IIMB-WP N0. 697/2024

WORKING PAPER NO: 697

Federal Reserve Speeches and Sovereign Credit Risk

Abhinav Anand
Assistant Professor
Finance & Accounting
Indian Institute of Management Bangalore
abhinav.anand@iimb.ac.in

Hitesh Doshi
Professor
Bauer College of Business,
University of Houston
hdoshi@bauer.uh.edu

Ankit Kumar
Assistant Professor
Indian Institute of Management Calcutta
ankitk@iimcal.ac.in

Jalaj Pathak
Assistant Professor
Indian Institute of Management Lucknow
jalaj.pathak@iiml.ac.in

Year of Publication – August 2024

Federal Reserve Speeches and Sovereign Credit Risk*

Abhinav Anand† Hitesh Doshi‡ Ankit Kumar§

Jalaj Pathak¶

*We thank Saurin Patel, Stephen Szaura, Virgilio Zurita, seminar participants at the Indian Institute of Technology Kanpur (IITK) and the Centre for Advanced Financial Research and Learning (CAFRAL) at the Reserve Bank of India (RBI).

†Indian Institute of Management Bangalore, abhinav.anand@iimb.ac.in

‡Bauer College of Business at the University of Houston, hdoshi@bauer.uh.edu

§Indian Institute of Management Calcutta, ankitk@iimcal.ac.in

¶Indian Institute of Management Lucknow, jalaj.pathak@iiml.ac.in

Abstract

We examine the spillover effect of speeches delivered by the Federal Reserve Board of Governors on sovereign credit risk and find that the tone of speeches—especially those that are forward-looking—negatively impacts sovereign credit spreads. Cross-sectionally, the impact is stronger for countries with high external debt and those with high exchange rate stability. The negative relationship between Fed speech tone and sovereign spreads is exacerbated in the presence of monetary policy shocks, economic policy uncertainty, and a loose monetary policy stance, and is likely channeled via the macroeconomic content embedded in speeches. We also show that Fed speeches delivered 1–4 weeks prior to FOMC meetings contain advance information, which can be used to explain variation in CDS spreads around FOMC announcements. 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

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], bond yields [Gilchrist et al., 2014], corporate bond returns [Guo et al., 2020], 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.

A major portion of the central bank communication literature has focused on the impact of FOMC communication. This ranges from the impact

[1] Carr 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.

of FOMC on financial market variables [Kuttner, 2001, Gürkaynak et al., 2005, Bernanke and Kuttner, 2005, Swanson, 2021] to using an FOMC announcement as an "external instrument" to examine the impact on macroeconomic variables such as inflation, unemployment and output [Cochrane and Piazzesi, 2002, Faust et al., 2003, 2004, Stock and Watson, 2012, Gertler and Karadi, 2015, Ramey, 2016, Bauer and Swanson, 2023]. However, due to sample size issues (8 FOMC meetings per year) there have been questions on the efficacy of such results [Ramey, 2016]. In a notable recent study, Swanson and Jaywickrema [2023] combine the data for FOMC announcements as well as Federal Reserve board speeches to show how the impact is strengthened with the increased effect of Fed speeches and argue that these speeches "*[...] have large effects on financial markets and are even more important than FOMC announcements for stocks and bonds.*" This is because the decisions of the FOMC are communicated ahead of time to the financial market through these speeches.[2] Similarly, Cieslak and McMahon [2023] in another recent study, argue that FOMC members reveal their forward-looking stance through public speeches above and beyond regularly scheduled policy announcement which significantly affects asset prices. Our motivation in estimating the impact of Federal Reserve's Board of Governors' speeches on sovereign CDS spreads is motivated primarily by this stream of literature.

Recognizing the critical role of the US Federal Reserve in shaping expec-

[2] Gagnon et al. [2011], Wright [2012], Kim et al. [2020], Swanson [2023] are other relevant studies that examine the impact of Fed speeches on the financial market variables.

tations 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 quantify the tone using the financial dictionary of Loughran and McDonald [2011] along with central bank related words and phrases as specified in Apel and Grimaldi [2014] and Apergis and Pragidis [2019]. We further complement the tonal words and phrases with the usage of "valence shifters" (adverbs, adjectives, negators and adversative conjunctions) which can modify their polarity [Schulder et al., 2018] using the the sentence as the base unit of analysis [Andreevskaia and Bergler, 2008, Apergis and Pragidis, 2019].

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.[3] We offer detailed 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 a major 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. The results also highlight the rela-

[3]The full list of countries used in this study are included in Table A1.

tive importance of the U.S. Fed speech tone in explaining the variation in CDS spreads in comparison to the U.S. and sovereign specific variables as per Longstaff et al. [2011]. 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, Hubert and Labondance, 2021, Cieslak and McMahon, 2023]. Further, we find that cross-sectionally, the impact of Fed speeches is more 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—are especially sensitive to the information embedded in Fed speeches. Moreover, the negative relationship between the tone of Fed Board of Governors' speeches and the sovereign CDS spreads is intensified in the presence of i) extreme monetary policy shocks in the US, calculated according to Bu et al. [2021], ii) extreme economic policy uncertainty in non-US countries, as quantified by the well-known 'Economic Policy Uncertainty Index' (EPUI) Baker et al. [2016] and iii) monetary policy loosening by the Fed. We also demonstrate that Fed BoG speeches 1–4 weeks prior to FOMC meetings contain advance information and have significant explanatory power, over and above that of FOMC announcements for CDS spreads around FOMC meeting days. This is line with Istrefi et al. [2023], Swanson [2023], Cieslak and McMahon [2023] who show that the speeches delivered by the Federal Reserve—while relatively

understudied—are even more important than FOMC announcements for asset prices since they communicate major FOMC decisions well ahead of time Swanson and Jaywickrema [2023].

In addition, we offer evidence that the likely channel via which Fed speeches move sovereign spreads is the macroeconomic content embedded in speeches, especially when this macroeconomic content is embedded in words and phrases which allude to matters related to foreign entities. Such macro content contains important information about the common factors that impact all economies. This result is consistent with Longstaff et al. [2011] which show that sovereign credit spreads are impacted far more by US-related factors than by country-level variables. More recently, Leombroni et al. [2021] also demonstrate the importance of a 'direct macroeconomic channel' via which Fed communication can move sovereign bond yields.

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 likely transmitted via their influence on sovereign credit risk premia. We also demonstrate that the technique of tone quantification used in this study is robust to the inclusion of i) the popular LM dictionary-based "bag-of-words" approach [Loughran and McDonald, 2011], ii) FinBERT—a leading machine learning-based tone quantification technique [Huang et al., 2023] and iii) the Dove-Hawk Index Cieslak et al. [2023]. 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 since 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 since 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 as well as economic policy uncertainty are more strongly impacted than their counterparts. Similarly, the content embedded in Fed speeches also

carries differential implications for sovereign CDS spreads: forward-looking speeches and those with high macroeconomic content have a much higher impact than other speeches.

The paper is organized as follows: Sections 2 and 3 specify, respectively, the methodology and data sources. Section 4 discusses the results of the impact of speech tone on CDS spreads, while Section 5 analyses potential channels of transmission. This is followed by Section 6 which presents the robustness results. Finally, Section 7 offers concluding remarks.

2 Methodology

2.1 Quantifying the tone of Fed's BoG speeches

We quantify the tone 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.

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 ($2 \leqslant n \leqslant 5$) 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 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 conjunctions 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]

Further, the tone quantification is done using the sentence as a baseline

[4]The list of valence shifters is taken from Schulder et al. [2018]. Table A2 in the appendix contains the full list of valence shifters for Fed speeches in our sample.

unit to avoid incorrect quantification of words and phrases [Andreevskaia and Bergler, 2008]. This approach can generate results quite different from standard techniques of tone quantification. For example, consider the following hypothetical sentences:

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*.

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 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., 2019, 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 bench-

[5] Link: https://www.federalreserve.gov/newsevents/speeches.htm

[6] 5 year CDS spreads are the most liquid and highly traded. Results are robust for 1, 3, 7, and 10 year spreads as well.

[7] All variables at the daily frequency.

mark 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.

Insert Table 1 around here.

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) primarily due to the occurrence of two major crises—the Great Recession and the Eurozone debt crisis—in our sample.[8] This is also consistent with Hubert and Labondance [2021] who document that the majority as well as the mean tone of FOMC statements is negative. About one-third of the words used in Fed's speeches are 'complex words' (words more than 2 syllabi), and the average sentence in a speech 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] is 0.88.[9]

Insert table 2 around here.

[8]This can also be observed visually in Figure 1.
[9]Please see section 4.4 for calculation details.

Table 3 presents the correlation between all speech-related and macroeconomic control variables used in this study. This is done primarily to allay concerns regarding multicollinearity among the explanatory variables. Tone—calculated on the basis of our methodology—has relatively low correlation with other variables and displays the highest observed correlation with US term spread (-0.23). 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. This plot also shows why the median and mean tone of Fed BoG speeches in the sample are negative.

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:

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

where $Y_{i,t}$ is the 5-year sovereign CDS spread at time (date) 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, SMOG and Flesch Kincaid (FK) indices and have been shown to be higher in central bank communication [Binder, 2017]. 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.[10] 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

[10]Detailed definitions of all variables can be found in Table 1.

(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 tend to amplify them. 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 (columnn 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 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.[11]

Insert table 4 about here.

Further, we conduct variance decomposition of sovereign CDS spreads with respect to the Fed speech tone by computing partial R^2s and find that

[11] We also find that the negative impact of Fed speech tone on sovereign CDS spreads can be attributed to the concurrent fall in the term (risk) premium component of sovereign bonds [Adrian et al., 2013]. These results are not included in the main paper for brevity but are reported in table A4 of the appendix.

Fed speeches contribute about 9.3% of the total explained variation.[12] This estimate is comparable to the contribution of other US-specific factors such as US VIX, US term spread etc. but is much larger than country-specific factors such as debt ratios, inflation, reserves etc. These findings seem to suggest that US-based factors drive the sovereign credit spreads of foreign countries much more than country-specific factors—in line with well-known findings reported in Longstaff et al. [2011]. In other words, we add a new variable—the Fed BoG speech tone—to the list of well-known US-based factors that are known to impact other countries' borrowing costs. These results are also consistent with Miranda-Agrippino and Rey [2020] who show that the US monetary policy has a significant explanatory power in describing variation in international asset prices.

4.2 Impact of speeches based on country, speech and Fed 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 our sample countries based on important macroeconomic characteristics such as external debt, exchange rate stability, monetary policy shocks, economic policy uncertainty, as well as the US monetary policy

[12] Calculated as $2.24/24.11 \times 100 = 9.3$.

stance. In addition, we also examine an 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. We specify a dummy variable for high external debt which takes the value 1 when the external debt for a particular country is higher than the 90^{th} percentile of all countries in a particular year.[13] We then add this dummy and its interaction with Fed speech tone in the regression specification (1).

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 policy 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, 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

[13]The results are robust to other similar classification.

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 divide nations into two categories based on the exchange rate stability index of Aizenman et al. [2013] which 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. The dummy for dividing countries into two categories is at the 90^{th} percentile for each year.

Further, 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 expectations of economic agents and are less likely to be endogenous. While in principle, Federal Reserve communication can be used to disseminate information (reporting) or to engage in signalling, more forward-looking content can be used to emphasize the latter (signalling) as opposed to the former (reporting) and can have major implications for financial market outcomes [Hubert and Labondance, 2021]. To quantify the impact of forward-looking Fed speeches, we consider the set of speeches that feature an above 90^{th} percentile of terms associated with forward-looking statements and examine their impact on the CDS spreads across sample economies.[14] To identify forward-looking com-

[14]The results are robust to other thresholds of classification.

munication, we look for specific words and phrases which are generally used to convey premeditated plans and actions taken from related prior literature [Li, 2010, Anand et al., 2022].

We also examine the impact of the Fed speech tone using monetary policy shocks calculated at the monthly frequency according to Bu et al. [2021] (BRW henceforth) based on the Fama [1971] two-step regression procedure.[15] If the resulting beta is negative, it suggests a hawkish stance and for positive values, implies a dovish stance. We define a dummy variable that takes the value 1 if the BRW shock exceeds the 90^{th} percentile (indicating extreme dovishness) or subceeds the 10th percentile (suggesting extreme hawkishness) to capture extreme instances of both policy stances. Further, we interact it with the Fed speech tone to examine if the impact of Fed speeches is moderated by extreme hawkish or dovish monetary policy shocks in that month.

Further, we analyze whether the impact of Fed speeches on foreign countries' borrowing costs is more intense when policy uncertainty is high. Evidence in favor of this hypothesis is presented in Bordo et al. [2016] which studies the impact of uncertainty on the credit channel as well as on macroeconomic factors such as the GDP. More recently, Cieslak et al. [2023] argue that Fed-managed uncertainty can influence its monetary policy stance. In light of such results, we employ the well-known 'Economic Policy Uncertainty

[15] This proxy for monetary policy shocks has been used in a recent paper by Di Giovanni and Rogers [2023] to examine the impact of the US Fed on other economies.

Index' (EPUI) [Baker et al., 2016] and define an EPUI dummy which assumes value 1 when the uncertainty is beyond the 90^{th} percentile and 0 otherwise. We note that the policy uncertainty index is not available for all 20 countries in the sample and hence we calculate it for the set of 9 countries for which it is available. These are Canada, Chile, France, Germany, India, Italy, UK, Sweden, and Mexico.

Finally, we examine the impact of the Fed speech tone on sovereign CDS spreads with respect to the monetary policy stance of the Fed. Gilchrist et al. [2019] specifies how the monetary policy of the U.S. significantly impacts the pricing of sovereign debt. The study shows that an easing (tightening) of monetary policy by the U.S. is significantly associated with narrowing (widening) of credit spreads on sovereign bonds. On similar lines, we examine the impact of the Federal Reserve BoG speech tone in the light of the U.S. monetary policy stance. The tightening and loosening periods are in accordance with Gilchrist et al. [2015] and the monetary policy dummy ("MP dummy") takes value 1 for periods when the stance corresponds to loosening and 0 otherwise.

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, forward-looking speeches, monetary policy shock, policy uncertainty and the Fed's monetary policy stance.

Insert table 5 about here.

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 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.

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.

Column 4 presents the results for the impact of the Fed speech tone on CDS spreads in the presence of extreme monetary policy shocks. Results for this regression show that the Fed tone retains its usual, significantly negative association with CDS spreads. On the other hand the BRW dummy which encodes extreme hawkish or dovish Fed policy does not show any major impact on the sovereign spreads. However, the interaction between the Fed tone and the BRW dummy displays a significantly negative impact on the CDS spreads suggesting that the tone of Fed speeches assumes much more

importance when the monetary policy shock in that month is extreme. In particular, for a 0.1 unit increase in the positivity of the Fed speech tone—corresponding to a unit interquartile movement—in the presence of an extreme monetary policy shock, there is a fall of 87 bps in the sovereign spreads, corresponding to about 95% of the overall mean spread. This implies that extreme monetary policy shocks have an economically meaningful impact on the influence of the Fed speech on other nations' sovereign CDS spreads.

Column 5 presents results for the impact of Fed speeches on sovereign spreads in the presence of high economic policy uncertainty. We find that extreme policy uncertainty—encoded by the EPUI dummy—has a major positive influence on the CDS spreads of foreign nations. In other words, in the presence of extremely high levels of economic policy uncertainty, borrowing costs of sovereigns rise significantly. Further, the interaction between the tone of Federal Reserve Board of Governors' speeches and the EPUI dummy is significantly negative. This implies that during times of high policy uncertainty, positive Fed speeches reduce CDS spreads significantly, while negative speeches strongly amplify sovereign spreads.

Finally, column 6 presents the impact with respect to the Federal Reserve monetary policy stance (loosening or tightening). We find that the action of monetary policy loosening by the Fed has a significant association with reduction in the sovereign CDS spreads. Further, the interaction of the Fed BoG speech tone with the monetary policy stance dummy is also significantly negative, suggesting that the impact of Fed speeches on CDS spreads get

further intensified during times when the Fed loosens its monetary policy stance.

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. Similarly, extreme monetary policy shocks, policy uncertainty and Fed's monetary policy stance also strongly amplify the influence of the tone of Fed speeches on sovereigns' borrowing costs.

4.3 Advance information embedded in Fed speeches

Prior research has demonstrated the significant impact of FOMC announcements and shocks on credit spreads [Javadi et al., 2018, Walz, 2024]. However, another line of recent research has argued than the speeches delivered by the Federal Reserve are even more important than announcements made during FOMC meetings since they disseminate major FOMC decisions well ahead of time [Swanson, 2023, Swanson and Jaywickrema, 2023]. Hence we investigate if Fed speeches prior to FOMC meetings have any influence on CDS spreads across countries over and above the content of FOMC announcements. We regress CDS spreads on FOMC announcements' tone, and on the mean tone of Fed speeches delivered 1–4 weeks prior to the FOMC meetings in the presence of speech text controls (speech % CW, speech AWPS) and

FOMC announcements' text controls (FOMC % CW, FOMC AWPS). The results are presented in Table 6 where the Fed speech tone 1-4 weeks prior to FOMC announcements continues to manifest its significant negative association with the CDS spreads for all countries. Quite notably, the tone of FOMC announcements as well as its text characteristics have no impact on the CDS spreads suggesting that Fed speeches drive the movement in CDS spreads and not the FOMC text, mirroring the results of Swanson and Jaywickrema [2023], Cieslak and McMahon [2023] and Swanson [2023].

Insert table 6 about here.

4.4 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 $\Re = (1, S_t^1, F_t^{1\times1}, F_t^{3\times1}, F_t^{5\times1}, F_t^{7\times1})$ for estimating the regression parameters β^{EX}. The sovereign credit risk premia are obtained based on the information available at time t as:

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

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

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

The results are reported in Table 7.[16] 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 $\mathbb{E}^{\mathbb{Q}}[\log(S_{t+\tau})] - \mathbb{E}^{\mathbb{P}}[\log(S_{t+\tau})]$ 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 $\mathbb{E}^{\mathbb{P}}[\log(S_{t+\tau})]$. 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 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

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

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 7 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.

4.5 Alternative tone metrics and their impact on CDS spreads

The metric for tone quantification which we primarily employ in this study relies on the notion of valence shifters which impart nuance and modification to the connotation of sentences. However, there are other widely used tone quantification techniques which could presumably be used to explain variation in sovereign CDS spreads. Three such prominent methods are the 'bag of words' (unigram) approach based on the LM dictionary [Loughran and McDonald, 2011]; 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;[17] and the 'Dove-Hawk' index introduced in Cieslak and McMahon [2023] which is the difference between the number of 'Dovish' and 'Hawkish' words and phrases in speeches delivered by FOMC committee members.

We present the results of a comparative analysis between the tone quantification metrics in Table 8. Columns 1–6 depict results based on including different measures: FinBERT (column 1), LM bag of words tone (column 2), Dove Hawk Index (column 3); valence shifter tone and FinBERT together (column 4); valence shifter tone and LM bag of words tone (column 5); and finally valence shifter tone and Dove Hawk Index (column 6).

Insert Table 8 about here

None of the alternative tone quantification metrics 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, the latter render the former insignificant suggesting that valence shifter tone is able to capture features not present in other tone quantification metrics. These results are also quite reasonable: the LM dictionary-based bag of words approach overlooks the impact of connotation-modifying valence shifters, and hence fails to detect any impact on CDS spreads. The FinBERT model, on the other hand, suffers from

[17]FinBERT classifies words as positive, neutral, or negative based on computing the probability of words belonging to each category and employs 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.

its probabilistic approach which assigns a positive, negative or neutral value based on predicted probabilities, which has been also highlighted in Arslan et al. [2021] and Kim et al. [2023], who explain 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]. Similarly, the dove-hawk index uses terms and phrases that are more directly related to monetary policy tightening or easing and hence misses out on nuance-injecting, connotation altering role played by valence shifters in the Federal Reserve speeches.

5 Potential channels of transmission

In this section we investigate potential channels via which the impact of Fed speeches gets transmitted to the sovereign CDS spreads. In their well-known paper, Longstaff et al. [2011] analyze sovereign credit risk through CDS spreads in developed and emerging markets and find minimal or non-existent country-specific credit risk premiums. Instead, they attribute the variation in sovereign CDS to US equity and bond market-related metrics. Movements in the US equity and bond markets in turn, are strongly influenced by Federal Reserve communication [Kuttner, 2001, Gürkaynak et al., 2005, Bernanke and Kuttner, 2005, Swanson, 2021]. On a similar note, in a recent study, Leombroni et al. [2021] show that central bank communication—in particular, macroeconomic-related content—can directly move sovereign bond yields. Similar results are presented by Xing et al. [2024], who examine

the impact of the U.S. macroeconomic news and its significant impact on the bond yields of Canada, Sweden and the U.K. In order to verify if the same channel is at work in our study, we examine the macroeconomic content of Fed speeches and relate it to movements in sovereign CDS spreads for our sample countries.

We quantify the macroeconomic content of Fed speeches at both the word and the sentence level. First, from the corpus of speeches we create a word-frequency table after the removal of stop words.[18] Since the word-frequency distribution tends to follow power laws, we only examine the top 20% words since they contribute roughly 80% of the cumulative frequency [Corral et al., 2015]. Among these most frequently occurring words, we identify those characteristic of macroeconomic-related discourse [Gardner et al., 2022].[19] For each speech, we then classify the percentage of macroeconomic-related words and then construct a macro-dummy that is assigned a value 1 if the proportion of macroeconomic-related words exceeds the 90^{th} percentile and 0 otherwise. At the sentence-level, we identify those sentences which contain at least one such macroeconomic word and create a Fed speech dummy which

[18] Stop words contribute minimally to the overall connotation of a text. These include prepositions, articles, pronouns etc.

[19] These include "federal", "policy", "inflation", "banks", "economic", "monetary", "economy", "growth", "rates", "interest", "prices", "stability", "liquidity", "funds", "mortgage", "regulatory", "labor", "fomc", "lending", "unemployment", "employment", "income", "demand", "regulation", "fed", "economies", "consumer", "policies", "governors", "sector", "costs", "government", "basel", "debt", "economics", "households", "treasury", "loan", "productivity", "developments", "consumers", "job", "exchange", "regulators", "macroeconomic", "reserves", "yields", "economists", "saving", "consumption", "tax", "tightening", "quantitative", "imbalances", "currencies", "produce", "recessions", "libor", "interests", "depression", "legislation", "ccp", "countercyclical", "liability", "macroeconomics", "deficits", "unemployed", "fsoc"

assumes value 1 when the number of sentences with macroeconomic content exceeds the 90^{th} percentile, and 0 otherwise. We also create a Fed tone dummy which assumes the value 1 when the tone exceeds the 90^{th} percentile or subceeds the 10^{th} percentile thereby capturing either extremely positive or extremely negative speeches.[20]

With this specification, we present results in Table 9. For the speech content based on macroeconomic words, we find that the interaction between the Fed tone dummy and word-based macro dummy is significantly negative. In a similar vein, the interaction between the Fed tone dummy and the sentence-based macro dummy is also significantly negative. These results imply that for extremely positive speeches with high levels of macroeconomic content, there is substantial reduction in sovereign CDS spreads, which indicates that it is the macro-related content that drives the impact of speeches on spreads. We note however, that while this provides evidence in favor of the macroeconomic channel at work (consistent with Longstaff et al. [2011]) there could be other factors operating simultaneously via other content embedded in Fed speeches as well. Moreover, the impact of the macroeconomic content channel can be exacerbated by country-specific variables such as external debt, exchange rate, and economic policy uncertainty as specified in Table 5.

Insert table 9 about here.

[20]The results are robust for other similar thresholds as well.

Further, we also examine if the impact of the Fed Speech tone on CDS spreads is channeled via the explicit mention of matters related to other countries in the speeches. To investigate this aspect, we quantify the level of discussion related to 'foreign' entities in Fed speeches. We find that the word 'foreign' occurs juxtaposed with terms used to identify macroeconomic content.[21] We create two metrics of mentions of such macro-juxtaposed 'foreign' terms: a continuous measure and a dummy. For constructing the continuous measure, we count the frequency of the term "foreign" juxtaposed with macroeconomic words and normalize it by the total number of words in the speech. For the 'foreign' dummy, we stipulate that it takes the value 1 if the continuous measure exceeds the 90^{th} percentile and 0 otherwise.[22] Results are presented in Table 10. For both metrics of macro-juxtaposed 'foreign' mentions, we see a strong, negative impact on the sovereign CDS spreads. In particular, the interaction of the Fed speech tone with the macro-juxtaposed 'foreign' mentions assumes major significance, suggesting that the negative impact of Federal Reserve speech tone on CDS spreads gets amplified especially in the presence of macroeconomic terms emphasizing relations with foreign entities.

Insert table 10 about here.

[21] For example, 'foreign demand', 'foreign debt', 'foreign funds', 'foreign loans' etc.
[22] The results are robust to other categorizations as well.

6 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 11.

Insert table 11 about here.

Column 1 presents 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 annoucement dates of which we account for, in line with Adrian et al. [2013]. The result with the

modified sample of speeches show that the benchmark estimates continue to retain their inference and validity.

Further, 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].[23] 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

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

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 the robustness of results with respect to all other terms of CDS premium as well as the change in risk premium instead of level. The results for 1, 3, 7, and 10 year CDS premium are presented in Table 12 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 12 around here.

7 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 for a sample of 10 advanced and 10 emerging economies and find that the speech tone—especially for forward-looking speeches—is significantly negatively associated with the CDS spreads. In other words, positive Fed speeches significantly lower CDS spreads for all economies in our sample. We also find that Fed speeches contain information 1-4 weeks in advance of FOMC announcements and are significant in explaining CDS spreads around FOMC meetings. Cross-sectionally, results are more pronounced for countries with higher external debt and for those with more managed exchange rate stabil-

ity. We also show that our results are exacerbated in the presence of extreme US monetary policy shocks, extreme economic policy uncertainty in foreign countries as well as during periods in which the Fed's monetary policy stance favors loosening. We also provide evidence that the likely channel via which Fed speeches move sovereign spreads is via the macroeconomic content embedded in the Board of Governors' speeches. The results are robust even after accounting for the impact of FOMC communication and for macro-announcement dates for other countries as well to the inclusion of other popular tone quantification schemes. Finally we 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 likely transmitted via the speeches' impact on the sovereign credit risk premia.

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.

Figures

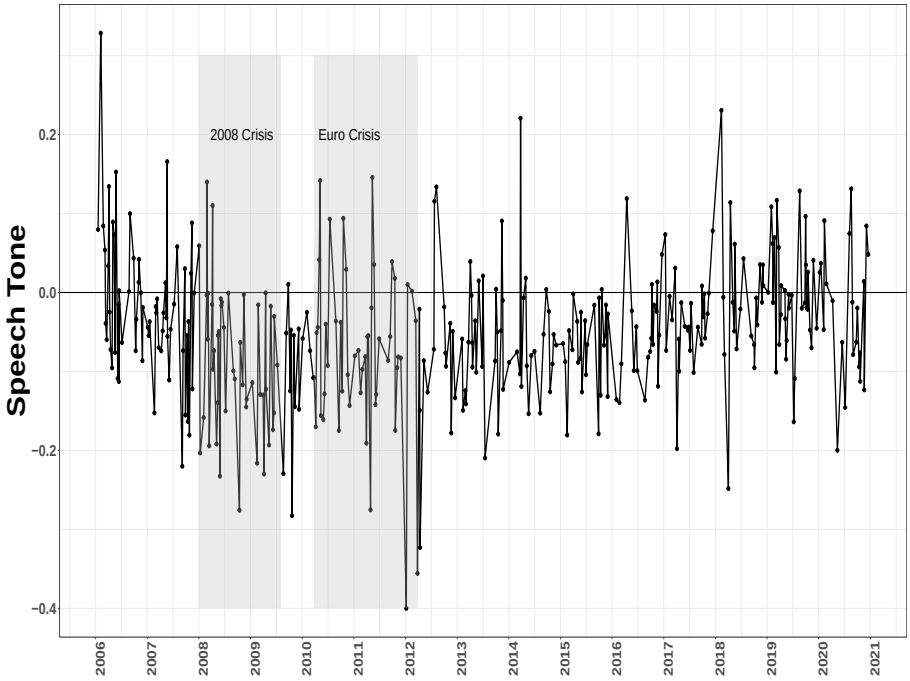

Figure 1: Valence shifter-based tone for Fed's Board of Governors' speeches over time.

Tables

Table 1: Definitions of the variables used in this study

Variable	Definition
Speech Text Measures:	
Fed Tone	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/
Average words per sentence (AWPS)	The number of words in the speeches divided by the total number of sentence termination characters after removing those associated with headings and abbreviations.
Percent complex words (% CW)	The percentage of words with more than two syllables.
Dependent variable:	
CDS Spread	The CDS spread for 1, 3, 5, 7, and 10 year as downloaded from the **Markit** database.
Control variables:	
Debt Ratio	The total Debt to GDP ratio for each country in the sample as downloaded from Bloomberg.
Inflation	The benchmark inflation index for each country in the sample as downloaded from Bloomberg.
VIX	The benchmark volatility index for each country in the sample as downloaded from Bloomberg.
Bond10Y	The yield of the 10-year bond of the U.S. as downloaded from Bloomberg.

Variable	Definition
US Term Spread	The difference in the yields of the 10-year and 3-month bond of the U.S. as downloaded from Bloomberg.
ToT Volatility	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.
Reserves	The exchange rate reserves without gold (in USD). The data are downloaded from Bloomberg.
Log(Market Cap)	The market cap of the benchmark index for each country. Downloaded from Bloomberg.

Table 2: Descriptive statistics

	Mean	Median	SD	IQR
Panel A: Text characteristics of Fed BoG speeches				
Tone	-0.05	-0.05	0.09	0.10
% Complex Words	29.92	29.67	8.22	11.67
Average Words Per Sentence	29.03	28.00	7.75	9.00
Panel B: Sovereign five year CDS spreads (basis points)				
CDS spread	91.31	70.12	88.90	98.05
Panel C: Sovereign five year year credit risk premia				
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 4.4.

Table 3: Correlation Table

	Tone	% CW	AWPS	Debt Ratio	Inflation	VIX	Bond 10Y	US Term Spread	ToT Vol	Reserves	Market Cap
Tone	**1**										
% CW	0.01	**1**									
AWPS	**-0.03**	**-0.04**	**1**								
Debt Ratio	**-0.04**	0.01	0.01	**1**							
Inflation	0.01	0.01	**0.03**	**-0.04**	**1**						
VIX	0.01	**0.06**	**-0.05**	-0.01	0.01	**1**					
Bond 10Y	**0.12**	**0.05**	**-0.17**	**-0.11**	**0.05**	**0.04**	**1**				
US Term Spread	**-0.23**	0.01	**-0.05**	**0.13**	**-0.06**	0.01	**-0.25**	**1**			
ToT Vol	0.01	0.01	-0.02	**-0.16**	**-0.10**	**0.04**	0.01	0.03	**1**		
Reserves	**0.03**	0.01	-0.01	**-0.23**	-0.01	-0.01	**0.06**	**-0.09**	**0.09**	**1**	
Market Cap	**-0.03**	0.01	-0.03	**0.28**	0.01	-0.02	**0.05**	**0.05**	**0.09**	**-0.26**	**1**

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***	−42.77***	−91.46***	−32.52***
	(23.99)	(14.22)	(22.29)	(11.66)
% CW	−18.25	−11.05	−17.97	−11.19
	(17.82)	(14.85)	(17.20)	(12.37)
AWPS	−0.11	−0.36*	−0.08	−0.21
	(0.21)	(0.20)	(0.24)	(0.20)
VIX		18.81		12.28
		(22.96)		(18.81)
US Term Spread		11.19**		9.81*
		(4.50)		(5.27)
Bond10Y		−17.17**		−28.70***
		(8.48)		(10.08)
Debt Ratio			61.22*	42.36**
			(31.85)	(17.26)
Inflation			0.02	0.04*
			(0.01)	(0.02)
ToT Vol			1.74	1.05
			(2.96)	(2.25)
Reserves			−5.65	−66.01***
			(14.80)	(23.70)
Market Cap			−4.24	−3.43
			(7.76)	(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 5-year sovereign CDS spreads on Fed BoG's speech tone 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, speech and Fed characteristics

	External Debt	Ex Rate Stability	Forward Looking Speeches	BRW Shock	EPUI Shock	Monetary Policy Stance
Fed Tone	−36.69***	−65.08***	−25.28*	−21.96*	−8.0447	13.75
	(13.89)	(19.23)	(13.79)	(12.37)	(14.5938)	(13.59)
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)			
BRW Dummy				6.50		
				(4.23)		
Fed Tone× BRW Dummy				−64.51**		
				(31.01)		
EPUI Dummy					60.94***	
					(17.47)	
Fed Tone× EPUI Dummy					−225.45***	
					(81.31)	
MP Dummy						-36.13**
						(16.57)
Fed Tone× MP Dummy						−56.29***
						(11.96)
Control variables						
Time-based Controls	Yes	Yes	Yes	Yes	Yes	Yes
Speech Controls	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country and Date FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.20	0.22	0.20	0.24	0.44	0.25
Observations	4380	4380	4380	4380	1928	4380

Note: This table presents results from the panel regression of 5-year sovereign CDS spreads on Fed BoG's speech tone based on the countries' external debt, exchange rate stability, forward looking Fed speeches, and monetary policy stance. The dummy for external debt, exchange rate stability, BRW dummy, EPUI, and forward looking speeches is defined as 1 for values exceeding the 90th percentile whereas for monetary policy stance, the dummy takes value 1 if the stance was loosening (easing) and 0 otherwise. 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. All variables and their sources are defined in detail in Table 1.

Table 6: Impact of Fed speeches delivered prior to FOMC meetings on CDS spreads

	1 week prior to FOMC	2 weeks prior to FOMC	3 weeks prior to FOMC	4 weeks prior to FOMC
Fed Speech Tone	−95.82**	−207.53***	−65.66*	−166.57***
	(47.16)	(55.76)	(35.55)	(54.45)
Fed FOMC Tone	−53.86	−89.80	−56.54	−38.12
	(46.63)	(55.42)	(44.35)	(46.69)
% CW Speech	−31.79	−59.21	23.33	−7.57
	(33.54)	(43.68)	(45.51)	(57.31)
AWPS Speech	−0.36	−1.54**	−1.57**	−1.29*
	(0.75)	(0.71)	(0.70)	(0.66)
% CW FOMC	−211.59	−150.22	−253.55	−169.60
	(253.32)	(244.14)	(246.06)	(230.94)
AWPS FOMC	−1.30	−1.13	−1.14	−1.06
	(1.04)	(1.05)	(1.0522)	(1.03)
Control variables				
Time-based Controls	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes
Country and Date FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.18	0.21	0.18	0.20
Observations	925	925	919	925

Note: This table presents results from the panel regression of 5-year sovereign CDS spreads on Fed BoG's speech tone and controls, 1-4 weeks prior to the FOMC announcements. 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 7: 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 5-year sovereign CDS risk premiums on Fed BoG's speech tone for all countries in the sample in line with the regression specification in equation (1). The CDS risk premium is calculated as per Friewald et al. [2014] as elaborated in section 4.4. 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 alternative Fed speech tone metrics on CDS spreads

	(1)	(2)	(3)	(4)	(5)	(6)
Valence shifter tone				−41.26**	−79.39**	−32.92***
				(19.07)	(32.15)	(11.40)
FinBERT	−9.31			5.68		
	(5.99)			(9.87)		
LM Bag of Words		−56.59			201.03	
		(45.67)			(125.87)	
Dove Hawk Index			−0.14			−0.28
			(2.74)			(2.70)
Time-based Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country and Date FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.25	0.25	0.25	0.25	0.25	0.25
Observations	4380	4380	4380	4380	4380	4380

Note: This table presents results from the panel regression of 5-year sovereign CDS spreads on Fed BoG's speech tone and alternate quantification schemes for all countries in the sample in line with the regression specification in equation (1). 'FinBERT' denotes tone according to the FinBERT model; 'LM Bag of Words' denotes tone computed according to the LM dictionary bag of words approach; and Dove Hawk Index is the difference between dovish and hawkish terms and phrases as per Cieslak and McMahon [2023]. 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. All variables and their sources are defined in detail in Table 1.

Table 9: Impact of macroeconomic content in Fed speeches on CDS spreads

	(1)	(2)
Fed Tone Dummy	0.01	0.48
	(2.38)	(2.40)
Macro Dummy (Words)	−0.67	
	(4.07)	
Fed Tone Dummy× Macro Dummy (Words)	−24.52***	
	(5.84)	
Macro Dummy (Sentences)		7.70
		(5.07)
Fed Tone Dummy× Macro Dummy (Sentences)		−10.77***
		(0.72)
Controls	Yes	Yes
Time-based Controls	Yes	Yes
Country and Date FE	Yes	Yes
Adjusted R^2	0.25	0.25
Observations	4380	4380

Note: This table presents results from the panel regression of 5-year sovereign CDS spreads on Fed BoG's speech tone for all countries in the sample in line with the regression specification in equation (1). The macro-related terms are defined in section 5. The dummy for both macro words and sentences takes value 1 if the number of macro words/sentences is higher than the 90th percentile and 0 otherwise. The standard errors are reported in the parentheses and are all Heteroskedasticity and Autocorrelation (HAC) robust. All variables and their sources are defined in detail in Table 1.

Table 10: Impact of Fed speeches featuring macro terms juxtaposed with 'foreign' mentions on CDS spreads

	(1)	(2)
Fed Tone	−14.74	−16.87
	(11.19)	(11.21)
'Foreign' mentions	−2.27***	
	(0.54)	
Fed Tone× 'Foreign' mentions	−39.41***	
	(8.28)	
'Foreign' mentions dummy		−3.74
		(5.71)
Fed Tone× 'Foreign' mentions dummy		−139.02***
		(52.97)
Controls	Yes	Yes
Time-based Controls	Yes	Yes
Country and Date FE	Yes	Yes
Adjusted R^2	0.26	0.26
Observations	4380	4380

Note: This table presents results from the panel regression of 5-year sovereign CDS spreads on Fed BoG's speech tone for all countries in the sample in line with the regression specification in equation (1). The macro-related terms are defined in section 5. The 'foreign' mentions dummy assumes value 1 when the frequency of occurrence of the term 'foreign' juxtaposed with macroeconomic terms exceeds the 90th percentile and is 0 otherwise. The standard errors are reported in the parentheses and are all Heteroskedasticity and Autocorrelation (HAC) robust. All variables and their sources are defined in detail in Table 1.

Table 11: 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***	−36.90***	−28.89**
	(13.52)	(12.81)	(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 5-year CDS spreads on 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 after 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. All variables and their sources are defined in detail in Table 1.

Table 12: Impact of Fed speech tone on alternate maturity (1, 3, 7, 10 year) CDS spreads

	1Y	3Y	7Y	10Y
Fed Tone	−42.19***	−44.18***	−30.07**	−23.49**
	(11.97)	(12.79)	(12.26)	(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 1,3,7, and 10 year sovereign CDS spreads on Fed BoG's speech tone 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. All variables and their sources are defined in detail in Table 1.

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 taken from Schulder et al. [2018].

Word	Classification	Weight	Word	Classification	Weight
almost	de-amplifier	0.8	not	negator	-1
although	adversative-conjuction	0.8	only	de-amplifier	0.8
barely	de-amplifier	0.8	particular	amplifier	0.8
but	adversative-conjuction	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-conjuction	0.8	very	amplifier	0.8
huge	amplifier	0.8	whereas	adversative-conjuction	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
USA	CPI Urban Consumers (M)	Industrial Production (M)	Initial Jobless Claims SA (W)
AUS	CPI All Groups Goods (Q)	GDP (Q)	Unemployment rate SA (M)
CAD	CPI (M)	GDP All industries (M)	Unemployment rate SA (M)
CZE	CPI (M)	Industrial Production (M)	N/A
FRA	CPI EU Harmonized (M)	Industrial Production (M)	Unemployment rate SA (M)
GER	CPI EU Harmonized (M)	GDP (Q)	Unemployment rate SA (M)
ITA	CPI EU Harmonized (M)	Industrial Production (M)	Unemployment rate SA (M)
JPN	CPI Nationwide (M)	Industrial Production (M)	Unemployment rate SA (M)
NZL	CPI All Groups (Q)	GDP (Q)	Unemployment rate SA (Q)
NOR	CPI (M)	Industrial Production (M)	Unemployment rate SA (M)
SWE	CPI Headline (M)	Industrial Production (M)	Unemployment rate SA (M)
SWI	CPI (M)	GDP (Q)	Unemployment rate SA (M)
UKG	CPI EU Harmonized (M)	Industrial Production (M)	Claimant Count Rate SA (M)
CHI	CPI (M)	Monthly Economic Index (M)	Unemployment rate SA (M)
COL	CPI (M)	Industrial Production (M)	Unemployment rate SA (M)
HUN	CPI (M)	Industrial Production (M)	Unemployment rate SA (M)
IND	CPI (M)	GDP (Q)	N/A
IDO	CPI (M)	GDP (Q)	N/A
ISR	CPI (M)	GDP (Q)	N/A
KOR	CPI (M)	Industrial Production (M)	Unemployment rate SA (M)
MEX	Biweekly CPI (B)	Industrial Production (M)	Unemployment rate SA (M)
POL	CPI (M)	Industrial Goods & Services (M)	Unemployment rate SA (M)
SOA	CPI (M)	Manufacturing Production (M)	Unemployment rate SA (Q)
TWN	CPI (M)	Industrial Production (M)	Unemployment rate SA (M)
THA	CPI (M)	GDP (Q)	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.

Table A4: Impact of Fed speech tone on the bond term (risk) premium component

	(1)	(2)	(3)	(4)
Fed Tone	−47.11**	−47.19**	−43.58**	−43.59**
	(20.17)	(20.09)	(20.97)	(20.94)
% CW	32.02	30.95	25.12	24.94
	(20.99)	(21.58)	(17.07)	(17.41)
AWPS	−1.22**	−1.21**	−0.77*	−0.77*
	(0.48)	(0.48)	(0.42)	(0.42)
VIX		18.04		3.07
		(28.61)		(20.75)
Debt Ratio			33.19	33.22
			(29.2199)	(29.15)
Inflation			−0.01	−0.01
			(0.01)	(0.01)
ToT Vol			1.51	1.51
			(3.33)	(3.31)
Reserves			−72.19***	−72.16***
			(10.10)	(10.08)
Market Cap			7.74	7.74
			(8.19)	(8.19)
Time-based Controls	Yes	Yes	Yes	Yes
Country and Date FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.02	0.02	0.17	0.17
Observations	4380	4380	4380	4380

Note: This table presents results from the panel regression of the 5 year term (risk) premium component of sovereign bonds [Adrian et al., 2013] on the Fed BoG's speech tone 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; '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.

References

Christopher S Adam and David L Bevan. Fiscal deficits and growth in developing countries. *Journal of Public Economics*, 89(4):571–597, 2005.

Tobias Adrian, Richard K Crump, and Emanuel Moench. Pricing the term structure with linear regressions. *Journal of Financial Economics*, 110(1): 110–138, 2013.

Joshua Aizenman, Menzie David Chinn, and Hiro Ito. The "impossible trinity" hypothesis in an era of global imbalances: Measurement and testing. *Review of International Economics*, 21(3):447–458, 2013.

Joshua Aizenman, Mahir Binici, and Michael M. Hutchison. The transmission of Federal Reserve tapering news to emerging financial markets. *International Journal of Central Banking*, 12(2):317–356, 2016.

Elias Albagli, Luis Ceballos, Sebastian Claro, and Damian Romero. Channels of US monetary policy spillovers to international bond markets. *Journal of Financial Economics*, 134(2):447–473, 2019.

Abhinav Anand, Sankarshan Basu, Jalaj Pathak, and Ashok Thampy. Whose speeches impact European markets: ECB's or the national central banks'? *European Financial Management*, (28):1413–1476, 2022.

Alina Andreevskaia and Sabine Bergler. When specialists and generalists work together: Overcoming domain dependence in sentiment tagging. In *Proceedings of ACL-08: HLT*, pages 290–298, 2008.

Mikael Apel and Marianna Blix Grimaldi. The information content of central bank minutes, 2012. Working Paper Series 261, Sveriges Riksbank (Central Bank of Sweden).

Mikael Apel and Marianna Blix Grimaldi. How informative are central bank minutes? *Review of Economics*, 65(1):53–76, 2014.

Nicholas Apergis and Ioannis Pragidis. Stock price reactions to wire news from the European Central Bank: Evidence from changes in the sentiment tone and international market indexes. *International Advances in Economic Research*, 25(1):91–112, 2019.

Yusuf Arslan, Kevin Allix, Lisa Veiber, Cedric Lothritz, Tegawendé F Bissyandé, Jacques Klein, and Anne Goujon. A comparison of pre-trained language models for multi-class text classification in the financial domain. In *Companion Proceedings of the Web Conference 2021*, pages 260–268, 2021.

Patrick Augustin. The term structure of cds spreads and sovereign credit risk. *Journal of Monetary Economics*, 96:53–76, 2018.

Patrick Augustin, Valeri Sokolovski, Marti G Subrahmanyam, and Davide Tomio. How sovereign is sovereign credit risk? global prices, local quantities. *Journal of Monetary Economics*, 131:92–111, 2022.

Scott R Baker, Nicholas Bloom, and Steven J Davis. Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, 131(4):1593–1636, 2016.

Michael D Bauer and Eric T Swanson. A reassessment of monetary policy surprises and high-frequency identification. *NBER Macroeconomics Annual*, 37(1):87–155, 2023.

Luca Benzoni, Pierre Collin-Dufresne, Robert S Goldstein, and Jean Helwege. Modeling credit contagion via the updating of fragile beliefs. *The Review of Financial Studies*, 28(7):1960–2008, 2015.

Ben S Bernanke and Kenneth N Kuttner. What explains the stock market's reaction to Federal Reserve policy? *The Journal of Finance*, 60(3):1221–1257, 2005.

Antje Berndt, Rohan Douglas, Darrell Duffie, and Mark Ferguson. Corporate credit risk premia. *Review of Finance*, 22(2):419–454, 2018.

Carola Binder. Fed speak on main street: Central bank communication and household expectations. *Journal of Macroeconomics*, 52:238–251, 2017.

Michael D Bordo, John V Duca, and Christoffer Koch. Economic policy uncertainty and the credit channel: Aggregate and bank level us evidence over several decades. *Journal of Financial stability*, 26:90–106, 2016.

Valentina Bruno and Hyun Song Shin. Capital flows and the risk-taking channel of monetary policy. *Journal of Monetary Economics*, 71:119–132, 2015.

Chunya Bu, John Rogers, and Wenbin Wu. A unified measure of Fed monetary policy shocks. *Journal of Monetary Economics*, 118:331–349, 2021.

Peter Carr and Liuren Wu. Theory and evidence on the dynamic interactions between sovereign credit default swaps and currency options. *Journal of Banking & Finance*, 31(8):2383–2403, 2007.

Anna Cieslak and Michael McMahon. Tough talk: The Fed and the risk premium, 2023. Working Paper.

Anna Cieslak, Adair Morse, and Annette Vissing-Jorgensen. Stock returns over the FOMC cycle. *The Journal of Finance*, 74(5):2201–2248, 2019.

Anna Cieslak, Stephen Hansen, Michael McMahon, and Song Xiao. Policymakers' uncertainty, 2023. National Bureau of Economic Research.

John H Cochrane and Monika Piazzesi. The Fed and interest rates—a high-frequency identification. *American Economic Review*, 92(2):90–95, 2002.

John H Cochrane and Monika Piazzesi. Bond risk premia. *American Economic Review*, 95(1):138–160, 2005.

Álvaro Corral, Gemma Boleda, and Ramon Ferrer-i Cancho. Zipf's law for word frequencies: Word forms versus lemmas in long texts. *PloS one*, 10 (7):e0129031, 2015.

Jacob Devlin, Ming-Wei Chang, Kenton Lee, and Kristina Toutanova. Bert: Pre-training of deep bidirectional transformers for language understanding. *arXiv preprint arXiv:1810.04805*, 2018.

Julian Di Giovanni and John Rogers. The impact of US monetary policy on foreign firms. *IMF Economic Review*, pages 1–58, 2023.

Stephan Dieckmann and Thomas Plank. Default risk of advanced economies: An empirical analysis of credit default swaps during the financial crisis. *Review of Finance*, 16(4):903–934, 2012.

Hitesh Doshi, Kris Jacobs, and Virgilio Zurita. Economic and financial determinants of credit risk premiums in the sovereign CDS market. *The Review of Asset Pricing Studies*, 7(1):43–80, 2017.

Michael Ehrmann and Marcel Fratzscher. The timing of central bank communication. *European Journal of Political Economy*, 23(1):124–145, 2007.

Michael Ehrmann and Jonathan Talmi. Starting from a blank page? semantic similarity in central bank communication and market volatility. *Journal of Monetary Economics*, 111:48–62, 2020.

Eugene F Fama. Risk, return, and equilibrium. *Journal of Political Economy*, 79(1):30–55, 1971.

Jon Faust, John H Rogers, Eric Swanson, and Jonathan H Wright. Identifying the effects of monetary policy shocks on exchange rates using high frequency data. *Journal of the European Economic association*, 1(5):1031–1057, 2003.

Jon Faust, Eric T Swanson, and Jonathan H Wright. Identifying vars based on high frequency futures data. *Journal of Monetary Economics*, 51(6): 1107–1131, 2004.

Stanley Fischer. The Federal Reserve and the global economy. *IMF Economic Review*, 63:8–21, 2015.

Marcus J Fleming. Domestic financial policies under fixed and floating exchange rates. *IMF Staff Papers*, 9:369–379, 1962.

Nils Friewald, Christian Wagner, and Josef Zechner. The cross-section of credit risk premia and equity returns. *The Journal of Finance*, 69(6): 2419–2469, 2014.

Joseph Gagnon, Matthew Raskin, Julie Remache, and Brian Sack. The financial market effects of the Federal Reserve's large-scale asset purchases. *International Journal of Central Banking*, 7(1):45–52, 2011.

Ben Gardner, Chiara Scotti, and Clara Vega. Words speak as loudly as actions: Central bank communication and the response of equity prices to macroeconomic announcements. *Journal of Econometrics*, 231(2):387–409, 2022.

Mark Gertler and Peter Karadi. Monetary policy surprises, credit costs, and economic activity. *American Economic Journal: Macroeconomics*, 7(1): 44–76, 2015.

Simon Gilchrist, Vivian Yue, and Egon Zakrajsek. US monetary policy and foreign bond yields. In *15th Jacques Polak Annual Research Conference hosted by the IMF, Washington, November*, pages 13–14, 2014.

Simon Gilchrist, David López-Salido, and Egon Zakrajšek. Monetary policy and real borrowing costs at the zero lower bound. *American Economic Journal: Macroeconomics*, 7(1):77–109, 2015.

Simon Gilchrist, Vivian Yue, and Egon Zakrajšek. US monetary policy and international bond markets. *Journal of Money, Credit and Banking*, 51: 127–161, 2019.

Haifeng Guo, Alexandros Kontonikas, and Paulo Maio. Monetary policy and corporate bond returns. *The Review of Asset Pricing Studies*, 10(3): 441–489, 2020.

Refet S Gürkaynak, Brian Sack, and Eric Swanson. The sensitivity of long-term interest rates to economic news: Evidence and implications for macroeconomic models. *American Economic Review*, 95(1):425–436, 2005.

Bernd Hayo, Ali M Kutan, and Matthias Neuenkirch. Communicating with many tongues: FOMC speeches and US financial market reaction, 2008. MAGKS Joint Discussion Paper Series in Economics.

Jens Hilscher and Yves Nosbusch. Determinants of sovereign risk: Macroeconomic fundamentals and the pricing of sovereign debt. *Review of Finance*, 14(2):235–262, 2010.

Allen H Huang, Hui Wang, and Yi Yang. Finbert: A large language model for extracting information from financial text. *Contemporary Accounting Research*, 40(2):806–841, 2023.

Paul Hubert and Fabien Labondance. The signaling effects of central bank tone. *European Economic Review*, 133:103684, 2021.

Klodiana Istrefi, Florens Odendahl, and Giulia Sestieri. Fed communication on financial stability concerns and monetary policy decisions: Revelations from speeches. *Journal of Banking & Finance*, 151:106820, 2023.

Siamak Javadi, Ali Nejadmalayeri, and Timothy L Krehbiel. Do FOMC actions speak loudly? Evidence from corporate bond credit spreads. *Review of Finance*, 22(5):1877–1909, 2018.

Kyungmin Kim, Thomas Laubach, and Min Wei. Macroeconomic effects of large-scale asset purchases: New evidence, 2020. Finance and Economics Discussion Series 2020-047, Board of Governors of the Federal Reserve System.

Wonseong Kim, Jan Frederic Spörer, and Siegfried Handschuh. Analyzing fomc minutes: Accuracy and constraints of language models. *arXiv preprint arXiv:2304.10164*, 2023.

Kenneth N Kuttner. Monetary policy surprises and interest rates: Evidence from the Fed funds futures market. *Journal of Monetary Economics*, 47 (3):523–544, 2001.

Matteo Leombroni, Andrea Vedolin, Gyuri Venter, and Paul Whelan. Central bank communication and the yield curve. *Journal of Financial Economics*, 2021.

Feng Li. The information content of forward-looking statements in corporate filings—a naïve Bayesian machine learning approach. *Journal of Accounting Research*, 48(5):1049–1102, 2010.

Francis A Longstaff, Jun Pan, Lasse H Pedersen, and Kenneth J Singleton. How sovereign is sovereign credit risk? *American Economic Journal: Macroeconomics*, 3(2):75–103, 2011.

Tim Loughran and Bill McDonald. When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks. *The Journal of Finance*, 66(1):35–65, 2011.

Silvia Miranda-Agrippino and Hélene Rey. US monetary policy and the global financial cycle. *The Review of Economic Studies*, 87(6):2754–2776, 2020.

Robert A Mundell. The monetary dynamics of international adjustment under fixed and flexible exchange rates. *The Quarterly Journal of Economics*, 74(2):227–257, 1960.

Robert A Mundell. Capital mobility and stabilization policy under fixed and flexible exchange rates. *Canadian Journal of Economics and Political Science*, 29(4):475–485, 1963.

Maurice Obstfeld, Jay C Shambaugh, and Alan M Taylor. Financial instability, reserves, and central bank swap lines in the panic of 2008. *American Economic Review*, 99(2):480–86, 2009.

Maurice Obstfeld, Jonathan D Ostry, and Mahvash S Qureshi. A tie that binds: Revisiting the trilemma in emerging market economies. *Review of Economics and Statistics*, 101(2):279–293, 2019.

Valerie A Ramey. Macroeconomic shocks and their propagation. *Handbook of macroeconomics*, 2:71–162, 2016.

Marc Schulder, Michael Wiegand, Josef Ruppenhofer, and Stephanie Köser. Introducing a lexicon of verbal polarity shifters for English. In *Proceedings of the Eleventh International Conference on Language Resources and Evaluation (LREC 2018)*, Miyazaki, Japan, May 2018. European Language Resources Association (ELRA).

James H Stock and Mark W Watson. Disentangling the channels of the 2007-2009 recession. Technical report, National Bureau of Economic Research, 2012.

Eric Swanson and Vishuddhi Jaywickrema. Speeches by the Fed Chair are more important than FOMC announcements: An improved high-frequency measure of US monetary policy shocks, 2023. University of California Irvine Working Paper.

Eric T Swanson. Measuring the effects of Federal Reserve forward guidance and asset purchases on financial markets. *Journal of Monetary Economics*, 118:32–53, 2021.

Eric T Swanson. The importance of Fed chair speeches as a monetary policy tool. *AEA Papers and Proceedings*, 113:394–400, 2023.

Aaron Tornell and Andres Velasco. The tragedy of the commons and economic growth: Why does capital flow from poor to rich countries? *Journal of Political Economy*, 100(6):1208–1231, 1992.

Stefan Walz. How does the Fed affect corporate credit costs? Default risk, creditor segmentation and the post-FOMC drift. *Journal of Monetary Economics*, 143:103527, 2024.

Jonathan H Wright. What does monetary policy do to long-term interest rates at the zero lower bound? *The Economic Journal*, 122(564):F447–F466, 2012.

Bingxin Ann Xing, Bruno Feunou, Morvan Nongni-Donfack, and Rodrigo Sekkel. Us macroeconomic news and low-frequency changes in bond yields in canada, sweden and the uk. *Journal of Banking & Finance*, page 107270, 2024.