overall mean spread. These results are aligned with the Mundell-Fleming paradigm since countries with high exchange rate stability intervene more in the foreign exchange market to keep the exchange rate steady, leading to their monetary policy being more closely aligned with

that of the Fed. Thus, any information embedded in a speech on the health of the US economy by the Fed Board of Governors has a greater impact on these economies since their economic variables are more procyclical and closely aligned with policy rates in the US. These results are also in line with prior work such as [Obstfeld et al. \[2009\]](#) which show that global disturbances have a more significant effect on economies with a more regulated exchange rate system.

Finally, column 3 presents the estimated results based on forward looking speeches. We find that negative speeches, especially those which contain higher forward-looking content correspond to significant rises in sovereign CDS spreads. In particular, a 0.1 unit rise in the positivity of the Fed tone—a unit interquartile range movement—for a speech with high levels of forward-looking content, corresponds to a fall in sovereign CDS spreads of about 9.5 basis points, or about 104% of the overall mean spread.

Together, these results show that while negative Fed speeches tend to raise sovereign CDS spreads, the impact is especially pronounced for the set of countries which are overly dependent on external debt and committed to high exchange rate stability; and the influence of Fed speeches with high forward-looking content is especially strong.

4.3 Impact of Fed speeches on sovereign credit risk premia

Our results so far have shown that the Fed speeches have a significant impact on sovereign CDS spreads, which in turn are driven by the changes in the

actual default probabilities and the associated risk premia [Doshi et al., 2017, Longstaff et al., 2011, Berndt et al., 2018]. We further examine the role of Fed speeches on sovereign credit risk premia, which allows us to disentangle the potential channel through which Fed speeches influence sovereign CDS spreads. We follow Friewald et al. [2014] and Cochrane and Piazzesi [2005] to extract sovereign credit risk premia from observed sovereign CDS spreads.

We estimate sovereign credit risk premia using the term structure of CDS spreads, defined as the (log) difference between risk-neutral and physical expectations of future CDS spreads in line with Friewald et al. [2014]. We derive country-specific credit risk premium indicators from the term structure of CDS spreads for each country as a linear combination of forward CDS spreads. For a given forecast horizon $\tau = 30$ days, the forward CDS spread $F_t^{t \times \tau}$ contracting at t and effective at $t + \tau$ for T periods contains information on the future expected T -year CDS spread at $t + \tau$. We compute countries' forward CDS spread $F_t^{t \times \tau}$ which represents the risk-neutral expectation of its future CDS spread. Specifically, we use a piecewise constant intensity model to fit the term structure of CDS spreads on a given day and compute the forward CDS spreads for various horizons using the estimated intensities. Next, we calculate monthly CDS spread changes $\Delta S_{t+\tau}^T$ and monthly forward-implied changes $\Delta F_t^{\tau \times T}$ for the sample maturities $T_k \in T = 1, 3, 5, 7$. The log difference between them gives us the relative excess return $EX_{t+\tau}^T$:

$$EX_{t+\tau}^T = \ln(S_{t+\tau}^T) - \ln(F_t^{\tau \times T})$$

We then compute the average excess changes in cross maturities over all

available maturities $T_k \in T = 1, 3, 5, 7$ as :

$$\overline{EX}_{t+\tau} = \frac{1}{K} \left(\sum_{T_k \in T} EX_{t+\tau}^{T_k} \right)$$

Furthermore, we regress $\overline{EX}_{t+\tau}$ on the full CDS term structure $\mathfrak{R} = (1, S_t^1, F_t^{1 \times 1}, F_t^{3 \times 1}, F_t^{5 \times 1}, F_t^{7 \times 1})$ for estimating the regression parameters β^{EX} . The sovereign credit risk premia are obtained based on the information available at time t as:

$$\widetilde{RP}_{t+\tau} = -(\beta^{EX})^\top \mathfrak{R}$$

We redeploy the regression specification (1), but now with the risk premium $\widetilde{RP}_{t+\tau}$ as the dependent variable:

$$(\widetilde{RP}_{t+\tau})_i = a_0 + a_1 Fed.Tone_t + \sum_j a_j^i * Controls_j^i + u_{i,t} \quad (2)$$

The results are reported in Table 6.¹¹ Overall, we find a significant positive relation between the risk premium and the Fed speech tone. The reasoning is as follows: the risk premium captures the difference between $\mathbb{E}^Q[\log(S_{t+\tau})] - \mathbb{E}^P[\log(S_{t+\tau})]$ and one potential channel through which the positive relation between the risk premium and the Fed tone arises is through its impact on actual default probabilities and, therefore, on $\mathbb{E}^P[\log(S_{t+\tau})]$. A more positive (negative) tone suggests improved (worsened) macroeconomic conditions in the future, which likely drives the actual, physical default probabilities down (up) and raises (lowers) the risk premium. Thus, the results in this section

¹¹Since the data for all maturities of CDS are required to compute the CDS risk premium, there is a drop in total number of observations.

may suggest that the impact of Fed speech tone on credit spreads is due to its impact on physical probabilities. However, we should add a caveat here that our analysis does not provide direct evidence of this channel and it may be useful to examine more details in future work.

Insert table 6 about here.

To summarize, we examine the impact of the tone of Fed’s BoG’s speeches on CDS spreads for a cross-section of economies. We find that positive Fed speeches reduce and negative speeches amplify sovereign CDS spreads. We also show that this effect is channeled via credit risk premia and in particular, positive Fed speeches raise sovereign credit risk premia by presumably lowering (physical) default probabilities.

4.4 Impact of alternative metrics of Fed’s speech tone

While the metric we primarily employ in this study relies on the notion of valence shifters which impart nuance and modification to the connotation of sentences, there are other widely used tone quantification techniques which could presumably be used to explain variation in sovereign CDS spreads. Two such prominent methods are the ‘bag of words (unigram)’ approach based on the LM dictionary [Loughran and McDonald, 2011]; and finBERT, a pre-trained natural language processing (NLP) model for analyzing sentiment of financial text, built by training the BERT language model in the finance domain, using a large corpus of financial terms. FinBERT classifies words as positive, neutral, or negative based on its computation of probability of

words belonging to each category, employing a discretization technique to quantify tone. [Huang et al. \[2023\]](#) show that FinBERT outperforms several leading machine learning algorithms in capturing the tone of financial texts.

We present the results of a comparative analysis between the tone quantification metrics in [Table 7](#). Columns 1–4 depict results based on including different measures: finBERT (column 1), LM bag of words tone (column 2), valence shifter tone and finBERT together (column 3); and valence shifter tone and LM bag of words tone (column 4).

Insert [Table 7](#) about here

Neither the LM bag of words tone; nor the finBERT tone show any significant impact on the movements in sovereign 5-year CDS spreads. Further, when alternative tone metrics are employed in the presence of the valence shifter-based tone introduced in this study, only the latter has any significant impact on the 5-year sovereign spreads. The LM dictionary-based bag of words approach overlooks the impact of connotation-modifying valence shifters, and hence fails to register any impact. The finBERT model, on the other hand, suffers from its probabilistic approach which assigns a positive, negative or neutral value based on predicted probabilities. This point is also highlighted in [Arslan et al. \[2021\]](#) and [Kim et al. \[2023\]](#), who specify how domain-specific models such as FinBERT do not necessarily lead to improvements as compared to generic models such as BERT [[Devlin et al., 2018](#)].

5 Robustness

Do Fed BoG speeches contain information over and above that contained in FOMC communication? To account for this possibility, we remove speeches which are delivered one week before as well as after the FOMC meetings to ensure that our results are not driven by FOMC communications. Further, are our results driven by countries' domestic macroeconomic announcements and not due to Fed speeches? To assuage such concerns, we remove all dates which coincide with the announcement of domestic macro variables. Further, we ensure the results are robust to the inclusion of US bond risk premium. The results of all these exercises are presented in Table 8.

Insert table 8 about here.

Column 1, presents the results when we remove all Fed speeches one week before, and one week after the FOMC meetings, leading to 464 (out of 865) speeches. The estimated results are similar to the baseline results in Table 4, namely, that an increase in positivity in the tone of Fed speeches is associated with a significant fall in countries' sovereign CDS spreads.

Further, in column 2, for each country in our sample, we remove all dates on which inflation, unemployment, and GDP announcements have taken place for our sample duration, which leads to 480 speeches (out of 865). Table A3 presents the list of macroeconomic variables, the announcement dates of which we account for, in line with [Adrian et al. \[2013\]](#). The result with the modified sample of speeches, which show that the benchmark estimates continue to retain their inference and validity.

Also, our benchmark specification includes the slope (the US 10-year term spread) and the level of US treasury yield (the US 10-year bond yield). In order to assess if the results are not driven primarily by the US bond risk premium, we add the risk premium of the 10 year zero-coupon US T-bill as an additional control. The risk premium represents the compensation that investors require to bear the risk that interest rates may change over the life of the bond. Since the risk premium is not directly observable, it must be estimated. We use the 10-year risk premium component of the T-bills as calculated by [Adrian et al. \[2013\]](#).¹² The results are presented in column 3 with US risk premia as an additional control.

If the Fed BoG speeches operate exclusively via impacting US risk premia, the regression coefficient for the Fed tone should lose its significantly negative relationship once we explicitly include the US risk premia in our regression specification, and the coefficient for the US bond risk premium should assume significance. Indeed, the US risk premium's coefficient is positive and significant suggesting that rises in the US risk premia correspond to significantly increased sovereign CDS spreads. In other words, if there is a rise in the US risk premium, there is a concomitant increase in CDS spreads for other countries. This is reasonable since a higher US risk premium reflects higher compensation for US interest rate movements, which gets added as a premium to the compensation sought for sovereign countries' CDS spreads. However, the Fed tone retains its negative significance with CDS spreads.

Lastly, we also ensure robustness of results with respect to all other terms

¹²Data for the US risk premium are downloaded from the New York Federal Reserve website: https://www.newyorkfed.org/research/data_indicators/term-premia-tables#/overview.

of CDS premium. The results for 1, 3, 7, and 10 year CDS premium are presented in Table 9 and the results are similar to Table 4 with an increase in positive speech tone being significantly associated with a decrease in CDS term premium across all terms.

Insert table 9 around here.

6 Concluding remarks

In this study, we examine the impact of the tone of the Federal Reserve's Board of Governors' speeches on international 5 year sovereign CDS spreads. To measure the tone of Fed speeches, we use the sentence as a base unit of analysis along with valence shifters (adverbs and adjectives) and multi-clausal phrases. We investigate the impact of the tone of the speeches on the 5 year sovereign CDS spreads of a sample of 10 advanced and 10 emerging economies and find that the speech tone is significantly negatively associated with the CDS spreads across both sets of countries. In other words, positive Fed speeches significantly lower CDS spreads for all economies in our sample. We also find that this impact is much larger for speeches that are more forward-looking. Cross-sectionally, the results are more pronounced for countries with higher external debt to GDP ratios, and for those with more managed exchange rate stability. The results are robust even after accounting for the impact of FOMC communication and for macro-announcement dates for other countries. Finally we also show that the impact of Fed speeches on sovereign CDS spreads is above and beyond changes in the US term premium, and that the lowering of the CDS spreads on account of positive speeches is

channelled via the speeches' impact on the sovereign credit risk premia.

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Figures

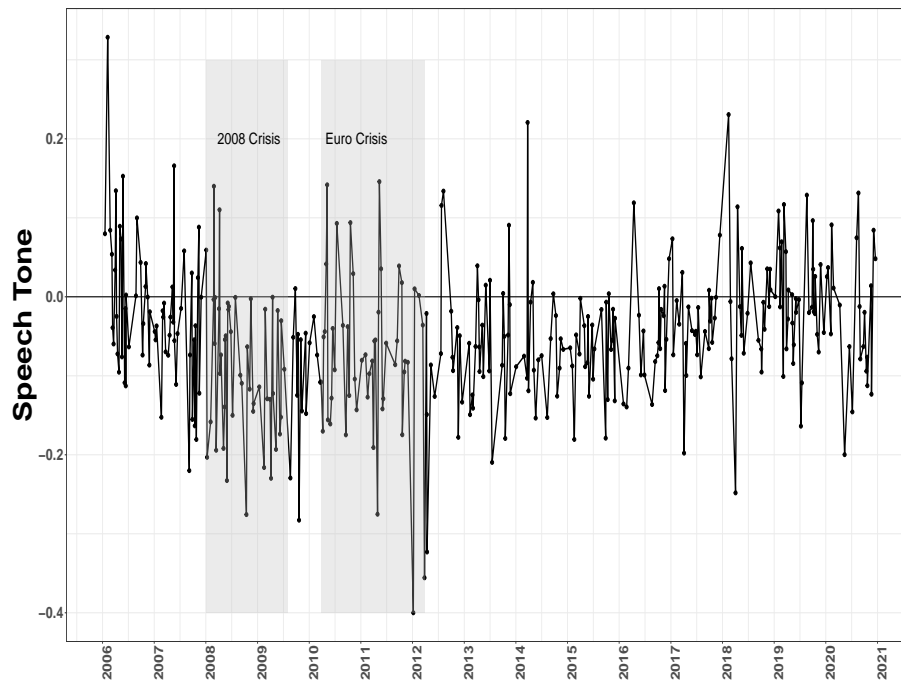


Figure 1: Tone for Fed's Board of Governors' speeches across time.

Tables

Table 1: Definitions of the variables used in this study

Variable	Definition
Speech Text Measures:	
<i>Fed Tone</i>	The tone of each Fed BoG speech calculated at a sentence level using polar words from Loughran and McDonald dictionary [Loughran and McDonald, 2011], ngram phrases [Apel and Blix Grimaldi, 2012, Apergis and Pragidis, 2019] and valence shifters [Anand et al., 2022]. The tone of the whole speech is the average of of all sentences. The speeches are downloaded from the Federal Reserve website: https://www.federalreserve.gov/
<i>Average words per sentence (AWPS)</i>	The number of words in the speeches divided by the total number of sentence termination characters after removing those associated with headings and abbreviations.
<i>Percent complex words (% CW)</i>	The percentage of words with more than two syllables.
Dependent variable:	
<i>CDS Spread</i>	The CDS spread for 1, 3, 5, 7, and 10 year as downloaded from the Markit database.
Control variables:	
<i>Debt Ratio</i>	The total Debt to GDP ratio for each country in the sample as downloaded from Bloomberg.
<i>Inflation</i>	The benchmark inflation index for each country in the sample as downloaded from Bloomberg.
<i>VIX</i>	The benchmark volatility index for each country in the sample as downloaded from Bloomberg.
<i>Bond10Y</i>	The yield of the 10-year bond of the U.S. as downloaded from Bloomberg.
<i>US Term Spread</i>	The difference in the yields of the 10-year and 3-month bond of the U.S. as downloaded from Bloomberg.

Variable	Definition
<i>ToT Volatility</i>	The 18-month rolling volatility of terms of trade (exports/imports) as in Hilscher and Nosbusch [2010] . The exports and import data are downloaded from Bloomberg.
<i>Reserves</i>	The exchange rate reserves without gold (in USD). The data are downloaded from Bloomberg.
<i>Log(Market Cap)</i>	The market cap of the benchmark index for each country. Downloaded from Bloomberg.

Table 2: Descriptive statistics

	Mean	Median	SD	IQR
<i>Panel A: Text characteristics of Fed BoG speeches</i>				
<i>Tone</i>	-0.05	-0.05	0.09	0.10
<i>% Complex Words</i>	29.92	29.67	8.22	11.67
<i>Average Words Per Sentence</i>	29.03	28.00	7.75	9.00
<i>Panel B: Sovereign five year CDS spreads (basis points)</i>				
CDS spread	91.31	70.12	88.90	98.05
<i>Panel C: Sovereign five year year credit risk premia</i>				
CDS risk premia	0.88	0.86	0.52	0.68

Note: Summary statistics for the 5 year CDS spread and CDS risk premia. ‘SD’ and ‘IQR’ refers to standard deviation and inter-quartile range, respectively. In Panel C, the sovereign credit risk premia are calculated as the (log) difference between risk neutral and physical expectations of future CDS spreads in accordance with [Friewald et al. \[2014\]](#). The details of the estimation procedure are included in Section [4.3](#).

Table 3: Correlation Table

	% CW	AWPS	Debt Ratio	Inflation	VIX	Bond 10Y	US Term Spread	ToT Vol	Reserves	Market Cap
% CW	1.00									
AWPS	-0.04	1.00								
Debt Ratio	0.01	0.01	1.00							
Inflation	0.01	0.03	-0.04	1.00						
VIX	0.06	-0.05	-0.01	0.01	1.00					
Bond 10Y	0.05	-0.17	-0.11	0.05	0.04	1.00				
US Term Spread	0.01	-0.05	0.13	-0.06	0.01	-0.25	1.00			
ToT Vol	0.01	-0.02	-0.16	-0.10	0.04	0.01	0.03*	1.00		
Reserves	0.01	-0.01	-0.23	-0.01	-0.01	0.06	-0.09	0.09	1.00***	
Market Cap	0.01	-0.03*	0.28	0.01	-0.02	0.05	0.05	0.09	-0.26	1.00

Note: Correlation table for the speech-related and macroeconomic control variables in this study. Bold represents significance at 5 percent. Detailed variable definitions can be found in Table 1.

Table 4: Impact of Fed speech tone on CDS spreads

	(1)	(2)	(3)	(4)
Fed Tone	-96.75*** (23.99)	-42.77*** (14.22)	-91.46*** (22.29)	-32.52*** (11.66)
% CW	-18.25 (17.82)	-11.05 (14.85)	-17.97 (17.20)	-11.19 (12.37)
AWPS	-0.11 (0.21)	-0.36* (0.20)	-0.08 (0.24)	-0.21 (0.20)
VIX		18.81 (22.96)		12.28 (18.81)
US Term Spread		11.19** (4.50)		9.81* (5.27)
Bond10Y		-17.17** (8.48)		-28.70*** (10.08)
Debt Ratio			61.22* (31.85)	42.36** (17.26)
Inflation			0.02 (0.01)	0.04* (0.02)
ToT Vol			1.74 (2.96)	1.05 (2.25)
Reserves			-5.65 (14.80)	-66.01*** (23.70)
Market Cap			-4.24 (7.76)	-3.43 (6.15)
Time-based Controls	Yes	Yes	Yes	Yes
Country and Date FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.02	0.16	0.06	0.24
Observations	4380	4380	4380	4380

Note: This table presents results from the panel regression of Fed BoG's speech tone on 5 year sovereign CDS spread for all countries in the sample in line with the regression specification in equation (1). The standard errors are reported in the parentheses and are all Heteroskedasticity and Autocorrelation (HAC) robust. The time-based controls include day of the week and month dummy. The speech level controls are '%CW', which denotes the percentage of complex words (more than two syllables); and 'AWPS', which denotes average words per sentence; 'Debt Ratio' denotes the country's total debt-to-GDP-ratio; 'Inflation' is the benchmark inflation rate; 'VIX' is the US volatility index; 'Bond10Y' is the US 10 year bond yield; the US term spread is the 10 year yield - the 3 month yield; 'ToT Vol' denotes terms of trade volatility; 'Reserves' denote reserves (excluding gold); and 'Market Cap' denotes the market capitalization of the benchmark stock index. All variables and their sources are defined in detail in Table 1.

Table 5: Impact of Fed speech tone on CDS spreads based on country and speech characteristics

	External Debt	Ex Rate Stability	Forward Looking Speeches
Fed Tone	−36.69*** (13.89)	−65.08*** (19.23)	−25.28* (13.79)
Debt Dummy	−28.83 (20.48)		
Fed Tone*Debt Dummy	−17.46** (8.49)		
Ex Rate Dummy		11.65 (12.58)	
Fed Tone*Ex Rate Dummy		−44.24*** (16.76)	
Forward-Looking Dummy			−2.53 (3.58)
Fed Tone*Forward-Looking Dummy			−69.99** (33.82)
Control variables			
Time-based Controls	Yes	Yes	Yes
Speech Controls	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes
Country and Date FE	Yes	Yes	Yes
Adjusted R^2	0.20	0.22	0.20
Observations	4380	4380	4380

Note: This table presents results from the panel regression of Fed BoG speech tone and controls on 5 year sovereign CDS spreads based on the countries' external debt, exchange rate stability, and the forward looking Fed speeches. The dummy for external debt, exchange rate stability, and forward looking speeches is defined as 1 for greater than 90th percentile value. The regression specification is in line with equation (1). The standard errors are reported in the parentheses and are all Heteroskedasticity and Autocorrelation (HAC) robust. The time-based controls include day of the week, month dummy. The speech level controls are '%CW', which denotes the percentage of complex words (more than two syllables); and 'AWPS', which denotes average words per sentence; macro controls are as defined in Table 1.

Table 6: Impact of Fed speech tone on sovereign credit risk premia

	(1)	(2)
Fed Tone	0.32**	0.32**
	(0.12)	(0.12)
% CW	0.11	0.11
	(0.11)	(0.10)
AWPS	-0.01	0.01
	(0.01)	(0.01)
VIX	-0.27**	-0.16
	(0.12)	(0.10)
US Term Spread	-0.01	-0.02
	(0.03)	(0.02)
Bond10Y	-0.29***	-0.30***
	(0.08)	(0.08)
Debt Ratio		0.80***
		(0.30)
Inflation		0.01
		(0.01)
ToT Vol		-0.03**
		(0.01)
Reserves		-0.01
		(0.01)
Market Cap		-0.01
		(0.03)
Country and Date FE	Yes	Yes
Adjusted R^2	0.32	0.41
Observations	3772	3770

Note: This table presents results from the panel regression of Fed BoG speech tone on 5 year sovereign CDS risk premium of sample countries in line with the regression specification in equation (2). The CDS risk premium is calculated as per the methodology specified in section 4.3. The standard errors are reported in the parentheses and are all Heteroskedasticity and Autocorrelation (HAC) robust. The time-based controls include day of the week and month dummy. The speech level controls are ‘%CW’, which denotes the percentage of complex words (more than two syllables); and ‘AWPS’, which denotes average words per sentence; ‘Debt Ratio’ denotes the country’s total debt-to-GDP-ratio; ‘Inflation’ is the benchmark inflation rate; ‘VIX’ is the US volatility index; ‘Bond10Y’ is the US 10 year bond yield; the US term spread is the 10 year yield - the 3 month yield; ‘ToT Vol’ denotes terms of trade volatility; ‘Reserves’ denote reserves (excluding gold); and ‘Market Cap’ denotes the market capitalization of the benchmark stock index. All variables and their sources are defined in detail in Table 1.

Table 7: Impact of alternative Fed speech tone schemes on CDS spreads

	(1)	(2)	(3)	(4)
VS			-41.26** (19.07)	-79.39** (32.15)
FinBERT	-9.31 (5.99)		5.68 (9.87)	
LM BOG		-56.59 (45.67)		201.03 (125.87)
% CW	-11.43 (12.56)	-9.66 (12.53)	-10.47 (12.50)	-15.58 (12.57)
AWPS	-0.14 (0.18)	-0.13 (0.18)	-0.12 (0.18)	-0.13 (0.18)
VIX	12.28 (18.49)	12.94 (18.49)	13.30 (18.28)	12.45 (18.32)
US Term Spread	8.77* (5.09)	8.62* (5.05)	8.25 (5.14)	8.46* (5.05)
Bond10Y	-31.14*** (10.72)	-31.13*** (10.73)	-30.91*** (10.67)	-31.07*** (10.71)
Debt Ratio	42.80** (17.72)	42.82** (17.71)	42.78** (17.72)	42.73** (17.86)
Inflation	0.04* (0.02)	0.04* (0.02)	0.04* (0.02)	0.04* (0.02)
ToT Vol	2.45 (1.51)	2.47 (1.51)	2.46 (1.51)	2.44 (1.51)
Reserves	-65.85*** (24.56)	-66.08*** (24.50)	-65.59*** (24.54)	-65.44*** (24.46)
Market Cap	-3.11 (6.43)	-3.13 (6.44)	-3.22 (6.43)	-3.14 (6.34)
Time-based Controls	Yes	Yes	Yes	Yes
Country and Date FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.25	0.25	0.25	0.25
Observations	4380	4380	4380	4380

Note: This table presents results from the regression of alternate quantification schemes of the Fed BoG's speech tone on the 5-year sovereign CDS spread for all countries in the sample in line with the regression specification in equation (1). 'VS' denotes the valence shifter-based tone; 'finBERT' denotes tone according to the finBERT model; 'LM BOG' denotes tone computed according to the LM dictionary bag of words approach. The standard errors are reported in the parentheses and are all Heteroskedasticity and Autocorrelation (HAC) robust. The time-based controls include day of the week and month dummy. The speech level controls are '%CW', which denotes the percentage of complex words (more than two syllables); and 'AWPS', which denotes average words per sentence; 'Debt Ratio' denotes the country's total debt-to-GDP-ratio; 'Inflation' is the benchmark inflation rate; 'VIX' is the US volatility index; 'Bond10Y' is the US 10 year bond yield; the US term spread is the 10 year yield - the 3 month yield; 'ToT Vol' denotes terms of trade volatility; 'Reserves' denote reserves (excluding gold); and 'Market Cap' denotes the market capitalization of the benchmark stock index. All variables and their sources are defined in detail in Table 1.

Table 8: Impact of Fed speech tone on CDS spreads (Robustness)

	Speech removal around FOMC	Speech removal around Macro Dates	US Term Premium as additional control
Fed Tone	-41.28*** (13.52)	-36.90*** (12.81)	-28.89** (11.96)
US TP			141.73*** (35.12)
Control variables			
Time-based Controls	Yes	Yes	Yes
Speech Controls	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes
Country and Date FE	Yes	Yes	Yes
Adjusted R^2	0.20	0.20	0.25
Observations	3892	3923	4347

Note: This table presents results from panel regression of Fed BoG speech tone after removal of speeches 1 week before and after the FOMC meetings, around major macro announcement days of respective countries, and including US term premium as additional control, in line with the regression specification in equation (1). The standard errors are reported in the parentheses and are all Heteroskedasticity and Autocorrelation (HAC) robust. The time-based controls include day of the week and month dummy. The speech level controls are ‘%CW’, which denotes the percentage of complex words (more than two syllables); and ‘AWPS’, which denotes average words per sentence; ‘Debt Ratio’ denotes the country’s total debt-to-GDP-ratio; ‘Inflation’ is the benchmark inflation rate; ‘VIX’ is the US volatility index; ‘Bond10Y’ is the US 10 year bond yield; the US term spread is the 10 year yield - the 3 month yield; ‘ToT Vol’ denotes terms of trade volatility; ‘Reserves’ denote reserves (excluding gold); and ‘Market Cap’ denotes the market capitalization of the benchmark stock index. All variables and their sources are defined in detail in Table 1.

Table 9: Impact of Fed speech tone on CDS spreads (Term Structure)

	1Y	3Y	7Y	10Y
Fed Tone	-42.19*** (11.97)	-44.18*** (12.79)	-30.07** (12.26)	-23.49** (11.88)
Time-based Controls	Yes	Yes	Yes	Yes
Speech Controls	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes
Country and Date FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.13	0.15	0.23	0.25
Observations	3973	4183	4256	4270

Note: This table presents results from the panel regression of Fed BoG's speech tone on 1,3,7, and 10 year sovereign CDS spread for all countries in the sample in line with the regression specification in equation (1). The standard errors are reported in the parentheses and are all Heteroskedasticity and Autocorrelation (HAC) robust. The time-based controls include day of the week and month dummy. The speech level controls are '%CW', which denotes the percentage of complex words (more than two syllables); and 'AWPS', which denotes average words per sentence; 'Debt Ratio' denotes the country's total debt-to-GDP-ratio; 'Inflation' is the benchmark inflation rate; 'VIX' is the US volatility index; 'Bond10Y' is the US 10 year bond yield; the US term spread is the 10 year yield - the 3 month yield; 'ToT Vol' denotes terms of trade volatility; 'Reserves' denote reserves (excluding gold); and 'Market Cap' denotes the market capitalization of the benchmark stock index. All variables and their sources are defined in detail in Table 1. The full list of countries along with their categorization into 'advanced' and 'emerging' is in line with MSCI and is presented in Table A1.

Appendix

Table A1: List of Countries

Country	Classification
Chile	Emerging
Colombia	Emerging
Czech Republic	Emerging
Hungary	Emerging
India	Emerging
Indonesia	Emerging
Mexico	Emerging
Poland	Emerging
Thailand	Emerging
South Africa	Emerging
Canada	Advanced
France	Advanced
Germany	Advanced
Italy	Advanced
Israel	Advanced
New Zealand	Advanced
Norway	Advanced
Sweden	Advanced
Switzerland	Advanced
UK	Advanced

Note: This table presents the list of countries in this study along with their classification as 'Emerging' or 'Advanced' based on MSCI.

Table A2: List of Valence Shifters

Word	Classification	Weight	Word	Classification	Weight
almost	de-amplifier	0.8	not	negator	-1
although	adversative-conjunction	0.8	only	de-amplifier	0.8
barely	de-amplifier	0.8	particular	amplifier	0.8
but	adversative-conjunction	0.8	particularly	amplifier	0.8
cannot	negator	-1	partly	de-amplifier	0.8
certain	amplifier	0.8	purpose	amplifier	0.8
certainly	amplifier	0.8	quite	amplifier	0.8
colossal	amplifier	0.8	rarely	de-amplifier	0.8
considerably	amplifier	0.8	real	amplifier	0.8
deep	amplifier	0.8	really	amplifier	0.8
deeply	amplifier	0.8	seldom	de-amplifier	0.8
definitely	amplifier	0.8	serious	amplifier	0.8
dont	negator	-1	seriously	amplifier	0.8
enormous	amplifier	0.8	severe	amplifier	0.8
enormously	amplifier	0.8	severely	amplifier	0.8
especially	amplifier	0.8	significant	amplifier	0.8
extreme	amplifier	0.8	significantly	amplifier	0.8
extremely	amplifier	0.8	slightly	de-amplifier	0.8
few	de-amplifier	0.8	somewhat	de-amplifier	0.8
greatly	amplifier	0.8	sure	amplifier	0.8
hardly	de-amplifier	0.8	surely	amplifier	0.8
heavily	amplifier	0.8	totally	amplifier	0.8
heavy	amplifier	0.8	true	amplifier	0.8
high	amplifier	0.8	truly	amplifier	0.8
highly	amplifier	0.8	vast	amplifier	0.8
however	adversative-conjunction	0.8	very	amplifier	0.8
huge	amplifier	0.8	whereas	adversative-conjunction	0.8
hugely	amplifier	0.8	decidedly	amplifier	0.8
least	de-amplifier	0.8	definite	amplifier	0.8
little	de-amplifier	0.8	immense	amplifier	0.8
massive	amplifier	0.8	immensely	amplifier	0.8
massively	amplifier	0.8	incalculable	amplifier	0.8
more	amplifier	0.8	incredibly	de-amplifier	0.8
most	amplifier	0.8	sparsely	de-amplifier	0.8
much	amplifier	0.8	vastly	amplifier	0.8
neither	negator	-1	uber	amplifier	0.8
never	negator	-1	cant	negator	-1
majorly	amplifier	0.8	faintly	de-amplifier	0.8
none	negator	-1	wont	negator	-1

Table A3: Economic Release Description

Country code	CPI		Activity		Unemployment	
	Urban	Consumers (M)	Industrial Production (M)	Initial Jobless Claims SA (W)	Unemployment rate SA (M)	Unemployment rate SA (M)
USA	CPI All Groups	Goods (Q)	GDP (Q)		Unemployment rate SA (M)	Unemployment rate SA (M)
AUS	CPI (M)		GDP All industries (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
CAD	CPI (M)		Industrial Production (M)		N/A	N/A
CZE	CPI EU Harmonized	(M)	Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
FRA	CPI EU Harmonized	(M)	Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
GER	CPI EU Harmonized	(M)	GDP (Q)		Unemployment rate SA (M)	Unemployment rate SA (M)
ITA	CPI EU Harmonized	(M)	Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
JPN	CPI Nationwide	(M)	Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
NZL	CPI All Groups	(Q)	GDP (Q)		Unemployment rate SA (Q)	Unemployment rate SA (Q)
NOR	CPI (M)		Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
SWE	CPI Headline	(M)	Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
SWI	CPI (M)		GDP (Q)		Unemployment rate SA (M)	Unemployment rate SA (M)
UKG	CPI EU Harmonized	(M)	Industrial Production (M)		Claimant Count Rate SA (M)	Claimant Count Rate SA (M)
CHI	CPI (M)		Monthly Economic Index (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
COL	CPI (M)		Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
HUN	CPI (M)		Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
IND	CPI (M)		GDP (Q)		N/A	N/A
IDO	CPI (M)		GDP (Q)		N/A	N/A
ISR	CPI (M)		GDP (Q)		N/A	N/A
KOR	CPI (M)		Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
MEX	Biweekly CPI	(B)	Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
POL	CPI (M)		Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
SOA	CPI (M)		Industrial Goods & Services (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
TWN	CPI (M)		Manufacturing Production (M)		Unemployment rate SA (Q)	Unemployment rate SA (Q)
THA	CPI (M)		Industrial Production (M)		Unemployment rate SA (M)	Unemployment rate SA (M)
			GDP (Q)		N/A	N/A

Note: This table presents the inflation, economic activity and unemployment releases for all countries. Q = Quarterly, M = Monthly, B = Bi-Weekly, W = Weekly and NA = Not Available, SA = Seasonally Adjusted. Federal Reserve speeches delivered on these dates are removed from the sample of speeches and the results re-tested for their putative impact on sovereign credit default swaps' spreads.