Does Wall Street Understand Fed Speak?
Monetary Policy Communication and Corporate Conference Calls[*]

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Abstract

Using short-time windows centered on FOMC communication days and a novel dataset comprising dialogues between managers and analysts during corporate conference calls, we uncover a *tone transmission channel* of monetary policy wherein the linguistic tone of Fed communication drives the linguistic tone of macro-related dialogues in conference calls. The tone of macro-related dialogues contemporaneously affects stock markets, and the semantics of such dialogues consistently conveys monetary policy content. Additional analysis suggests that the effect of monetary policy tone on corporate conference calls is stronger in more recent years. Our results shed light on how economic agents respond to "Fed Speak."

KEYWORDS: Monetary policy, Federal Reserve, FOMC, corporate conference calls.
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Abstract

Using short-time windows centered on FOMC communication days and a novel dataset comprising dialogues between managers and analysts during corporate conference calls, we uncover a *tone transmission channel* of monetary policy wherein the linguistic tone of Fed communication drives the linguistic tone of macro-related dialogues in conference calls. The tone of macro-related dialogues contemporaneously affects stock markets, and the semantics of such dialogues consistently conveys monetary policy content. Additional analysis suggests that the effect of monetary policy tone on corporate conference calls is stronger in more recent years. Our results shed light on how economic agents respond to "Fed Speak."

— "The Fed will have to do something to prevent inflation from becoming embedded or if it does become embedded, well, that is an even worse situation. So don't we have a dilemma here? Is there a way out, Jim?"

— "I guess I should call Bernanke and see if he can help us here. I don't see us going into any kind of a '70s style high inflation, stagflation."

James W. Owens, Caterpillar's CEO, responding to an analyst in a conference call in 2009.

"Monetary policy is 98 percent talk and only two percent action. The ability to shape market expectations of future policy through public statements is one of the most powerful tools the Fed has."

Ben S. Bernanke (2015), Chairman of the Federal Reserve Board (2006–14).

1   Introduction

Academics and policymakers often agree that monetary policy communication is a powerful tool central bankers have to achieve their goals and influence economic agents (Blinder et al. (2008)).[1] Exactly how monetary policy communication exerts its influence on such agents, however, is still an open question. With conventional monetary policy constrained by near-zero interest rates, understanding how the communication of either conventional (i.e., changes in interest rates) or unconventional policies (e.g., quantitative easing) affects economic agents is of central importance in policy-making (Blinder (2018); Coibion, Georgarakos, Gorodnichenko and Weber (2020a)). The relevance of this question is highlighted by the existence of many studies examining how monetary policy announcements affect different economic agents, including households, firms, and the press.[2] Additionally, a dense literature in macroeconomics and finance has focused on how central bank announcements affect asset prices.[3]

Despite significant advances in the literature, we know surprisingly little about how Wall Street decision-makers read, process, and discuss "Fed Speak." As most studies focus on high-frequency responses of asset prices around the Federal Open Market Committee (FOMC) meeting dates, it is difficult for researchers to enter the "black box" of how Corporate America processes information from the FOMC press releases.

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[1] Blinder et al.'s (2017) survey asked central bank governors if forward guidance (i.e., communication about the future path of monetary policy) would remain a potential instrument after the Great Recession. The responses indicate a remarkable agreement: 0% believed it would be discontinued, 28% said it was too early to judge, and 72% believed it would remain part of the policy toolkit either unchanged (59%) or in a modified form (13%).

[2] Some studies focused on households are Binder (2017a), Coibion, Gorodnichenko and Weber (2019), Coibion, Georgarakos, Gorodnichenko and Weber (2020a), D'Acunto, Hoang, Paloviita and Weber (2020). For firms' responses, see Enders, Hünnekes and Müller (2019). See Binder (2017b) for a study of the press response to Fed communication.

[3] See, among others, Rigobon and Sack (2004), Neuhierl and Weber (2019), Doh, Song and Yang (2020), and Neuhierl and Weber (2021).

In this paper, we use machine-learning and natural language processing (NLP) techniques to study how the Fed's communication affects Wall Street market participants, specifically their optimism (or pessimism) towards the economy and specific corporations. We focus on corporate conference calls, wherein managers of US publicly-traded firms and the sell-side equity research analysts following those firms interact.[4] There are at least two reasons that make corporate conference calls an appropriate empirical setting. First, conference calls are important and recurrent venues where monetary policy information is potentially discussed in an objective context: whether and how monetary policy can affect the business of the largest US companies. Since much of the literature focuses on instantaneous responses of asset prices, we instead shed light on less immediate consequences of Fed policy communication, such as when equity analysts bring up Fed-related topics in conference calls. Second, complementing the previously documented instantaneous market responses to FOMC announcements, conference calls allow a clean identification of longer-lasting effects, as conference calls and the Fed's press releases do not occur contemporaneously.

The main empirical challenge in identifying a directional channel from the Fed's communication to corporate communications is that both are likely to reflect the overall state of macroeconomic expectations. For example, when economic agents' expectations are positive (negative), not only the Fed is likely to bring this positive (negative) outlook when communicating its actions, but managers and analysts also would engage in discussions conveying this positive (negative) state. We overcome this challenge following an identification strategy that relies on two conditions. First, the timing of FOMC press releases should be plausibly unrelated to the timing of individual firms' conference call dates. To validate this assumption, we begin our analysis by empirically documenting the statistical independence of the timing of conference calls by firms and the timing of press releases by the Fed.[5] Second, we restrict our analysis to short time windows around the events of interest (i.e., FOMC press release days) and perform an event study estimation in the tradition of Cook and Hahn (1989) and, more recently, Bernanke and Kuttner (2005).

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[4]Managers disseminate an abundant amount of information to capital markets during conference calls, including hard information (e.g., firms' political risks, as in Hassan et al. (2019)) and soft information (e.g., managerial emotions, as in Mayew and Venkatachalam (2012)).

[5]Conceptually, the timing independence of corporate conference calls and monetary policy communications stands to logic because of their inherently different objectives: firms set the dates of their conference calls months in advance with the intent of communicating their individual financial performance to investors and analysts, whereas the Fed's press releases reflect the timing of monetary policy actions—announced about a year ahead with the FOMC's annual schedule.

In doing so, we draw our attention to the main effect of interest while controlling for possible confounding factors related to macroeconomic expectations.

The identification approach we employ also exploits our dataset's granularity to substantiate the tone transmission channel. Our data encompasses the micro-features of 2,455 corporate conference calls (henceforth, *dialogue sample*), allowing us to neatly identify conversations likely to be shaped by monetary policy communication.[6] We delve into the timing and content of dialogues between firm managers and equity analysts, wherein earnings and financial performance of corporations are discussed in a question-and-answer (Q&A) format. Crucially, we observe not only the turns-at-talk between managers and analysts, but also the specific time stamps (at the minute-and-second level) of each dialogue's start and end.[7] Most importantly, the content of manager-analyst dialogues allows us to categorize conversations as either related to the macroeconomy or to firm-specific aspects. This linguistic categorization is reasonable since firms are exposed to both systematic (macro) and firm-specific (micro) factors. Classifying individual dialogues as either macro- or non-macro-related enables us to identify which conversations are more likely to be affected by Fed communication. In sum, we provide a suitable setting to identify the tone transmission channel of monetary policy by focusing on the neatly identified macro vs. non-macro dichotomy of dialogues occurring during conference calls that take place within short-time windows (i.e., a few days) around the FOMC meetings.

Our main result can be summarized as follows. Considering conference calls held (i) one day before, (ii) on the same day, and (iii) the day after an FOMC press release date, we show that the linguistic tone (i.e., sentiment) of the Fed's press release is transmitted to the tone of macro conversations for *only* those conference calls that happened the day *after* the FOMC press release in question took place. In other words, the association between the tone of macro conversations in conference calls that occurred the day before (or on the same day) of the monetary policy communication is statistically insignificant. Importantly, we also show that the tone of non-macro dialogues in conference

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[6]Our dialogue sample is constructed using the same sample period (2008–2010) and focusing on the same S&P1500 firms as the one used by Mayew, Sethuraman and Venkatachalam (2020). This period encompasses the events preceding the subprime crisis, the crisis itself and its subsequent economic recovery. As explained later, our additional (large sample) analysis spans a much longer sampe period (2001–2020) in order to provide evidence of the generalizability of our findings.

[7]A dialogue necessarily involves a single equity analyst asking questions to which one or more managers respond (e.g., the CEO, the CFO, or the Investor Relations Officer). Table B.3 of Appendix B provides examples of conference call dialogues from our sample.

calls is unrelated to the tone of the Fed's communication—regardless of whether the call occurred before or after the Fed communication. Taken together, the heterogeneous effects obtained for macro dialogues just-before and just-after monetary policy communications and the lack of effect for non-macro dialogues provide evidence consistent with a tone transmission channel of monetary policy hitherto undocumented in the literature. We argue it is unlikely that any state variable proxying for the state of the macroeconomy would change within three-day time windows centered around key monetary policy dates via a channel other than the direct effect of policy communication.

Probing further, we relax the aforementioned sample restriction and widen the scope of our analysis to include dialogues pertaining to all conference calls regardless of their proximity to FOMC press releases. In tune with our short-window findings, we show that the tone of macro-related dialogues in conference calls is positively related to the tone of the most recent Fed press release that occurred before the calls were hosted, whereas unrelated to the tone of the next Fed press release (i.e., the earliest Fed press release that takes place after the calls in question). Turning to the macro versus non-macro dichotomy, we show that the tone of non-macro-related dialogues is not associated with the tone of the Fed press release occurring either before or after the call.

To further investigate the market consequences of the aforementioned tone transmission channel of monetary policy, we first delve into investors' expectations by analyzing stock price reactions for the firms whose conference calls are being held, occurring specifically during the narrow time intervals of a few minutes corresponding to individual macro-related dialogues. Following Mayew, Sethuraman and Venkatachalam (2020), we analyze absolute stock returns to estimate the information content of a macro "dialogue," defined as a question-and-answer (Q&A) interaction between a manager and an analyst involving macroeconomic topics.[8] Consistent with prior literature that shows that pessimistic language is more informative to markets than optimistic language (Tetlock (2007); Tetlock, Saar-Tsechansky and Macskassy (2008)), we document market responses of larger magnitudes when the contemporaneous macro dialogues are inherently more negative in tone. At this juncture, it is important to emphasize that the reason to analyze stock returns computed over the narrow interval pertaining to the individual macro dialogue is to pinpoint precisely the market reactions stemming from the non-transitory tone transmission channel doc-

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[8]In Appendix Table B.3, we provide examples of macro-related dialogues between managers and analysts. Table B.1 provides a dictionary of terms used to identify macroeconomic topics in conference-call dialogues.

umented herein. Put differently, because returns are computed over narrow time windows that typically last a few minutes, we isolate the effect of the tone transmission specifically to corporate communication from the gamut of other important asset pricing effects broadly stemming from monetary policy communication documented by prior literature (Neuhierl and Weber (2019); Doh et al. (2020); Gorodnichenko, Pham and Talavera (2021)).

The tone transmission channel proposed in this paper relies on the notion that the content of monetary policy communication is relevant for corporate managers and analysts. To ascertain this, we analyze the content of monetary policy press releases and conference calls in addition to their tone. To do so, we employ novel natural language processing algorithms to shed light on the *semantic similarity* between the content communicated by the Fed in monetary policy press releases and that discussed by managers and analysts in conference calls. Specifically, we parse the content of the Fed's press releases and classify the content of monetary policy communication into distinct themes based on groups of keywords that occur together. In possession of this thematic classification of monetary policy language, we then analyze each sentence within macro dialogues by using a state-of-the-art machine learning algorithm (Reimers and Gurevych's (2019) "Sentence Bidirectional Encoder Representations from Transformers," or SBERT). The SBERT algorithm allows us to identify the textual semantic similarity between the macro dialogue sentences in a conference call and the keyword groups in monetary policy themes previously identified. Our results suggest not only that macro dialogues semantically reflect monetary policy communication, but also that the semantic similarity does not depend on the proximity of conference calls to the relevant announcements by the Fed. Put differently, our evidence upholds the notion that the content of monetary policy communication is relevant for corporate communications, and such relevance corroborates the existence of the tone transmission channel documented in this paper.

While the dialogue-level information of our granular dataset bolsters the internal validity of the tone transmission channel, the external validity of our findings is, to some extent, limited. We circumvent this limitation by conducting a large sample analysis using a dataset of conference-call transcripts spanning a longer sample period (henceforth, *large sample*), while also contrasting calls that take place just before and just after relevant press releases by the Fed, thereby mirroring our short window approach outlined earlier.[9] This expanded dataset has the advantage of overlap-

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[9]The large sample is comprised of 36,231 conference-call transcripts over the period of 2001–2020.

ping with mandates of four Fed chairpersons (Greenspan, Bernanke, Yellen, and Powell), thereby enabling us to exploit different sources of heterogeneity in monetary policy releases, stemming from monetary policy communication over different time periods. Notwithstanding its broader nature, the data is inherently coarser than our granular dialogue-level dataset, as the unit of analysis is the text corpus of macro sentences aggregated at the conference-call level rather than specific dialogues between managers and equity analysts.

Our results, based on the large sample analysis, suggest that the relationship between the tone of monetary policy communications and the overall tone of macro sentences in conference calls became stronger in the most recent chairperson mandates of our sample. Importantly, both conference-call datasets (i.e., the dialogue sample and the large sample) used in this paper have natural advantages and limitations—particularly along the trade-off between identification finesse and generalization. As such, we rely on the complementary nature of their strengths and weaknesses to create a unified body of empirical evidence in line with manager-analyst discussions in conference calls reflecting the tone of monetary policy communications. In essence, the dialogue-sample and the large-sample findings should be construed as complementary pieces of evidence in light of their synergistic characteristics.

We contribute to several branches of the literature. First, our paper is related to an extensive literature on the effects of central bank communication on security markets and real decisions of economic agents.[10] While the vast majority of studies focus on contemporaneous high-frequency asset pricing responses to the Fed's actions—either interpreted as interest rate shocks or the information effect—we go beyond immediate responses and analyze longer-lasting consequences of the Fed's communication on capital market participants. Moreover, we bring detailed textual analysis in the spirit of Hansen and McMahon (2016) to inform the debate on how central banks should communicate to better influence key economic agents, such as managers of the largest companies in the US and the sell-side equity analysts covering them. Our paper also contributes to a recent literature that exploits alternative data and machine-learning algorithms to inform topics of interest to central bankers (e.g., Bholat, Hansen, Santos and Schonhardt-Bailey (2015); Hansen, McMahon

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[10]See, for example, Rigobon and Sack (2004), Brenner, Pasquariello and Subrahmanyam (2009), Boguth, Grégoire and Martineau (2019), and Enders, Hünnekes and Müller (2019).

and Tong (2019); Ehrmann and Talmi (2020); Curti and Kazinnik (2021); Doerr, Gambacorta and Serena (2021); Gorodnichenko, Pham and Talavera (2021); Gardner, Scotti and Vega (2021)).

Our paper is inspired by a recent wave of research that uses datasets and empirical settings relatively unexplored in the monetary policy literature. Noteworthy mentions are Bauer and Swanson (2020), who conducted a survey with Blue Chip forecasters to directly ask if they take the Fed's forecasts into consideration when forming their own forecasts.[11] In a series of papers, Coibion et al. (2019, 2020a,b) exploit a randomized-control trial (RCT) ran by the Nielsen Consumer Panel to study how households' expectations and consumption outcomes react to alternative forms of policy communication. Lastly, Binder (2020) surveys US consumers at the outbreak of the Coronavirus crisis to understand households' concerns about COVID–19, their awareness of the Fed's announcement, and macroeconomic expectations. In a similar vein, we draw on a detailed dialogue-level and a call-level corporate conference call datasets pertaining to a large sample of publicly-traded companies in the US.

Finally, our paper adds to the literature on the systematic differences in policy making of distinct central bank leadership, in particular of each Federal Reserve chairperson (e.g., Clarida, Gali and Gertler (2000); Cogley and Sargent (2005); Sims and Zha (2006); Malmendier, Nagel and Yan (2021)).

The remainder of this paper is organized as follows. Section 2 describes our dataset of conference calls dialogues and other relevant data used in our analyses. Section 3 describes our empirical strategy. Section 4 presents the main results on the tone transmission channel of monetary policy using our dialogue-level data. Section 5 discusses how our large sample analysis complements the results obtained with the dialogue-level data. Section 6 provides our concluding remarks.

2   Data and Summary Statistics

We first describe the various sources of data used in our empirical analyses. Then, we describe the sample and present summary statistics of conference calls-, dialogues- and Fed-related variables.

Corporate Conference Calls.   The main dataset exploited in this paper is a rich, dialogue-level transcript data pertaining to 2,455 corporate conference calls held during the period from 2008 to

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[11]Their survey evidence led them to challenge the "Fed information effect" (see, e.g., Nakamura and Steinsson (2018)).

2010 (Mayew, Sethuraman and Venkatachalam (2020)). The sample is restricted to earnings conference calls from S&P 1,500 firms that take place during trading hours, thereby enabling us to reliably compute intra-call stock returns. The transcripts of the conference calls, obtained from Thomson Reuters StreetEvents database, are parsed to identify unique turns-at-talk corresponding to each speaker. The original recordings of the calls are manually restreamed to reliably identify when one participant (i.e., a manager or an equity analyst) finishes and another participant begins speaking. The audio files are then manually parsed into individual turns-at-talk audio files by relying on human listeners, as this process cannot be reliably automated. The combination of timestamps corresponding to each turns-at-talk and the start time of the conference call allows us to precisely compute stock returns corresponding to each manager-analyst dialogue.

Corporate conference calls are typically comprised of two main sections: the presentation portion (wherein managers provide a monologue about the firm and its business prospects) and the Q&A portion (wherein managers and analysts engage in conversations about the firm's financial performance and outlook). The most time-granular unit of our analysis is a dialogue, which comprises a sequence of turns-at-talk that corresponds to each manager-analyst pair interaction in the Q&A portion of the conference call. Each dialogue begins with a question posed by an analyst and includes the entire conversation between that specific analyst and management.[12]

We compute the net linguistic tone (positive minus negative) at the call-presentation- and dialogue-levels using a dictionary of positive and negative words. We follow the standard in this literature and obtain the textual tone by counting the fractions of positive and negative words as per Loughran and McDonald's (2011) dictionary. Formally, we compute:

$$TONE = \frac{(\% \ positive \ words) - (\% \ negative \ words)}{(\% \ positive \ words) + (\% \ negative \ words) + 0.000001}. \tag{1}$$

We compute the tone of the presentation section of each conference call ($PRES \ TONE_{i,t}$). More granularly, we also compute the tone of each dialogue ($DIAL \ TONE_{d,\tau,i,t}$) in the Q&A sessions of the conference calls. The data also allows us to compute dialogue-level characteristics, such as length (in both words and minutes), number of turns-at-talk, and the sequential order in which analysts speak.

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[12]See Table B.3 in Appendix B for sample dialogues.

Stock Returns, Firm Fundamentals, and Analyst Characteristics. We complement our dialogue- and call-level information using a variety of datasets. We get individual analyst stock recommendations (e.g., buy, sell, or hold) from the Institutional Brokers' Estimate System (I/B/E/S). Dialogue-level stock returns are computed using NYSE Trade and Quote (TAQ) data. We rely on Thomson Reuters Guidance Reports to gather information on whether individual manager-analyst dialogue contains forward-looking guidance or not. At the conference call level, we merge our dataset with firm-level fundamentals (firm size and analyst earnings forecast dispersion) obtained from COMPUSTAT and I/B/E/S.

Monetary Policy Communication. We start from the broad sample of relevant FOMC announcement dates spanning the period 2007–2010 identified in Husted, Rogers and Sun (2020). We manually download and parse these press releases to compute the overall linguistic tone, as in Equation (1), using Loughran and McDonald's (2011) dictionary. We also use the monetary policy uncertainty measure computed by Husted et al. (2020) at the FOMC-meeting-level corresponding to FOMC press release dates.

Sample and Summary Statistics. Summary statistics for the call-, dialogue-, and Fed-dates-level samples are presented in Table 1, respectively in Panels A, B, and C. Variable descriptions are provided in Appendix A.

[INSERT TABLE 1 ABOUT HERE]

The average size ($Size_{i,t}$) of firms in our sample, as measured by total assets, is about \$12 billion. The average conference call lasts about 55 minutes ($MINS_{i,t}$) and a majority of the conference calls in our sample occur close to the middle of the week (see Panel A). Turning to the dialogue level in Panel B, we note that about one quarter of the dialogues in our sample are macro-related dialogues. A dialogue lasts, on average, for about 3.8 minutes and comprises of about 12 turns-at-talk (i.e. back-and-forth turns between the analyst and a manager) and close to 600 words.

About 35% of the analysts participating in the Q&A carry a buy or strong-buy opinion on the firm's stock. Similarly, around 31% of the participating analysts carry a hold, sell, or strong sell opinion on the firm's stock, and the remaining analysts do not have any outstanding recommendation. About one third of the dialogues elicit forward guidance from management and 23% of

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the participating analysts are recognized as "all-star" by *Institutional Investor* based on their positive performance in the past. The average stock price movement during a dialogue is about 40 basis points. In Panel C, we note that the median length of the FOMC press releases in our sample is 380 words and a majority of the releases are on Tuesdays or Wednesdays.

3   Empirical Strategy

A central assumption of our identification strategy is the notion that even though the timing of firms' conference calls are endogenous to firms and the timing of the Fed's press releases are endogenous to monetary policy decisions, the specific determinants underlying the timing of the two types of communication are largely unrelated. In short, firms hold conference calls to facilitate information assimilation by investors and equity analysts regarding their recent financial performance and outlook. The press releases by the Fed, on the other hand, follow the schedule of the FOMC decisions, which is independent of any specific firm's conference call schedule. As such, the timing distributions of the corporate conference calls and the monetary policy communications should be largely orthogonal.

As highlighted in Table 1, the samples of conference call dates and Fed dates reveal specific *weekday-level* preferences. Specifically, most of the relevant policy announcements by the Fed occur on Wednesdays (20 dates) or Tuesdays (11 dates), whereas most of the conference calls occur on Thursdays (1,059 calls) or Tuesdays (542 calls)—with a clear avoidance of weekdays close to weekends, possibly owing to the fact that investors display limited attention (DellaVigna and Pollet (2009)). Probing further, we investigate whether firms' decisions on when to schedule their conference calls are determined by the proximity of relevant policy communication by the Fed by estimating a simple linear probability model of the occurrence of a call for firm i at days t using a balanced panel with all the firms in our sample and every business day pertaining to the sample period in question (i.e., variable *Call Occur$_{i,t}$* takes value one if firm i held a conference call on day t and zero otherwise). For determinants, we consider dummy variables indicating weekdays ($D_t^{Monday},...D_t^{Friday}$), as well as dummies indicating the extent of proximity to a relevant Fed release ($DFED_t^{(-2)}, DFED_t^{(-1)}, DFED_t^{(0)}, DFED_t^{(1)}$ and $DFED_t^{(2)}$, where $DFED_t^{(s)}$ is equal to one if $t-s$ is a date with relevant press release by the Fed and zero otherwise). Results of the panel estimation,

reported in Table 2, corroborate that timing decisions of corporate conference calls are better explained by week day preferences rather than firms strategically timing their communication with investors just before or just after relevant communication by the Fed.

[INSERT TABLE 2 ABOUT HERE]

The distributional properties of corporate conference calls around key Fed policy communication dates are important to dispel concerns that associations between the tone of conference calls and Fed's releases simply capture the overall state of the macroeconomy and business cycles, rather than construed as a channel of monetary policy communication shaping expectations of market participants. Whereas the Fed speech is definitely determined by the overall state of the economy (and monetary policies are conducted to have an effect on the economy), the timing of the communications allows us to provide evidence of a tone transmission channel of monetary policy communication, as conference calls occurring just before or just after a relevant policy date should be affected by the same factors besides those directly influenced by the Fed communication. Expressly, the aforementioned timing independence lends weight to the idea of contrasting the tone of conference call dialogues taking place just before and just after dates of monetary policy communication. Simply put, their timing resembles a forcing variable that assigns conference calls either to a treatment (just-after the Fed's communication) or control condition (just-before the Fed's communication), an exogenous assignment that allows us to isolate the effect of monetary policy communication from alternative macroeconomic channels.

A second key aspect of our empirical strategy is the time granularity of dialogues in corporate conference calls. Start and stop of dialogues between managers and equity analysts are stamped to the specific second level, which enables us to identify not only the portion of the interactions related to the macroeconomy per se but also the market reactions surrounding the narrow windows pertaining to the dialogues. For sake of clarity, we index the variables identified at second-level time stamp by τ (i.e., dialogues within a call, returns during the dialogue within a call) and variables generally associated with a given date (i.e., dates of conference calls, dates of Fed press releases) by t.

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3.1 Identifying Macroeconomic-Related Dialogues

Having established that the timing/dates of corporate conference calls are largely exogenous to the policy communications by the Fed, we now turn our attention to the specific dialogues between managers and equity analysts to identify the subset of conversations which are plausibly affected by the Fed Speak. Differently put, we identify the conversations generally related to the macroeconomy by developing a dictionary of macroeconomic related terms.

At this juncture, it is important to understand two important premises behind our approach. First, any categorical classification of dialogues into a macro *versus* micro dichotomy would have limitations, as there are topics which may relate to firm-idiosyncratic factors but are, ultimately, subject to macroeconomic forces (e.g., analysts asking why a manufacturing firm is accumulating inventory). Second, the choice of words comprising the macroeconomic dictionary must capture macroeconomic concepts typically employed by practitioners (i.e., managers and analysts), hence demanding a sensible balance of technicality and practical contextualization to a corporate environment.[13]

Accordingly, we develop our macro dictionary based on a general glossary of macroeconomics undergraduate and practitioner textbooks. The full list of macro terms (words and bigrams) are shown in Table B.1 of Appendix B. Following a dictionary approach, any dialogue d (i.e., a conversation between a manager and an equity analyst) taking place during the conference call of firm i at time stamp τ of day t is classified as $MACRO_{d,\tau,i,t} = 1$ if and only if at least one of the macro dictionary terms appear within the dialogue. Table B.2 shows the distribution of macro and non-macro dialogues across the ten Fama–French industries and Table B.3 provides examples of macro and non-macro dialogues from conference calls in our sample.

Having identified macro dialogues, we then proceed with a simple analysis of the broad properties of macro conversations, estimating a linear probability and a logit models of $MACRO_{d,\tau,i,t}$ as a function of dialogue characteristics and the attributes of individuals engaged in the conversation. Table 3 indicates that macro dialogues are descriptively longer but characterized by less turns-at-talk (i.e., fewer back-and-forth between participants) and more likely to occur earlier in the

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[13]To exemplify, it is plausible that terms such as "business cycle" or "government deficit" may appear in a conference call conversation, but not academic terms such as "overlapping generations model." Importantly, given that academic terms are unlikely to appear in any dialogue, their eventual inclusion in the dictionary would not lead to any incorrect categorization of dialogues, as macro (non-macro) dialogues are identified as the ones containing *any* (*none*) of the terms in the macro dictionary.

call Q&A than their non-macro counterparts. Not surprisingly, macro dialogues are more likely to involve "all-star analysts" (i.e., equity analysts deemed as having a solid record of forecast and recommendation accuracy), and analysts with bearish recommendations on the firm's prospects.

[INSERT TABLE 3 ABOUT HERE]

4   Dialogue-Sample Analysis

4.1   The Tone Transmission Channel of Monetary Policy

In possession of the dialogues between managers and analysts during conference calls, we now proceed with the main inquiry of our paper: to shed light on a monetary policy tone transmission channel, stemming from the linguistic tone of the Fed's press releases to the linguistic tone of macro-related conversations within conference calls. For clarity of exposition, having in mind the different time granularity of the conference-call dialogues and the Fed's press releases, we index dialogues by d and their second-level time stamps by τ, taking place during the conference call held by firm i at date t. Hence, our outcome variable of interest is $DIAL\ TONE_{d,\tau,i,t}$, representing the dialogue-level tone computed with the Loughran and McDonald (2011) dictionary.

We start our investigation by focusing on the dates of relevant monetary policy press releases, $T^M = \{t^m\}_{m=1}^M$, and restricting our sample to conference calls that took place either one day before, on the same day, or the day after the dates of Fed's communication. Our primal objective is to exploit the heterogeneity of the association between the tone of monetary policy communication and the tone of dialogues ($DIAL\ TONE_{d,\tau,i,t}$) occurring in conference calls held just before and just after monetary policy press releases. Empirically, this is accomplished by estimating the following reduced-form specification.

$$
DIAL\ TONE_{d,\tau,i,t} = \gamma_0 + \left(\sum_{s=-1,0,1} \beta^{(s)} \times DFED_{i,t}^{(s)} \right) \times MP\ TONE(t^{nearest}) +
$$
$$
+ \gamma_1 \times MPU(t^{nearest}) + \gamma_2 \times PRES\ TONE_{i,t} + \epsilon_{d,\tau,i,t} \qquad (2)
$$

Within that restricted sample of conference-call dialogues, $t^{nearest}$ represents the corresponding date of monetary policy announcement that is nearest in time to the conference call. As

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previously explained, the tone of the Fed communication at day $t^{nearest}$ ($MP\ TONE(t^{nearest})$) and the tone of conference call dialogues surrounding the announcement ($DIAL\ TONE_{d,\tau,i,t}$) are computed following the Loughran and McDonald (2011) dictionary. Because we are interested in how the overall association between $MP\ TONE(t^{nearest})$ and $DIAL\ TONE_{d,\tau,i,t}$ varies within the short-window $t \in [t^{nearest} - 1; t^{nearest} + 1]$ we define dummy variables $DFED_{i,t}^{(-1)}, DFED_{i,t}^{(0)}, DFED_{i,t}^{(1)}$ respectively indicating whether the call-dialogue occurred the day before ($t^{nearest} - 1$), on the same day of ($t^{nearest}$), or the day after ($t^{nearest} + 1$) a policy announcement. We interact these variable with $MP\ TONE(t^{nearest})$; coefficients $\{\beta^{(s)} : s = -1, 0, 1\}$ indicate how the association between $MP\ TONE(t^{nearest})$ and $DIAL\ TONE_{d,\tau,i,t}$ varies around the key announcements.

We also include the monetary policy uncertainty measure of Husted et al. (2020) of the nearest announcement date as a control ($MPU(t^{nearest})$, as well as the overall tone of the presentation section of the call ($PRES\ TONE_{i,t}$), as prior research shows that the tone of the presentation section of a conference call is strongly associated with the overall tone of the Q&A section that ensues (Mayew et al. (2020)). Equation (2) is separately estimated for macro ($MACRO_{d,\tau,i,t} = 1$) and non-macro ($MACRO_{d,\tau,i,t} = 0$) dialogues, including year and weekday fixed effects and with robust standard errors clustered at the nearest date ($t^{nearest}$) level. Results reported in Figure 1, with the upper (lower) panel reporting coefficients $\{\beta^{(s)} : s = -1, 0, 1\}$ and their 95% confidence intervals when the estimation is performed using macro (non-macro) dialogues.

Overall, Panel A of Figure 1 suggests that only tone of the dialogues taking place after the Fed's press releases display a positive and statistically significant association with the tone of the Fed's communication. We interpret these results as evidence consistent with a tone-transmission channel of monetary policy. Admittedly, macro dialogues that occurred just before the Fed's communications plausibly reflect state variables for the overall macroeconomic conditions and, undeniably, the same state variables should be part of the information set of the Fed when putting forth and communicating monetary policy decisions. As we restrict our analysis to short windows surrounding the Fed's communication, any change in such macro state variables are unlikely to be driven by factors other than the monetary policy communication itself. As such, the juxtaposition of macro calls that occurred just-after and just-before the Fed communication yields empirical results that support the existence of a tone transmission channel. Panel B reports that the tone of non-macro dialogues is not statistically related to the tone of the Fed's communication regardless of their timing relative
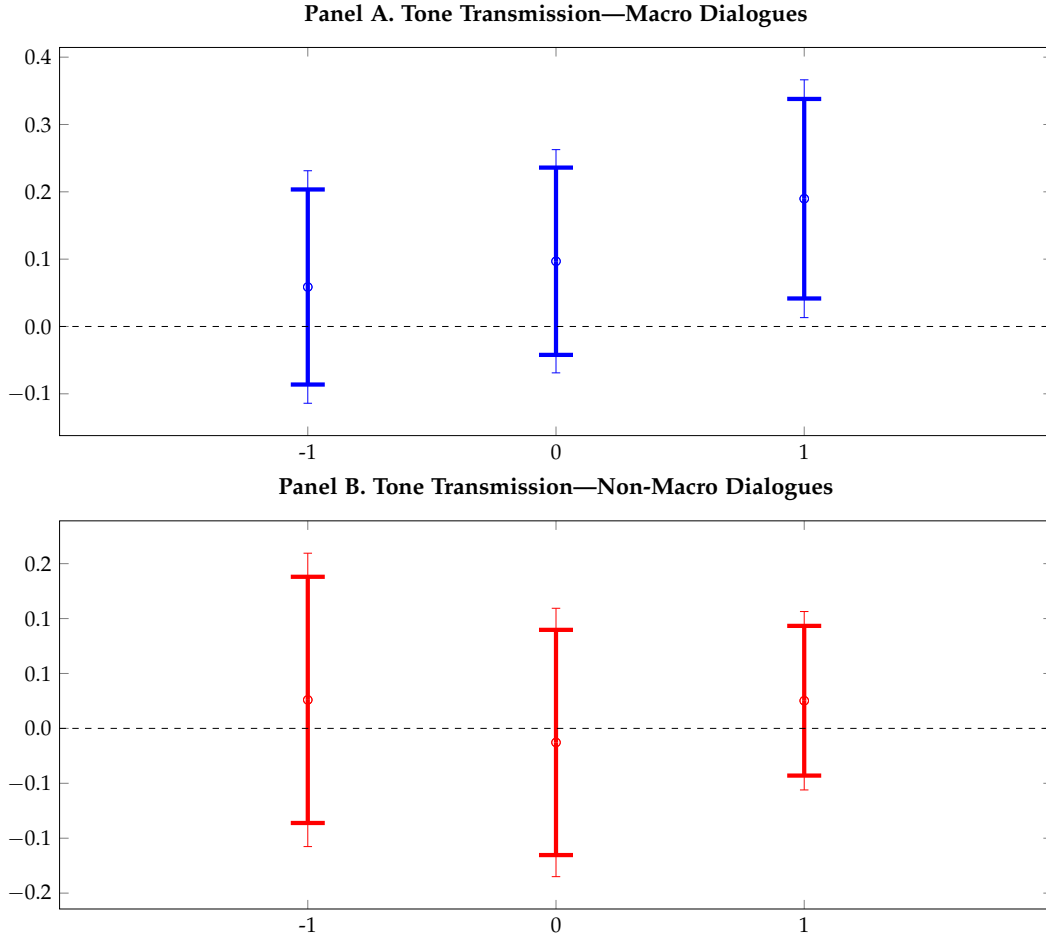
Figure 1. Tone Transmission Channel of Monetary Policy. This figure reports the coefficient estimates of $\beta^{(-1)}$, $\beta^{(0)}$, and $\beta^{(1)}$ obtained by an OLS estimation of Equation (2) for the sample of 1,043 macro (upper panel) and 3,055 non-macro (lower panel) conference-call dialogues around the key dates of monetary policy communication. The bars represent the 95% and 90% confidence intervals, computed with robust standard errors clustered at the FOMC nearest-meeting-date level.

to the dates of monetary policy releases. By way of explanation, non-macro dialogues around the same short-time windows can be construed as "content countefactuals" of the macro dialogues.

These findings can be alternatively observed by delving into scatter plots of $MP\ TONE(t^{nearest})$ and $DIAL\ TONE_{d,\tau,i,t}$ for dialogues from calls held the day before ($t = t^{nearest} - 1$) and the day after ($t = t^{nearest} + 1$) the Fed communication, repeating the procedure for macro and non-macro dialogues. Figure 2 depicts these associations, with left (right) panels representing dialogues that took place one day before (after) the dates of policy communication. Upper (lower) panels with blue (red) scatter plots indicate tones of macro (non-macro) dialogues. For each panel, we include the best-fit affine function and corresponding 95% confidence limits. An examination of the four scatter plots and fitted lines suggests that the association between monetary policy com-
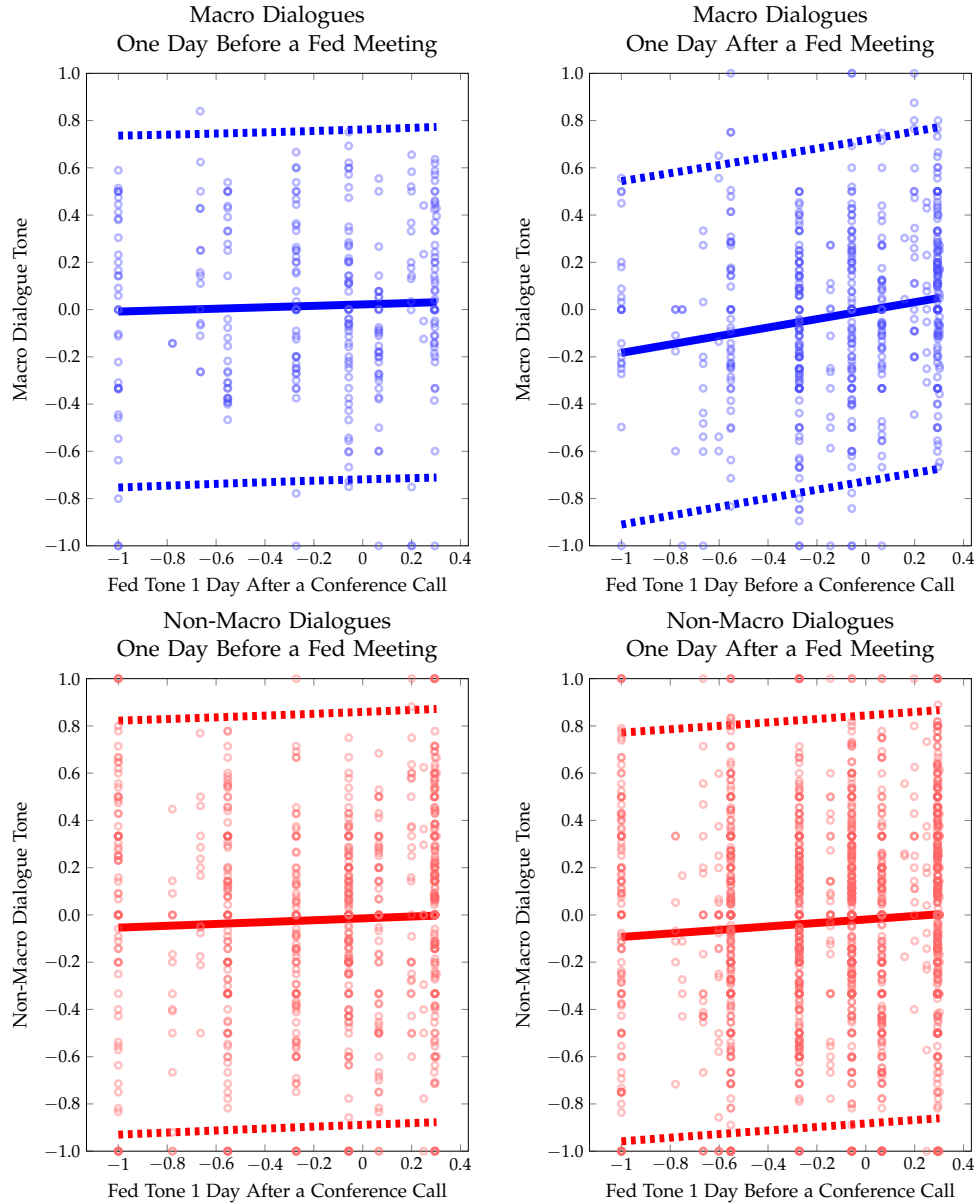
Figure 2. Monetary Policy Tone and Conference-Call Dialogue Tone. This figure reports the scatter plots of the tone of monetary policy communication and the tone of conference call dialogues occurring either one day before (left panels) or one day after (right panels) the key dates of FOMC communication. The upper (lower) panels depict the scatter plots of the tones of macro (non-macro) dialogues. Each plot includes an univariate best-fit affine curve and the corresponding 95% confidence intervals.

munication tone and dialogue tone is distinctively more pronounced for macro dialogues occurring one day after dates of Fed's press releases.

Whereas the restriction to dialogues within short windows around dates of monetary policy communication helps us substantiate the internal validity of our findings, it comes with the important shortcoming of losing a large number of dialogue-level information pertaining to the conference

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calls held outside the vicinity of the Fed's communication dates. Equipped with the overall sample of 19,605 dialogues from 2,455 conference calls, the natural consequence of the tone transmission channel is that the tone of macro dialogues occurring at date t should reflect more strongly the tone of the most recent Fed's communication released before the call date t than the tone of the earliest Fed's communication occurring after date t.

In line with these arguments, to link conference calls occurring at different dates t and the dates of relevant monetary policy releases by the Fed, $T^M = \{t^m\}_{m=1}^M$, we proceed as follows. For a given conference call held at day t, we define the *pre-Fed* date $t^{pre}(t)$ as the date of the *latest* Fed release that took place *before* the conference call date t (i.e., $t^{pre}(t) = \sup\{t^m \in T^M \mid t^m < t\}$) and the *post-Fed* date $t^{post}(t)$ as the date of the *earliest* Fed release that took place *after* the conference call date t (i.e., $t^{post}(t) = \inf\{t^m \in T^M \mid t^m > t\}$). These two dates of relevant monetary policy communication serve as reference points to compute the Loughran and McDonald (2011) tones of the Fed's press releases—namely, *MP TONE*(t^{pre}) and *MP TONE*(t^{post}).

In this empirical setting, the monetary policy tone transmission channel is represented by associations between the tone of macro-related dialogues in conference calls and the tone of the Fed's releases occurring before the conference call in question (i.e., we are interested in how *DIAL TONE*$_{d,\tau,i,t}$ of macro-related conversations is explained by *MP TONE*(t^{pre}) alone). For this purpose, the tone of the release of the *post-Fed* date (*MP TONE*(t^{post})) serves as an important placebo test to dispel the alternative explanation that associations between monetary policy communication and dialogues in conference calls are simply a mechanical effect of overall state of the macroeconomy, rather than a clear channel stemming from the Fed's announcements to the dialogues between analysts and managers. In other words, the dialogue of a conference call occurring at day t should not be influenced by future press releases by the Fed, regardless of how near this future Fed release to the conference call is. The scattered nature of the timing of conference calls t surrounding the dates of Fed communication $T^M = \{t^m\}_{m=1}^M$ lends credence to our identification of a tone transmission channel of monetary policy. Our reduced-form specification used in this analysis is illustrated in Equation (3), which, as in our short-window analysis, is separately

estimated for the two categorical groups of macro and non-macro dialogues of our sample.

$$DIAL\ TONE_{d,\tau,i,t} = \beta_0 + \beta_1 \times MP\ TONE(t^{pre}) + \beta_2 \times MP\ TONE(t^{post}) +$$

$$+ \beta_3 \times MPU(t^{pre}) + \beta_4 \times PRES\ TONE_{i,t} + \epsilon_{d,\tau,i,t} \tag{3}$$

Besides the tones of the *pre-Fed* and *post-Fed* releases, we include the monetary policy uncertainty measure from Husted et al. (2020) for the *pre-Fed* date as a control ($MPU(t^{pre})$). We also control for the overall tone of the presentation section of the call ($PRES\ TONE_{i,t}$), as prior research shows that the tone of the presentation section of a conference call is strongly associated with the overall tone of the Q&A section that ensues (Mayew et al. (2020)). Equation (3) is separately estimated for macro ($MACRO_{d,\tau,i,t} = 1$) and non-macro ($MACRO_{d,\tau,i,t} = 0$) dialogues, with robust standard errors clustered at the *pre-Fed* date (t^{pre}) level. Results reported in Table 4.

[INSERT TABLE 4 ABOUT HERE]

Columns (1) and (2) of Table 4 report coefficient estimates for the overall sample of conference-calls for non-macro and macro dialogues, respectively. First, specification (1) suggests that the tones of non-macro dialogues are not explained by the tones of Fed's communication of either the *pre-Fed* or the *post-Fed* dates. Turning our attention to macro dialogues, we find that the tone of the Fed release of the *pre-Fed* dates is positively associated with the tone of dialogues, as evidenced by the positive and statistically significant coefficient estimate of $MP\ TONE(t^{pre})$. Interestingly, the tone of macro dialogues is not explained by the tone of the nearest Fed release taking place after the call (i.e., the coefficient estimate of $MP\ TONE(t^{post})$ is statistically insignificant), which provides supporting evidence that the associations between the tones of the Fed's releases and the tones of conference-call dialogues can be construed as a monetary policy sentiment transmission, rather than both forms of communication (Fed's releases and conference calls) simply reflecting the overall state of the macroeconomy.

For robustness, we re-estimate specifications (1) and (2) excluding conference calls taking place on relevant Fed release dates (i.e., exclude 136 calls that took place at dates $t \in T^M$). Results, reported in columns (3) and (4) corroborate the notion that the overall tone of the Fed's communication shapes expectations of managers and analysts, as reflected by the

tone of their dialogues in conference calls, which can be construed as additional evidence of a tone transmission channel of monetary policy.

Interestingly, we find little evidence that the tone of macro (and non-macro) dialogues is related to monetary policy uncertainty, as defined in Husted et al. (2020), suggesting that our results represent a first-moment (expectations), rather than a second-moment (variance) effect.

4.2 The Tone Transmission Channel and the Informational Content of Macroeconomic Dialogues

Having established our main result of how the tone of the Fed's communications shapes the tone of conference call dialogues between managers and analysts, we then proceed to analyze the market-wide consequences of the tone transmission channel of monetary policy documented in the previous subsection.

Turing to how equity markets interpret the tone of macro-related dialogues, we perform an analysis akin to the one by Mayew et al. (2020), focusing on absolute stock returns ($ABSRET_{d,\tau,i,t}$) during narrow-time windows synchronous to the macro dialogues in question as a measure of informational content of such dialogues. We gauge the information content of the tone of macro dialogues which reflect the tone of monetary policy communication by estimating the specification below. Equation (4) captures the information content of macro dialogues processed by investors, which also includes other relevant controls identified by Mayew et al. (2020). To reiterate, the two key variables for which we seek to estimate statistical associations with Equation (4)—namely, $DIAL\ TONE_{d,\tau,i,t}$ and $ABSRET_{d,\tau,i,t}$—are synchronously aligned by the τ-stamped identification of a dialogue d. That is, market returns and the dialogues for which we compute the tone pertain to the same narrow-time windows that typically last for a few minutes.

$$ABSRET_{d,\tau,i,t} = \gamma_0 + \gamma_1 \times DIAL\ TONE_{d,\tau,i,t} + X \cdot Controls_{d,\tau,i,t} + \psi_{d,\tau,i,t} \qquad (4)$$

[INSERT TABLE 5 ABOUT HERE]

The negative and statistically significant coefficient estimate of $DIAL\ TONE_{d,\tau,i,t}$ in Table 5, column (1), implies that the more negative is the tone of the macro dialogue, the more information content it bears. These results are in sync with the large body of evidence that negative information has

more impact and is more thoroughly processed than positive information (Baumeister et al. (2001); Tetlock (2007)). As argued by Tetlock et al. (2008), pessimistic language associated with the firm is a strong predictor of future firm performance, which investors quickly incorporate into stock prices.

To cast light on the channel that the tone of monetary policy communication that took place before a conference call ($MP\ TONE(t^{pre})$) affects the tone of manager-analyst dialogues conveying macroeconomic information ($DIAL\ TONE_{d,\tau,i,t}$) which is then assimilated by the market ($ABSRET_{d,\tau,i,t}$), we perform a simple test by augmenting the model of Equation (4) with $MP\ TONE(t^{pre})$ as a regressor (Preacher and Hayes (2008)). The intuition is that for the proposed channel to be supported by the data, a regression of $ABSRET_{d,\tau,i,t}$ on both $DIAL\ TONE_{d,\tau,i,t}$ and $MP\ TONE(t^{pre})$ should display a statistically significant coefficient estimate for $DIAL\ TONE_{d,\tau,i,t}$ and a statistically insignificant coefficient for $MP\ TONE(t^{pre})$. Our results support this conjecture. In other words, the non-transitory effects of monetary policy communication manifest only through the tone of macroeconomic dialogues in conference calls.

Hence, our results can be construed as the tone of the Fed's communication having non-transitory effects on managers' and analysts' expectations. Such expectations are reflected in macro related dialogues typically occurring days or weeks after the Fed releases statements, and these conference call dialogues carry important information content to capital markets. Whereas we acknowledge the gamut of additional channels through which monetary policy communication affects asset prices (Doh et al. (2020); Neuhierl and Weber (2019)), such effects are presumably incorporated much before the narrow-windows pertaining to conference call macro dialogues.

4.3 The Content Relevance of Monetary Policy Communication

Thus far, our findings provide clear evidence that the sentiment (i.e. linguistic tone) of monetary policy press releases directly influences the sentiment of manager-analyst dialogues in corporate conference calls that ensue. However, this does not tell us to what extent the subject matter discussed in conference call dialogues reflects the semantic content conveyed by monetary policy communications. To shed light on this, we adopt the following two-step process using state-of-the-art content analytics techniques: (i) extract features (keyword n-grams or multi-word phrases) that capture the semantic content in monetary policy press releases and group the ex-

Figure 3. Word Cloud of Monetary Policy Press Releases. This figure shows a "word cloud" with the most common words appearing in the Federal Reserve's press releases. Larger words indicate higher frequency.

tracted features to form keyword groups, and (ii) identify specific sentences within conference call dialogues that semantically match one or more of the keyword groups extracted from monetary policy press releases. We elaborate on this process below:

4.3.1 Feature Extraction from Monetary Policy Press Releases

To extract features, we rely on *TextRank*, a graph-based ranking model for extracting key phrases from a text-based corpus (Mihalcea and Tarau (2004)). Specifically, we combine all 32 FOMC press releases that make our sample to form a corpus. We apply the following standard natural language processing steps to prepare the corpus for text analysis—remove extra spaces, remove stopwords, remove numbers, remove special characters, remove personnel info, and convert to lowercase. This simple pooled set of monetary policy press releases can be summarized by the word cloud depicted in Figure 3.

We then use *PyTextRank*, a Python-based implementation of the *TextRank* algorithm that extracts key phrases (n-grams and words that occur together) and ranks the extracted features based on their likelihood of occurrence. We rely on the *TextRank* algorithm as it is graph-based and hence works independent of the natural language comprising the corpus or the specific domain knowledge corresponding to the subject matter discussed in the corpus. We specifically choose the top-100 phrases ranked by the algorithm, combine the phrases that are similar in terms of underlying keywords and semantic content, and create a list of 44 *keyword groups* depicted in Table 6.

The objective of this exercise is simply to classify semantic content in monetary policy press releases into logical keyword groups. For ease of comprehension, we then manually categorize these 44 keyword groups under 6 different themes: *Federal*, *Economy*, *Inflation*, *Markets*, *Actions*, and *Other*.

4.3.2 Sentence Identification in Conference Calls

Having extracted the keyword groups that represent distinct semantic content in the monetary policy press releases, we then proceed to identify sentences in manager-analyst dialogues that are semantically similar to the aforementioned monetary-policy keyword groups.[14] To achieve this, we first isolate the 4,921 dialogues that correspond to macroeconomic discussions. We parse each dialogue into constituent sentences and retain only those sentences that contain at least 10 words.[15] We then compare the *semantic textual similarity* (STS) of each of the sentences with each monetary policy keyword group using Sentence Bidirectional Encoder Representations from Transformers (SBERT) algorithm (Reimers and Gurevych (2019)). SBERT is a state-of-the-art encoding algorithm based on a pre-trained deep-learning BERT network that maps each sentence (or a set of keywords) to a vector space such that semantically similar sentences are close to each other in the vector space. SBERT then computes the distance between vectors by using a standard approach such as cosine similarity or Manhatten/Euclidean distance.[16] Semantically similar sentences in the two input groups are thus identified based on a pre-defined distance-based threshold. Using this algorithm, we identify sentences in manager-analyst dialogues that are semantically similar to the identified monetary policy keyword groups. Specifically, for each sentence in a given manager-analyst dialogue, we identify all the monetary policy keyword groups that are less than 0.50 in semantic distance as measured by cosine similarity using SBERT. We rely on the cosine similarity distance measure as vector distances are measured on a 0 to 1 scale, where 0.5 is considered as a common benchmark for measuring proximity.[17]

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[14] By definition, a sentence (phrase) in our data is a more granular information unit than a dialogue. This means that a dialogue is comprised of many sentences and each sentence belongs to a single dialogue.

[15] This helps eliminate smaller sentences in dialogues that typically convey greetings and thanks at the beginning and end of the dialogues, respectively, and therefore lack any semantic content pertaining to the corporate subject matter discussed in the dialogue.

[16] As emphasized by Reimers and Gurevych (2019), Sentence-BERT reduces the effort for finding the most similar pair in a collection of 10,000 sentences from 65 hours with BERT / RoBERTa to about 5 seconds on a V100 GPU.

[17] Note that the cosine similarity is an inverse measure of semantic distance.
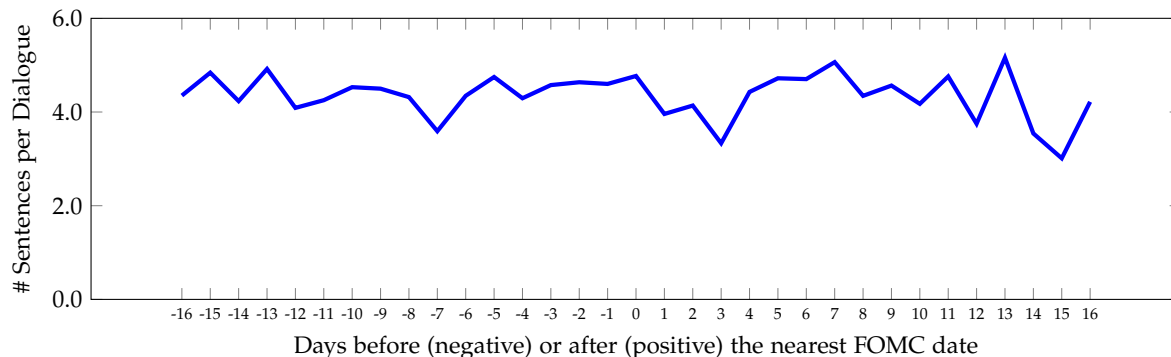
Figure 4. Average Number of Monetary Policy Sentences per Macro-Related Dialogue Around the Nearest FOMC Date. This figure shows the average monetary-policy-related sentences aggregated by the time distance of the conference calls to the nearest relevant Fed announcement. Dates are measured in business days, with $t = 0$ representing a key monetary policy date, i.e., an FOMC press release date.

Following this procedure, any sentence in a macro dialogue can be labeled as related to some (i.e., one or more) or none of the monetary-policy themes. Looking at the overall sample of 4,921 macro-related dialogues, each dialogue has, on average 4.39 sentences related to at least one monetary-policy theme (ranging from 0 to 22 monetary-policy-related sentences). Table 7 reports some examples of sentences related to at least one monetary-policy keyword group and the corresponding semantic cosine-similarity scores.

[INSERT TABLE 7 ABOUT HERE]

Interestingly, a perusal of the average number of monetary-policy-related sentences aggregated by the time distance of the calls to the nearest relevant Fed announcement (measured in business days, with zero representing a key monetary policy date) suggests that the overall average of 4.39 monetary-policy-related sentences per dialogue does not change significantly as the call dates approach the vicinity of monetary policy announcements. Results are illustrated in Figure 4.

While surprising at first glance, results of Figure 4 are congruent with the notion that the timing and purpose of conference calls reflect capital market incentives which are not directly related to monetary policy announcements. Nevertheless, whereas firms do not seem to time their conference calls as a function of monetary policy releases, the largely flat pattern shown in Figure 4 indicate that macro-dialogues *do reflect* monetary policy communication regardless of when the Fed announcements and conference calls take place.[18] These results provide supporting evidence on

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[18]Whereas Figure 4 reports the average semantic similarity of macro dialogues and monetary policy communication as a function of the "distance-to-the-nearest" FOMC announcement date, it is important to note that any conference call

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the sparsity of conference call dates and the continuity of their content characteristics regardless of their proximity to key monetary policy announcements.

Taken together, Figure 4 and the results of the tone-transmission reported in Figure 1 and Table 4 suggest that whereas managers and analysts deem monetary policy actions relevant irrespective of when conference calls take place (relative to FOMC announcements), it is only after the Fed communicates its actions and expectations that managers and analysts reflect the tone conveyed by the Fed. As such, these results corroborate the argument that the tone transmission results do indeed reflect a sentiment (i.e., optimistic/pessimistic) transmission pertaining to macroeconomic content.

5   Large-Sample Analysis

A central aspect of the empirical evidence presented so far is its micro-level nature, only possible due to the granularity of the dialogue-level information that allows us to delve into the timing and content of manager-analyst conversations. Nevertheless, the internal validity of the results discussed in Section 4 comes at the expense of external validity, as the sample period considered in our dialogue-level conference call data consists of only three years (2008–2010).

To overcome this limitation, we exploit a larger set of transcripts of corporate conference calls spanning the period from 2001 to 2020 obtained from Refinitiv (formerly Thomson Reuters StreetEvents). In this broad dataset, the unit of analysis is the entire text corpus of a conference call transcript. As such, because the data is rather coarse and not granular enough to identify the individual parts of a conference call (e.g., presentation and Q&A) or isolate specific manager-analyst dialogues, our goal in conducting this large sample analysis at the call level is to strengthen the generalizability of the previous analysis while acknowledging that such a coarse dataset curtails the identification of a tone transmission channel. Accordingly, our objective here is to investigate heterogeneous effects of monetary policy tone that could not be studied using our granular dataset.

In the same vein of the granular sample analysis, we start our sample construction by focusing on the set of monetary policy announcement dates ($T^M = \{t^m\}_{m=1}^M$) pertaining to the 2001–2020 time period for which Husted et al. (2020) monetary policy uncertainty index is available and restricting our sample to conference calls occurring at $t \in [t^m - 1, t^m + 1]$. To ensure that

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in our sample that took place not on the same dates of FOMC releases is placed, by construction, between two relevant FOMC release dates.

the conference-call transcripts are sufficiently informative, we eliminate transcripts with length smaller than 6,000 words. For the remaining transcripts, we compute the call-level macro tone ($CALL\ MACROTONE_{i,t}$) by following the standard dictionary approach applied at the sentence level. Specifically, within each conference-call transcript, we identify sentences that include at least one word from our macro dictionary and compute the linguistic tone for the corpus of macro sentences in the call using the Loughran and McDonald (2011) dictionary.[19] This sampling procedure yields 36,321 transcripts of conference calls occurring near monetary policy announcements, whose descriptive statistics are shown in Table 8.

[INSERT TABLE 8 ABOUT HERE]

Turning our attention to the textual information of the Fed's press releases, we compute the tone of the monetary policy announcements following the Loughran and McDonald (2011) dictionary. Figure 5 illustrates the tonal evolution of monetary policy communication over the 20-year sample period considered in our analysis, which underlines important stylized facts about how the Fed communicates monetary policy. First, the serial variation of tone is characterized by extreme variations (i.e., from very positive to very negative language, and vice versa) in the early years of our sample, which suggests that the Fed Speak became more nuanced in tone after the subprime crisis. Moreover, the tone of monetary policy communication is inherently negative at the onset of economic downturns (e.g., the dot-com bubble bust and the subprime crisis).

We then investigate how the macro tone of conference calls ($CALL\ MACROTONE_{i,t}$) reflects the tone of the nearest relevant monetary policy announcement ($MP\ TONE(t^{nearest})$) following an estimation that is akin to the one in our dialogue-level analysis (Equation (3)). In other words, besides the fact that the dependent variable of interest is now the macro-tone at the call level ($CALL\ MACROTONE_{i,t}$), our empirical strategy mirrors the one followed in our dialogue-level analysis, as we seek to contrast the association between $CALL\ MACROTONE_{i,t}$ and $MP\ TONE(t^{nearest})$ for calls that happened just before *versus* just after dates $t^{nearest} \in T^M$

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[19]In the specific case of conference calls for which we do not identify any sentence containing macro-dictionary terms, we set $CALL\ MACROTONE_{i,t} = 0$.
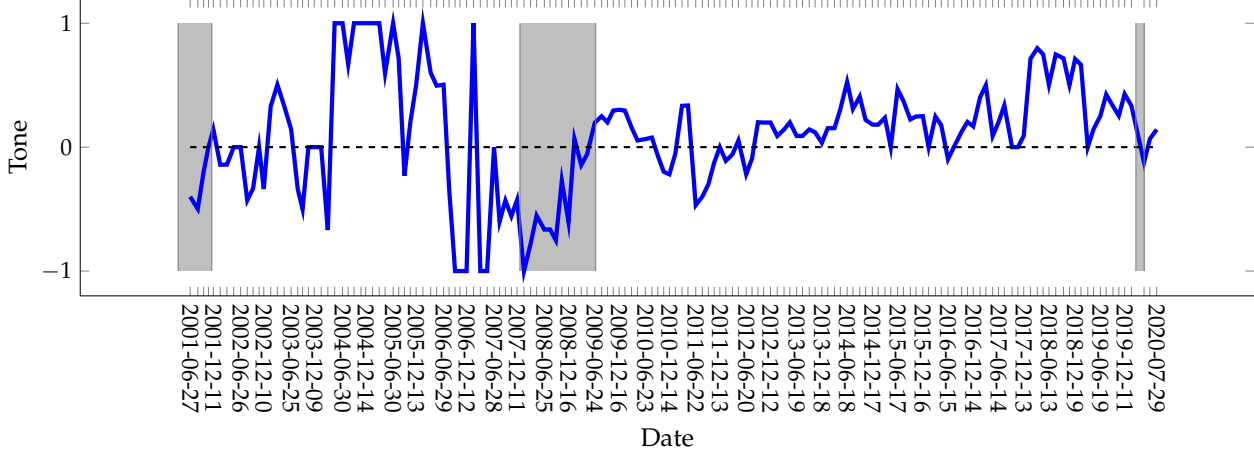
Figure 5. Monetary Policy Press Release Tone: 2001–2020. This figure shows the evolution of the linguistic tone of monetary policy press releases for the period from 2001 to 2020. The gray-shaded areas correspond to the NBER recession periods.

of monetary policy communication. This is formalized in Equation (5):

$$CALL\ MACROTONE_{i,t} = \gamma_0 + \left(\sum_{s=-1,0,1} \beta^{(s)} \times DFED_{i,t}^{(s)} \right) \times MP\ TONE(t^{nearest}) +$$

$$+ \gamma_1 \times MPU(t^{nearest}) + \epsilon_{i,t} \tag{5}$$

with coefficient estimates of $\beta^{(s)}$ indicating how the association between the tone of the Fed communication and the tone of macro-related sentences varies at the vicinity of press releases by the Fed. Probing further, we investigate how the aforementioned associations vary with the Fed's leadership by creating dummy variables I_c representing the four different chairpersons of the Fed covered in our sample period (i.e., $c \in C = \{Greenspan,\ Bernanke,\ Yellen,\ Powell\}$).[20] The Fed-chairperson indicators (I_c) are interacted with our call-proximity dummies ($DFED_{i,t}^{(s)}$), as shown in Equation (6).

$$CALL\ MACROTONE_{i,t} = \gamma_0 + \sum_{c\, \in\, C} I^c \times \left(\sum_{s=-1,0,+1} \beta^{(s,c)} \times DFED_{i,t}^{(s)} \right) \times MP\ TONE(t^{nearest}) +$$

$$+ \gamma_1 \times MPU(t^{nearest}) + \epsilon_{i,t} \tag{6}$$

Similarly to our dialogue-level analysis, we estimate Equation (5) and Equation (6) including year and weekday fixed effects and clustering standard errors at the nearest Fed communication date

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[20] I_c is coded based on the incumbent Fed chairperson at the date t that the conference call took place.
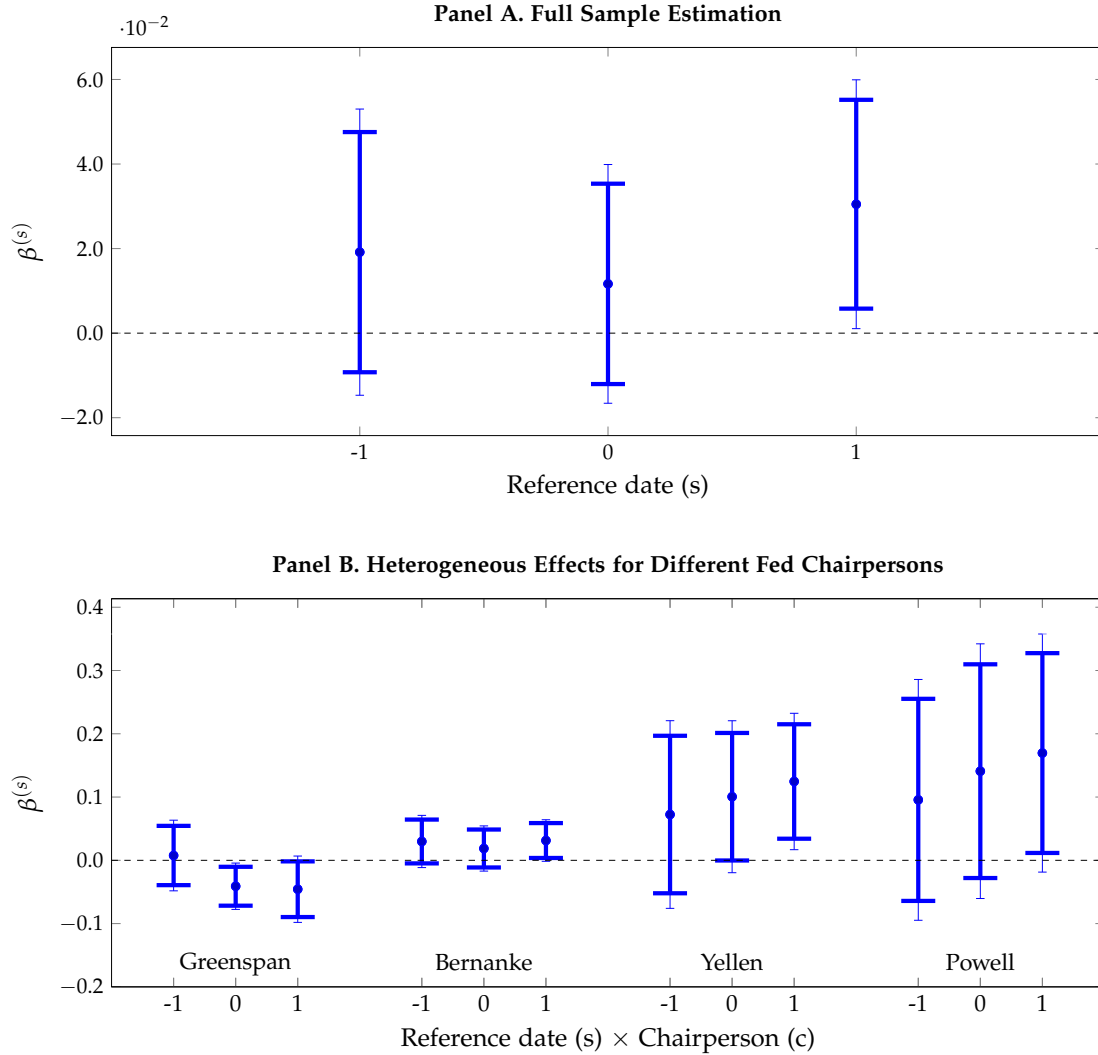
Figure 6. Tone Transmission Channel: Large Sample Evidence. This figure reports the coefficient estimates representing the overall transmission of the tone of the Fed communications to the macro-tone of conference calls taking place within $[t^{nearest} - 1; t^{nearest} + 1]$ short windows around key monetary policy announcement dates $t^{nearest}$ over the large sample period. Panel A depicts estimates of $\beta^{(-1)}$, $\beta^{(0)}$, and $\beta^{(1)}$ obtained from the OLS estimation of Equation (5). Panel B shows the heterogeneous-effects coefficients $\beta^{(-1)}$, $\beta^{(0)}$, and $\beta^{(1)}$ for different Fed chairpersons ($c \in C = \{Greenspan, Bernanke, Yellen, Powell\}$) obtained from the OLS estimation of Equation (6). The bars represent the 95% and 90% confidence intervals, computed with robust standard errors clustered at the FOMC nearest-meeting-date level.

($t^{nearest}$) level. Results are reported in Figure 6, with bars representing 95%- and 90%-confidence intervals for estimates of $\beta^{(s)}$ (Panel A) and $\beta^{(s,c)}$ (Panel B).

Estimates of $\beta^{(s)}$ indicate that macro tone of conference calls occurring one day before ($s = -1$) or at the same day ($s = 0$) of monetary policy communications do not display a statistically significant association with the tone of the corresponding press release by the Fed. On the other hand, the macro tone of conference calls taking place one day after such communications ($s = 1$) is positively

related to the tone of the Fed. To wit, the results of Figure 6 (Panel A) should be construed as evidence that generalizes the results of Figure 1 for a coarser measure of sentiment of macro-related content in conference calls but over a longer sample period.

Turning to the heterogeneous effects for different Fed chairpersons (Panel B), we report that the tone of conference calls occurring one day before monetary policy communications ($s = -1$) are statistically unrelated to the tone of the corresponding Fed press release for each of the chairperson mandates represented in our sample period (i.e., estimates of $\beta^{(s,c)}$ for $s = -1$ have p-values > 0.1, $\forall c \in C$). Conference calls taking place either on the same day or the day after monetary policy announcements, conversely, unravel important heterogeneous effects which are aligned with the general understanding of how monetary policy communication evolved over time. For example, the tone of the Fed Speak during Greenspan's mandate actually displays a *negative* association with the macro-tone of calls taking place either at the same day (p = 0.028) or the day after (p = 0.088). This is consistent with Greenspan's general stance that monetary policy decisions should be conducted unobtrusively and shielded from capital market expectations. The transition between Greenspan and Bernanke is characterized by a paradigm change regarding the role of monetary policy communication, as evidenced by the positive association between the tone of the Fed speak under Bernanke's mandate and the macro-tone of calls that happened one day after (p = 0.062). Communication effectiveness improved further during Yellen's mandate, as revealed by the stronger positive association between the tone of the Fed speak and the macro tone of calls take place one day after (p = 0.023). Regarding the economic magnitude of the tone transmission, a perusal of coefficient estimates indicate stronger effects for the most recent chairperson mandates, most remarkably observed for Yellen and Powell. Last, we underscore that the statistical significance of the tone transmission channel is marginally weaker during Powell's mandate (p = 0.077). We interpret these results with caution, owing to the fact that it comprises the ongoing COVID–19 pandemic.[21]

We emphasize that the results presented in this Section 5 and the ones from the previous Section 4 are not directly comparable for several reasons. First and foremost, since

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[21]We interpret these results as consistent with the unique nature of the economic contraction caused by a public health emergency situation. In other words, whereas monetary policies can counteract the undesirable economic effects of a pandemic, the crisis itself cannot be resolved through economic policies alone, without the implementation of non-pharmaceutical interventions (NPIs) or medical developments (e.g., anti-viral treatments, vaccines). As such, the marginal importance of monetary policy communication is reduced when a myriad of medical and public health factors are jointly affecting the macroeconomy.

the outcome variable of interest is the macro-tone computed at the conference-call level, the macro *versus* non-macro dichotomy—key to our empirical strategy using the dialogue-level data—is not explored in the present analysis. That is, $CALL\ MACROTONE_{i,t}$ is constructed to capture linguistic sentiment pertaining to macro content, whereas $DIAL\ TONE_{d,\tau,i,t}$ allows us to isolate the specific conversations which are more likely to be affected by monetary policy communication. Furthermore, $CALL\ MACROTONE_{i,t}$ also includes the sentiment of macroeconomic topic discussed during the presentation portion of the conference calls (i.e., the monologue session by managers preceding the Q&A session).

The crux of the matter is that using the call-level measure of $CALL\ MACROTONE_{i,t}$ comes with a loss in identification finesse, in the interest of generalizability over a broader sample. Thus, we rely on the complementary nature of the two analyses and the overall consistency of their results to marshal a unified body of evidence that furthers our understanding of how economic agents respond to monetary policy communication.

6   Concluding Remarks

In this paper, we use detailed data on manager-analyst conversations in corporate conference calls and relevant monetary policy announcements by the Fed to uncover a novel tone transmission channel of monetary policy. Specifically, we focus on conference calls taking place within short-time windows centered at key monetary policy announcements to show that (1) the tone of communication by the Fed affects only the tone of manager-analyst conference-call dialogues taking place after the corresponding announcements by the Fed, and (2) the effect is restricted to dialogues with information content broadly pertaining to the macroeconomy.

We stress the informational effect of the tone transmission channel for equity markets. Notably, the tone of monetary policy announcements directly spills over to the tones of macroeconomic dialogues in subsequent conference calls, which in turn affects market prices contemporaneously (i.e., within the precise narrow time windows corresponding to the dialogue). We also provide supporting evidence of the content-relevance of the Fed's communication, using machine learning algorithms to document the semantic similarity between the Fed's press releases and the macro dialogues.

Lastly, we show that the positive association between the overall tone of corporate conference calls and the tone of monetary policy announcements preceding the call is stronger in more recent years.

Collectively, our results underline heretofore undocumented effects of monetary policy communication beyond contemporaneous effects on asset prices, shedding light on how manager-analyst interactions during corporate conference calls help market participants interpret and incorporate monetary policy information released prior to the call.

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Table 1. Descriptive Statistics—Dialogue-Level Analysis

This table reports descriptive statistics for the regression variables. Panels A and B report summary statistics at the Call and Dialogue levels, respectively, for earnings call sample used in the dialogue level analysis. Panel C reports summary statistics for the FOMC meeting press releases spanning the period 2007–2010. All variables are described in Appendix A.

Panel A: Conference Calls Summary Statistics

Variables	N=2,455				
	Mean	**Median**	**SD**	**P25**	**P75**
$MINS_{i,t}$	54.408	55.05	14.457	44.95	62.933
$SIZE_{i,t}$ ($Bn)	12.103	3.199	33.293	1.245	8.647
$\log(SIZE_{i,t})$	8.146	8.07	1.486	7.127	9.065
$DISPERSION_{i,t}$	0.062	0.03	0.119	0.02	0.06
$PRES\_TONE_{i,t}$	0.164	0.164	0.267	-0.017	0.362

	Weekday				
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
# of Calls	103	524	491	1059	278

Panel B: Dialogue Summary Statistics

Variables	N=19,605				
	Mean	**Median**	**SD**	**P25**	**P75**
$MACRO_{d,\tau,i,t}$	0.251	0	0.434	0	1
$ORDER_{d,\tau,i,t}$	5.384	5	3.587	3	7
$MINS_{d,\tau,i,t}$	3.874	3.5	2.064	2.35	4.983
$LENGTH_{d,\tau,i,t}$	579.561	526	308.022	351	750
$TURNS_{d,\tau,i,t}$	11.757	11	6.165	8	14
$BUY_{d,\tau,i,t}$	0.348	0	0.476	0	1
$NBUY_{d,\tau,i,t}$	0.307	0	0.461	0	1
$GUIDE_{d,\tau,i,t}$	0.337	0	0.472	0	1
$ALLSTAR_{d,\tau,i,t}$	0.228	0	0.42	0	0
$DIAL\_TONE_{d,\tau,i,t}$	-0.003	0	0.42	-0.28	0.295
$ABSRET_{d,\tau,i,t}$	0.004	0.002	0.005	0.001	0.005

Panel C: FOMC Release Summary Statistics

Variables	N=32				
	Mean	**Median**	**SD**	**P25**	**P75**
$MP\_TONE(t^m)$	-0.22	-0.172	0.47	-0.601	0.118
$MP\_LENGTH(t^m)$	364.53	380	117.697	266.5	449.5

	Weekday				
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
# of Releases	0	11	20	1	0

Table 2. Timing Determinants of Corporate Conference Calls

This table reports the results from estimating a determinants model of firm's decisions to hold conference calls $CALL\_OCCUR_{i,t}$ estimated over a balanced panel of all firms i of our sample and dates t corresponding to our sample period (total of 424,018 firm-day combinations). Column (1) estimates the probability of a firm holding a conference call as a function of the firm's time distance to relevant monetary policy announcements (individual dummies representing each day of a [-2,+2] window around a monetary policy announcement). Column (2) estimates the probability of a firm holding a conference call as a function of the day of the week (dummies for weekdays). Column (3) considers dummies for the time distance to relevant monetary policy announcements and for weekdays. The t-statistics, included in parentheses, are computed using robust standard errors dually clustered at the firm and weekday levels. Standardized coefficients with two-tailed p-values are indicated: *** p < 0.01, ** p < 0.05, * p < 0.10.

	Dependent variable:		
	$CALL\_OCCUR_{i,t}$		
	(1)	(2)	(3)
$DFED_t^{(-2)}$	−0.002		0.001
	(−1.394)		(0.805)
$DFED_t^{(-1)}$	0.004		0.005
	(0.883)		(1.593)
$DFED_t^{(0)}$	0.005		0.005
	(1.301)		(1.375)
$DFED_t^{(1)}$	0.015*		0.011
	(1.654)		(1.373)
$DFED_t^{(2)}$	0.002		0.001
	(1.049)		(0.372)
D_t^{Monday}		0.001***	0.001***
		(19.521)	(5.332)
$D_t^{Tuesday}$		0.006***	0.005***
		(32.416)	(16.995)
$D_t^{Wednesday}$		0.006***	0.005***
		(33.458)	(12.088)
$D_t^{Thursday}$		0.012***	0.011***
		(52.175)	(14.174)
D_t^{Friday}		0.003***	0.003***
		(27.005)	(10.354)
Observations	424,018	424,018	424,018
R^2	0.001	0.002	0.003

Table 3. Characteristics of Macroeconomic Dialogues in Corporate Conference Calls

This table reports the results from estimating a determinants model using OLS and logit specifications in columns (1) and (2), respectively. The sample is comprised of 19,605 earnings conference call dialogues. The t-statistics, included in parentheses, are computed using robust standard errors clustered at the call level. Standardized coefficients with two-tailed p-values are indicated: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. All variables are described in Appendix A.

	Dependent variable:	
	$MACRO_{d,\tau,i,t}$	
	(1)	(2)
$ORDER_{d,\tau,i,t}$	-0.016^{**}	-0.011^{**}
	(-2.14)	(-1.96)
$\log(LENGTH_{d,\tau,i,t})$	0.267^{***}	1.262^{***}
	(30.27)	(26.8)
$TURNS_{d,\tau,i,t}$	-0.051^{***}	-0.023^{***}
	(-5.35)	(-6.49)
$BUY_{d,\tau,i,t}$	0.008	0.052
	(0.96)	(1.18)
$NBUY_{d,\tau,i,t}$	0.019^{**}	0.102^{**}
	(2.26)	(2.27)
$GUIDE_{d,\tau,i,t}$	0.015^{*}	0.072^{*}
	(1.86)	(1.79)
$ALLSTAR_{d,\tau,i,t}$	0.022^{***}	0.128^{***}
	(2.75)	(2.92)
$DIAL\_TONE_{d,\tau,i,t}$	-0.039^{***}	-0.231^{***}
	(-5.50)	(-5.01)
N	19,605	19,605
Method	OLS	LOGIT
Pseudo R2	0.063	0.062

Table 4. Tone Transmission from FOMC Press Releases to Corporate Conference Calls

This table reports the results from estimating Equation (3) using OLS. Columns (1) and (2) present the results from estimating Equation (3) for macroeconomic and non-macroeconomic dialogues, respectively, for the full dialogue sample. Columns (3) and (4) present the results after excluding calls occurring on Fed press release days. The t-statistics, included in parentheses, are computed using robust standard errors clustered at the Fed-press-release date level (t^{pre}). Standardized coefficients with two-tailed p-values are indicated: *** p < 0.01, ** p < 0.05, * p < 0.10. All variables are described in Appendix A.

	Dependent variable:			
	$DIAL\_TONE_{d,\tau,i,t}$			
	Full Sample		Excl. Calls Occurring on Fed Release Days	
	(1)	(2)	(3)	(4)
	$MACRO_{d,\tau,i,t}=1$	$MACRO_{d,\tau,i,t}=0$	$MACRO_{d,\tau,i,t}=1$	$MACRO_{d,\tau,i,t}=0$
$MP\_TONE(t^{pre})$	0.088**	0.041	0.084**	0.048
	(2.19)	(0.91)	(2.13)	(1.05)
$MP\_TONE(t^{post})$	0.047	0.022	0.029	0.019
	(0.89)	(0.37)	(0.59)	(0.34)
$PRES\_TONE_{i,t}$	0.248***	0.218***	0.244***	0.220***
	(15.50)	(19.29)	(14.18)	(19.80)
$MPU(t^{pre})$	0.037	0.025	0.033	0.036
	(0.94)	(1.14)	(0.91)	(1.56)
N	4,921	14,684	4,670	13,855
R^2	0.073	0.052	0.071	0.053

Table 5. Tone Transmission Channel and the Informational Content of Macro Dialogues

This table reports the results from estimating Equation (4) using OLS for the sample of 4,921 manager-analyst dialogues that discuss macroeconomic issues in earnings calls. The t-statistics included in brackets are computed using robust standard errors clustered at the Fed-press-release date level (t^{pre}). Standardized coefficients with two-tailed p-values are indicated: *** p<0.01, ** p<0.05, * p<0.10. See Appendix A for definitions of all variables.

	Dependent variable:	
	$ABSRET_{d,\tau,i,t}$	
	(1)	(2)
$DIAL\_TONE_{d,\tau,i,t}$	-0.035^{**}	-0.030^{**}
	(-2.22)	(-2.04)
$MP\_TONE(t^{pre})$		-0.055
		(-1.03)
$ORDER_{d,\tau,i,t}$	-0.062^{***}	-0.062^{***}
	(-4.71)	(-4.65)
$\log(LENGTH_{d,\tau,i,t})$	0.169^{***}	0.168^{***}
	(12.32)	(12.84)
$TURNS_{d,\tau,i,t}$	0.008	0.006
	(0.49)	(0.40)
$BUY_{d,\tau,i,t}$	-0.016	-0.012
	(-1.21)	(-0.78)
$NBUY_{d,\tau,i,t}$	0.005	0.011
	(0.35)	(0.67)
$GUIDE_{d,\tau,i,t}$	-0.012	-0.009
	(-0.91)	(-0.67)
$ALLSTAR_{d,\tau,i,t}$	0.004	0.002
	(0.27)	(0.16)
$DISPERSION_{i,t}$	0.105^{***}	0.103^{***}
	(7.80)	(7.44)
$\log(SIZE_{i,t})$	-0.106^{***}	-0.105^{***}
	(-6.00)	(-5.96)
R^2	0.065	0.068

Table 6. Thematic Classifications of Monetary Policy Communication

This table reports the 44 keyword groups (left column) obtained based on the TextRank algorithm using the corpus of 32 monetary policy press releases corresponding to our sample period. Keyword groups are manually categorized under 6 different themes (right column).

Keyword group	Theme
'federal open market committee', 'federal reserve', 'federal funds rate'	Federal
'economic sustainable moderate supportive growth activity', 'economic outlook conditions evolution', 'economic recovery return gradual', 'economic contraction slowing deterioration', 'economic downside risk', 'economic financial developments', 'economic weak strong', 'income growth sluggish', 'economic solid quarter', 'economic longterm nearterm', 'economic slack'	Economy
'inflation expectations increased elevated', 'inflation significant concern pressure upward downward longterm', 'inflation risk underlying uncertainty', 'inflation subdued', 'inflation outlook stable'	Inflation
'labor markets weak committee', 'financial markets institutions conditions', 'credit markets tight', 'credit extension', 'mortgage lending housing markets', 'financial market sales turmoil', 'financial markets improved functioning', 'market forces'	Markets
'foster preserve price stability', 'necessary support help financial stability economic', 'open market operations', 'purchase treasury securities', 'agency debt purchase', 'bank lending', 'easing monetary policy'	Actions
'levels resource utilization rate', 'maximum employment', 'energy commodity prices', 'export growth', 'term asset-backed security loan facility', 'consumer spending growth', 'smooth transition markets', 'growth household spending', 'commercial paper money market', 'foreign exchange FX currency'	Other

Table 7. Sample Macro-Dialogue Sentences and Semantic Textual Similarity with Monetary Policy Themes

Sentence: "What do you think is going to happen in the inflation environment worldwide, globally in 2009"
Keyword group: inflation risk underlying uncertainty; **Similarity score:** 0.67
Sentence: "When you come out of a normal recession, what happens is that the Fed loosens up on interest rates after they choked off the inflationary expectations, and then the banks lend money, extend credit and with that extension of credit you have that expansion phase coming off of the bottom of the economy"
Keyword group: economic contraction slowing deterioration; **Similarity score:** 0.64
Keyword group: easing monetary policy; **Similarity score:** 0.64
Sentence: "I think the emerging markets of the world being prudently conservative now and beginning to tighten their monetary policies and raise interest rates and try to slow growth and slow inflation somewhat."
Keyword group: easing monetary policy; **Similarity score:** 0.65
Sentence: "I don't see us going into any kind of a '70s style high inflation, stagflation"
Keyword group: inflation significant concern pressure upward downward longterm; **Similarity score:** 0.51
Sentence: "Well, you are benefiting, as usual, from the increases in inflation rate that have occurred in worldwide economies"
Keyword group: inflation expectations increased elevated; **Similarity score:** 0.72
Sentence: "But you are saying that you think you could see a substantial decline in commodity prices and still not see a big decline in demand, is that right"
Keyword group: economic downside risk; **Similarity score:** 0.62
Sentence: "Those things play to our strengths and I think, even with the commodity price decline, which is likely, in my view, we will see continued strong demand in those sectors"
Keyword group: economic contraction slowing deterioration; **Similarity score:** 0.59
Sentence: "If FX stays where it is today, can you give us a rough sense for what its impact would be on earnings in the next year or so"
Keyword group: foreign exchange FX currency; **Similarity score:** 0.51
Sentence: "Are we decidedly at a peak in credit losses"
Keyword group: financial market sales turmoil; **Similarity score:** 0.55

Table 8. Descriptive Statistics—Large Sample Analysis

This table reports descriptive statistics for the 36,231 conference-call transcripts used in the large sample analysis. Panel A reports the summary statistics of the conference-call tone and word count. Panel B depicts the number of conference-call transcripts per year over the period 2001–2020. All variables are described in Appendix A.

Panel A: Conference Calls Summary Statistics

Variables	N=36,321				
	Mean	**Median**	**SD**	**P25**	**P75**
$CALL\_MACROTONE_{i,t}$	0.079	0.000	0.434	-0.101	0.333
$CALL\_LENGTH_{i,t}$	9,114	8,878	2,150.8	7,488	10,306

Panel B: Distribution of Conference Calls over the Period 2001–2020

Year	# Calls
2001	14
2002	313
2003	968
2004	1,028
2005	1,264
2006	1,586
2007	1,800
2008	2,099
2009	1,872
2010	1,928
2011	2,044
2012	2,205
2013	2,332
2014	2,477
2015	2,568
2016	2,502
2017	2,560
2018	2,615
2019	2,777
2020	1,279

Appendix: Data Details and Additional Results

A   Variable Definitions

Table A.1. Variable Definitions

Variable	Description
$CALL\_OCCUR_{i,t}$	Indicator variable set to 1 if a firm i held a conference call at day t, and 0 otherwise.
$MACRO_{d,\tau,i,t}$	Indicator variable set to 1 if a dialogue contains macroeconomic terms, and 0 otherwise.
$ORDER_{d,\tau,i,t}$	ID number for the dialogue in ascending order of appearance by the analyst where the first analyst is coded 1, the second as 2, etc. Smaller values indicate the analyst speaks earlier in the call Q&A.
$MINS_{d,\tau,i,t}$	Length in minutes, measured by computing the difference between starting and ending time-stamps for the dialogue.
$LENGTH_{d,\tau,i,t}$	Length of dialogue (in words).
$TURNS_{d,\tau,i,t}$	Number of turns in a dialogue ("turn" refers to contiguous speech by a single participant).
$BUY_{d,\tau,i,t}$	Indicator variable to denote analysts (participating in a dialogue) with an outstanding Buy or Strong Buy recommendation. In the rare instances where data errors in IBES indicate an analyst has earnings forecast but no recommendation, we take the consensus mean recommendation of all analysts following the firm.
$NBUY_{d,\tau,i,t}$	Indicator variable to denote analysts (participating in a dialogue) with an outstanding Sell, Strong Sell, or Hold recommendation. In the rare instances where data errors in IBES indicate an analyst has earnings forecast but no recommendation, we take the consensus mean recommendation of all analysts following the firm.
$GUIDE_{d,\tau,i,t}$	Indicator Variable for whether a guidance was issued, and equals 1 if any sentence in the turn-at-talk was identified in a Thomson Reuters Guidance Report, and 0 otherwise.
$ALLSTAR_{d,\tau,i,t}$	Indicator variable to denote whether the analyst participating in the dialogue is classified as an ALL STAR analyst. The ALL STAR status reflects the professional prestige of the analyst as compiled by *Institutional Investor*.
$DIAL\_TONE_{d,\tau,i,t}$	Net Tone of the dialogue (% positive words – % negative words) / (% positive words + % negative words + 0.000001) computed using the Loughran and McDonald (2011) dictionary.
$ABSRET_{d,\tau,i,t}$	Absolute value of return (buy-and-hold) computed using mid-point of bid and ask prices from TAQ data corresponding to the starting and ending timestamps for the dialogue.
$SIZE_{i,t}$	Total assets of the firm at the end of the quarter corresponding to the conference call (Compustat: ATQ)
$\log(SIZE_{i,t})$	Natural logarithm of $SIZE_{i,t}$
$DISPERSION_{i,t}$	Analyst forecast dispersion reported as the standard deviation of forecasts in IBES Summary Statistics (computed based on the most recent quarterly forecast provided by analysts prior to the conference call)
$PRES\_TONE_{i,t}$	Net tone of the presentation portion of the call (% positive words – % negative words) / (% positive words + % negative words + 0.000001) computed using the Loughran and McDonald (2011) dictionary.
$MP\_TONE(t^{nearest})$	Net tone of the FOMC meeting press release nearest in time to the call (% positive words – % negative words) / (% positive words + % negative words + 0.000001) computed using the Loughran and McDonald (2011) dictionary.
$MP\_TONE(t^{pre})$	Net tone of the FOMC meeting press release issued prior to the call (% positive words – % negative words) / (% positive words + % negative words + 0.000001) computed using the Loughran and McDonald (2011) dictionary.
$MP\_TONE(t^{post})$	Net tone of the FOMC meeting press release issued after the call (% positive words – % negative words) / (% positive words + % negative words + 0.000001) computed using the Loughran and McDonald (2011) dictionary.
$CALL\_MACROTONE_{i,t}$	Net tone of macro sentences (% positive words – % negative words) / (% positive words + % negative words + 0.000001) computed at the conference-call level using the Loughran and McDonald (2011) dictionary. We isolate the corpus of macro sentences and non-macro sentences of conference-call transcripts and compute the Loughran and McDonald (2011) of the former.
$CALL\_LENGTH_{i,t}$	Length of the conference call (in words).

B Identification of Macroeconomic Dialogues

Table B.1. Dictionary of Macroeconomic-Related Terms

Economy	Consumer Sentiment	Trade Policy
Economic Conditions	Consumer Spending	Debt Ceiling
Macroeconomy	Aggregate Credit	Government Debt
Macroeconomic	Aggregate Risk	Sovereign Debt
Economic Expansion	Systemic Risk	Government Deficit
Economic Contraction	Financial Stability	Fiscal Deficit
Recession	Aggregate Capital	Fiscal Policy
Depression	Capital Stock	Money Supply
Economic Recovery	Capital Accumulation	Quantitative Easing
Employment	Capital Formation	QE
Unemployment	Aggregate Investment	Interest Rates
Cyclical	Aggregate Savings	Real Rates
Procyclical	Household Savings	Nominal Rates
Countercyclical	Capital Depreciation	Fed
Cyclicality	Aggregate Depreciation	Federal Reserve
Procyclicality	Aggregate Inventories	ECB
Countercyclicality	Government Bonds	MBS
Household Income	Treasury Bonds	Mortgage Backed Security
Disposable Income	T-bonds	Mortgage Backed Securities
GDP	T-bills	ABS
Domestic Product	Foreign Exchange	Asset Backed Security
GNP	Forex	Asset Backed Securities
National Product	FX	Liquidity Trap
Aggregate Output	Exchange Rate	Inflation
Output Gap	Currency	Disinflation
Household Consumption	Eurozone	Deflation
Aggregate Consumption	Foreign Trade	Deflator
Consumer Price Index	CPI	

Table B.2. Industry Distribution of Macro and Non-Macro Dialogues

FF10 Industry	# Macro	# Non-Macro
Consumer Nondurables: Food, Tobacco, Textiles, Apparel, Leather, Toys	277	687
Consumer Durables: Cars, TVs, Furniture, Household Appliances	133	244
Manufacturing: Machinery, Trucks, Planes, Chemicals, Off Furn, Paper, Com Printing	1233	2885
Oil, Gas, and Coal Extraction and Products	184	1534
Business Equipment: Computers, Software, and Electronic Equipment	321	855
Telephone and Television Transmission	67	150
Wholesale, Retail, and Some Services (Laundries, Repair Shops)	643	1761
Healthcare, Medical Equipment, and Drugs	304	882
Utilities	218	1072
Other: Mines, Constr., Bld. Mt., Trans, Hotels, Bus. Serv., Entertainment, Finance	1541	4614

Table B.3. Sample Dialogues—Macro and Non-Macro

Macro Dialogues

– It's Ingalls & Snyder. I have got a sort of a broader question, although I have the same concerns as most people. The fact that your second half guidance of 282 is below 290 earned a year ago and well below the 304 that had been expected by the Street. But I think you have gone over a lot of the reasons for that already, but it seems to me that you have got a problem coming up in 2009. I would like to get Jim's view on this as an economist, because you have announced 5% to 7% price increases for 2009 to overcome inflationary cost increases. Inflation in this country including food and energy is about 5% now. Compensation is up 3%, a little better at 3.2%. Clearly, if everybody increased prices 5% to 7%, the Fed would have to step in and do something. You said that the efforts to reduce inflation in these developing countries with interest—the increases in interest that have been announced have not been very effective. So if they are not effective and this inflation of commodities continues, it would seem to me that that is going to make the economic situation in the U.S. considerably worse. The Fed will have to do something to prevent inflation from becoming embedded or if it does become embedded, well, that is an even worse situation. So don't we have a dilemma here? Is there a way out, Jim? What do you think is going to happen in the inflation environment worldwide, globally in 2009?

– Well, that is a pretty big sweeping question. I guess I should call Bernanke and see if he can help us here. I don't see us going into any kind of a '70s style high inflation, stagflation. I think the emerging markets of the world being prudently conservative now and beginning to tighten their monetary policies and raise interest rates and try to slow growth and slow inflation somewhat. Hopefully, they will do that well. Commodity prices, as we have indicated several times, could drop fairly significantly. I'm talking 30%-ish and still be at levels that would be attractive to drive investment in the mining and oil and gas industries because there has been such a prolonged period of under investment. I am a little concerned very specifically about the steel industry, because there is more concentration globally in the steel industry. Their energy costs are clearly up quite a bit. Iron Ore pellet prices are up quite a bit and they have a pretty strong position to push a lot of that through to the market. I hope we are being prudently conservative, but we wanted to position ourselves to be sure we could cover material cost increases that might work themselves through in the latter half of '08 as we go into '09. That would be the best way I know how to say that.

– Well, you are benefiting, as usual, from the increases in inflation rate that have occurred in worldwide economies. This always happens with Caterpillar in every cycle. But as those inflation rates come down and as commodity prices come down, the other side of it works and you get hurt. But you are saying that you think you could see a substantial decline in commodity prices and still not see a big decline in demand, is that right?

– That is correct. I think if there is a significant decline in commodity prices from current levels then you will still see pretty strong demand because of the, again, very prolonged, underinvestment that occurred in global mining, in global energy and that would be cool, oil, gas, power distribution, etc. Those things play to our strengths and I think, even with the commodity price decline, which is likely, in my view, we will see continued strong demand in those sectors.

– Thanks, Alex.

– Okay, thank you.

– Thank you. Andy Casey.

Thank you. I have a couple of questions. First for Jeff, I'm wondering if you could please comment on the M&A outlook for Pfizer in light of what's occurred in the stock market in the past couple of months – specifically, do you believe that acquisition opportunities have increased in the context of current valuation? And related to that, has your thinking on M&A for Pfizer changed over these last couple of months? If so, how? And then separately for Frank, FX related question. If I look to year-to-date adjusted EPS growth for Pfizer, it's been up 2%. The year-to-date benefit from FX for EPS has been plus 7%. If FX stays where it is today, can you give us a rough sense for what its impact would be on earnings in the next year or so? Thanks.

– Thank you, Roopesh. Good morning. Let me start on business development. We have been clear that focused business development have continued to be an important enabler of all of our growth strategies, and we've said before that we are open to all opportunities and we never say never. I can tell you that under Bill Ringo's leadership, we engage in a very robust and ongoing process to constantly look at all opportunities. And in that process we are always taking account of the very dynamic landscape and the challenges and the opportunities that the environment may create. But while the environment changes, the fundamentals don't change and the considerations I have outlined previously still apply to any deal, large or small. First, it has to have strategic value. The price must be right. It must—we must manage the disruption and risks to productivity. In short, it must create shareholder value and none of that has changed. As the environment changes, we continue to observe and monitor very carefully and review those opportunities on a constant basis. Frank, you want to talk about foreign exchange?

– Yes. So let me cover this. Let me run a couple of numbers first and then I'll talk about going forward. So if you look at Q3, we benefited from foreign exchange on revenues by $620 million, on EPS by $0.05, which is part of the statistics that you quoted. If you look at foreign exchange going forward, if you look at our guidance, we said in our guidance, obviously—other than those $2 billion, that everything is at current October foreign exchange rates. If you were to leave current foreign exchange rates and run now for the rest of the year, FX in Q4 would actually not help our EPS numbers. It would actually be detrimental to the numbers by a couple of cents which we included, factored into our guidance. Beyond Q4, if you look at 2009, we are not ready to comment on that, and the reason I say that is there's lots of volatility right now in foreign exchange and the various currencies. And so to try to call that number up today we think is an imprudent thing to do. We will, I will talk about that number on the January earnings call.

– Thanks, Frank. Next question, please.

– Thank you. Our next question comes from Mr. Tim Anderson of Sanford Bernstein. Please proceed with your question.

– Good morning. Kelly, you've partially just answered my question but just sort of a follow up, then, in terms of credit losses for the industry and BB&T, are we—and maybe looking back last week, things were somewhat of a mixed message from the large caps that released earnings. Are we decidedly at a peak in credit losses?

– Jeff, I wouldn't be prepared today to call it a peak like a peak-peak. What I would say is and this is intuition but also based on just looking at our metrics. I think we are nearing the peak. If I had to stake myself out, I would say, you're certainly going to find the peak over the next two two or three quarters. I suspect you will see nonperformance of the industry and for us continue to increase probably at a declining rate of increase. And then, frankly, as you see the economy begin to stabilize and grow, you'll begin to see nonperforming asset sales increase because the marketplace is going to figure out when you're—when you've hit the peak, that's when you want to start buying. So, you'll see demand for these products go up materially, I think, over the next six to 12 months, which you'll—So, you'll get hit on both sides, you won't be putting as many in and you'll have more going out the bottom. And so, I wouldn't call it a peak today but I think it's not nearly as far away as it has been.

– Okay. And not—and just maybe—not to put words in your mouth and maybe it's obvious. But if the economy models along 1%, 2% GDP next year, is the rate of improvement and charge-offs, just if it's just a gradual lift from here, is it a gradual improvement? Or have we flushed as an industry so many bad credits that back half of 2010, even without the economy, credit costs start to drop notably?

– Well, you framed the question well. It really does depend on what happens to the economy. Back in January, when we were talking all together we were kind of projecting charge-offs and so forth. And we gave a little lower number than we're at now. But we said, "Look, if the economy is bad enough and we start seeing unemployment at plus 10%, that begins to change things." That's occurred. If the mood in the economy stays such that unemployment gets above 10% and hangs there, then, you'll see a stagnant level of high nonperformers for a material time. I don't think that's what's going to happen but that would be the result of that. So, right now, the pace at which we peak and the pace at which we decline is a function of consumer and corporate confidence. And to be honest with you, I think that's largely right now based on what's coming out of Washington. If our—when we were coming out of the first quarter, I think the mood was clearly improving and people were beginning to begin to think we were getting ready to get through this thing and move on. And then, all of the rhetoric coming out of Washington about health care and taxes and all of that has just put people on the sidelines. I get a lot of anecdotal feedback but I sit in the Federal Reserve Board in Richmond and I'm always required to say my comments are my personal ones and not of the Federal Reserve Board. But based on all of feedback that I see, the underlying metrics are turning. But whether it continues to turn will be a function of confidence. And so, we're going to need some positive leadership out of Washington to restore confidence before people are going to ahead and invest and buy.

– And we'll go next to Christopher Marinac with FIG Partners.

– Still $100 million. Okay. And Jim, the question about overall expectations among sellers, if you could just comment on whether or not you think expectations are too high or it probably always seems that way when you're more of a buyer, but I wondered how that may have changed over the last year or so?

– I don't know what the specific expectations of sellers are. I would put a little differently. I would say that with respect to a lot of businesses, sellers are looking to sell based on the economics of '07 and early '08, and buyers often times are looking to buy based on the economics of late '08 and '09. And it is too early to tell yet exactly how that's all going to weigh out. We're going to have to see, as well, what happens to the economy, and with that in general corporate profits and for each particular instance the profitability of those individual companies. My general sense is that we are not going to have a robust recovery the way we've had from prior recessions. And my reasoning for that is that I believe that this, what we now call great recession, is different from prior recessions. And it is different because it didn't come about because the Fed raised interest rates to choke off an expanding economy, rather it came about, I believe, because we as a nation had a mountain of debt that basically fell down on itself. We had debt to GDP in the '50s of 120% and that has expanded over the past 50 years to 360% of total debt to GDP in our economy. And in '07 and '08 that mountain cracked, and then crashed the economy. When you come out of a normal recession, what happens is that the Fed loosens up on interest rates after they choked off the inflationary expectations, and then the banks lend money, extend credit and with that extension of credit you have that expansion phase coming off of the bottom of the economy. This time around there is not that extension of credit. And the reason is because there is already too much credit in the economy either on the part of the homeowner, homeowner and consumers primarily, but also the overall economy in general. And so I don't believe we're going to get that boost or lift-off phase that you get ordinarily of of the bottom of a recession simply because we're not going to have the accelerant which is the credit extension in order to finance it. So just to bring that back to the price of buying businesses, we operate under the assumption that things are not going to get better, significantly better, in the near term, and we'll have to see what the market is thinking with respect to the economy by looking at the prices that others are willing to pay for businesses that are up for sale.

– Okay. And then just a quick follow-up, Jim. Do you tend to expand your scope of potential acquisitions more globally of late or are you primarily focused in the US?

– We're primarily focused in the US for a number of reasons. Number one, they don't make airplanes fast enough. Number two, they haven't eliminated time zones. Number three, we have a tough enough time understanding how to do business in the culture here in the United States, and to think that we could, from a few thousand miles away, master it in a foreign country just doesn't really make sense to me. Additionally, the question always has to arise if the opportunity is so good, why aren't the locals in that foreign country taking advantage of it? So for all of those reasons we tend to maintain our focus here in the United States. We're not afraid to have businesses that deal internationally. For example, Diamond Offshore has very substantial operations that occur outside the United States, but we are in general looking for businesses that are located here in the States.

– Thank you.

– (Operator Instructions). Your next question is a follow-up from Bob Glasspiegel of Langen McAlenney.

– Hi, good morning. It's Bank of America. Mike, given your comments about capacity constraints on the big machines and big engines, can you give us some idea of what percentage of new capacity you will be adding and when that will roll in? So we can start to think about '09 revenue growth.

– Well, we have talked about it in a couple of ways. One, just the continued implementation of CPS should improve throughput, so that is a positive. And that is ongoing. We have seen some benefits of that this year and that should continue on to '09 and '10. Then in June, I think mid-June, we announced capacity increases for the big Illinois facilities which produce a lots of the large machines. That is this year, next year we announced, essentially, I think a three-year program of $1 billion capacity increase. So that will come on over the next few years. I think that is the most we have said hat so far on the details of how it's coming in. Last year, right now, we were tight on supply and we are up versus a year ago. Without a lot of new bricks and mortar, we have been able to get production schedules up. We expect to get them up some more next year.

– Mike, maybe just a little more. Lafayette capacity is coming on as we speak and that is helping us on the big engine side. That is about a $400 million investment that by the end of this year will be fully deployed. That is a significant capacity increase there, but it's ramping up as we speak this year. We also have four new plants under construction in China as we speak. Two announce just recently that will be under construction in India. So our footprint in the emerging markets, and that would be supported by a lot of supplier development work, we will be adding significantly to our capacity. We bought a SEM in China. We are looking now to Brownfield expansion around that facility and lifting capacity there. We are not about to give you a 2009 outlook yet, but certainly we are working on a lot of things that will over the next, as Mike said, three years begin to bear fruit in the way of new capacity available to us.

– Okay, thanks. If I could just ask a follow-up on the North American market. Have you noticed a material decline in activity from local infrastructure or projects that are being funded by tax receipts at this point?

– Yes, I think, in fact I just looked at that this morning. At the collusion of this call, we will post up the retail numbers. I think what we have seen in North America is that with the exception of, at least for the big categories, with the exception of energy and mining pretty much everything—housing, non-res, infrastructure—they are all down similarly.

– Okay, thanks very much.

– Terry Darling.

– Thanks very much. I have two questions. The first is related to Lipitor. On the Lipitor sales, were sales impacted in 2008 or in 2007 by stocking? It seems like the reported sales performance in the US was a little weaker than what underlying demand would imply. The other question on Lipitor is that—is related to the outlook. Prescriptions have been stabilizing sequentially recently. Could you comment on the outlook? And then the final question is for Frank. Frank, at your analyst meeting in March you had projected a mid-30s to a high 30s operating margin in 2012. I think some investors have wondered how such a post expiry margin is possible without big blockbuster brands, but it seems like you're pretty confident because you're assuming that the organization will be downsized. Could you just talk about your level of confidence and your visibility for that level of operating margin? Thank you.

– Okay. Good morning, Dave. I'm going to, obviously, ask Ian to address the first two questions on Lipitor.

– Dave, so on inventory there was no impact in the third quarter for inventory movements on Lipitor and a very small impact on the year-to-date, so nothing material from inventories affecting Lipitor's performance. And on our sequential performance, I think it's a reflection of the way we are focusing the field force—our access programs are focused on introducing the switches, and I expect us to continue to do what we are doing, fighting for every script in the marketplace.

– And then, Dave, on the question for me, what I have said is operating margins in the mid to high 30s going forward, so basically what you said. In terms of getting there, it's really a combination of things. One is the items Jeff mentioned relative to creating new sources of revenue. So maximizing our patent protected portfolio, establishing opportunities for our established products unit, seeking opportunities in emerging markets, looking at adjacent space as well as business development and advancing our internal pipeline. So it's a combination of creating new sources of revenue, combined with continuing to be more efficient, more productive and executing on the cost reduction initiatives that we talked about. So it's really a two pronged approach that gets us to the mid to high 30s on the operating margins.

– Thanks, Frank. Next question?

– Thank you, sir. And our next question comes from Roopesh Patel of UBS. Please proceed with your question.

– Hi, guys. Can you just give a little more color on some the sale of some of the OREO's that you did this quarter, in terms of what you got versus where it was being carried at? And then, I assume that feeds into some of the OREO expenses that we saw this quarter?

– Yes, so we've been basically selling the—primarily focusing on the verticals during the most recent quarter. And I think as we reported, the sales price, if you look at it from the original loan all the through the final exit value, there was a reconduction of 37%. And so, what we do is, when we put it into OREO, we take a reduction that's usually about 27%. And then, we write it down, if necessary based on further appraisals, during the time we have it. And for the last quarter, it averaged about 10%. And then, we actually sold it for about 5% less, on the average, than what we had at it. So, now that math doesn't exactly add up because you're talking about the 10% is off of the 73% and the 5% is softer. So, you have to kind of go through that. But when you work through all the math, the final disposition price to us is about 37% off of the original loan balance.

– Okay. And I know it's impossible to know what the sales activity will look like this quarter but as you think about the OREO costs going forward, is this a decent run rate to start off or should we adjusting it up or down?

– That's a good question and a hard one to answer but I intuitively think we are at kind of a level we'll kind of be at for the next probably two or three quarters. I don't see it materially changing one way or the other. Because what happens to you is you kind of—if you've ever worked with these kind of projects, you're kind of getting the project in, you have some early costs. You kind of have to cut the grass or you've got to get all of the up front things done. Sometimes, there are repairs that have to be made, whether it's a house or whether it's a project. So, you get a lot of that kind up front expense but then, when you kind of get it up to ready to sale state, you're just kind of holding it. And then, you've just kind of got the taxes. And then, whether or not you have any write-downs. But I think we are kind of at a level that we will probably be able to sustain for the next two or three quarters.

– Okay. Thank you very much.

– Yes. Sure.

– And we'll go next to Todd Hagerman with Collins Stewart.

– Herb, wanted to make sure I understood a comment that you made in your prepared remarks. I thought you said that the medical cost trends that you are expecting for Medicare Advantage in 2008 are now higher than what you had expected when you submitted bids. Can you clarify that for me, make sure I am understanding it?

– No, I think these outpatient trends that we've talked about have been a little more persistent. We are putting actions in place to try and modify them. But at least right now, we are taking a little more conservative position on their impact relative to the MLR in 2010.

– Okay. Because I guess if I look at your 2009 guidance for MA MLR as it has progressed through the year, you had been thinking 81.5, and you ended the year closer to 81.0. But is there some kind of offsetting factor that happened in 2009 that kind of offset those higher trends that you are talking about for 2010, that won't recur in 2010?

– Well, actually, I think the reduced loss ratio may actually be more of a result of higher-than-expected revenues than they were lower-than-expected medical expenses. And at least right now, we are not changing our outlook in terms of revenue levels for '10.

– Okay, thanks.

– Thomas Carroll, Stifel Nicolaus.

– Morning, Mike.

– Good morning.

– Just wanted to find out if you could maybe elaborate a little bit on strategic planning as far as it relates to the lumber operations at Lewiston, Idaho and at St. Marys, Idaho. Obviously the Lewiston, Idaho, has been part of the Clearwater spinoff, St. Marys I believe is still under the Potlatch umbrella, but just want to see if you could maybe comment on operations up there and what you see developing in 2010.

– Mike, I can't comment on Lewiston as you mentioned, that's part of Clearwater Paper and it wouldn't be appropriate for me to comment on that. In regard to St. Marys operation where we have an industrial plywood plant and a dimension sawmill in St. Marys, Idaho, it's a very key part of our Idaho operations and is strategically linked to the timber that we harvest in north central Idaho and both mills are very competitive, low cost high quality facilities that we think are part of our core operations and will be for a long time.

– Thank you.

– Thank you.

– Your next question is from Mike Roxland with Bank of America Merrill Lynch.