

Communicating with vocal emotions*

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Abstract

This paper explores the interpersonal vocal communication of managers with analysts during earnings conference calls. We apply a novel machine learning technique on a sample of more than 20,000 earnings conference calls of S&P 500 firms to generate voice emotions measures. Focusing on analyst-manager conversations, we find evidence of reciprocal interactions when managers respond with a similar vocal emotion to analysts. We also document that managers, who dialogue with a female analyst, exhibit a more positive vocal response. Moreover, female managers and younger managers are more likely to display negative vocal emotions than their male and older colleagues. Further analysis shows that investors and analysts incorporate emotionally charged information in trading and earnings forecasts.

JEL: G10, G14, G41, G30, J16, M14

Key words: conference calls; vocal emotion; manager-analyst conversation; gender; market reaction

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1. Introduction

Accounting and finance research has established that the question-and-answer (Q&A) session is the most informative part of an earnings conference call due to the dynamic interactions between managers and analysts (Frankel et al., 1999; Matsumoto et al., 2011). Analysts could strategically ask questions to elicit information from managers, while managers could give strategic responses to disclose certain information (Cohen et al., 2020). At the same time, how questions are asked could affect how and what managers answer, which determines how much information is revealed. Despite the importance of manager-analyst interactions in information revelation, only a limited number of studies have explored this issue by examining the text content of the communication, i.e., what was asked/answered (e.g., De Amicis et al., 2021; Comprix et al., 2022; Haag et al., 2022; Mayew et al., 2022). Contributing to the literature, this study analyses how the questions/answers were delivered and whether managers' emotional states are affected by analyst-manager interactive characteristics.

Emotional expressions via non-verbal cues are essential elements of human communication. Non-verbal communication, including voice, contains information about an individual's belief beyond the literal meaning embedded in the verbal content (e.g., Caffi and Janney, 1994). As documented in the psychology literature (e.g., Zuckerman et al., 1981; DePaulo, 1992), the tone of voice can be considered as the "leakiest" channel of communication given that it can convey spontaneous non-verbal cues and information that speakers wish to conceal. Moreover, the appraisal theory of emotion contends that emotional states are elicited by interpretation and evaluation of stimuli and hence reveal information (e.g., Arnold, 1960; Roseman, 1984; Lazarus, 1991). Unlike formal disclosure (e.g., annual reports, press releases), which is "static" and scripted, the informational environment of the Q&A sessions in earnings conference calls is "dynamic" and less structured (Blau et al., 2015). In this setting, the emotional states of responding managers are elicited from analysts' questions. Hence, every aspect of the interpersonal interactions between managers and analysts (e.g., what question was asked, how it was asked, who asked the question) could affect managers' vocal emotions which then could give away the signals that managers might not want to reveal otherwise.

To assess how managers communicate with analysts, we hand-collect audio recordings of earnings conference calls for S&P 500 constituents held during the period of April 2010 to November 2021. To study the analyst-manager dialogue, we split the Q&A session of each conference call into audio clips corresponding to a question raised by an analyst or an answer

from a manager. To quantify the vocal emotion of each question and each answer, we develop a customised deep learning model. Each audio clip is then assigned to one of five emotions: angry, happy, sad, neutral, and pleasantly surprised. To examine how managers' vocal emotion is elicited by the external stimulus (i.e., analysts' questioning), we construct a sample of Q&A pairs and categorise the vocal emotion of analysts and managers into the negative state (i.e., sad and angry), neutral, and positive state (i.e., happy and pleasantly surprised). Overall, we find that managers exhibit more positive vocal emotions than analysts.

At the question-and-answer pair level, we analyse the vocal emotions of managers' answers, and we focus on understanding how each question is asked and who asks the question affecting it. First, consistent with the reciprocal effect in interpersonal behaviours that individuals respond with a reciprocal or matching behaviour pattern to their interacting partners (Burgoon et al., 1987), we find that the vocal emotion of responding managers is positively associated with the vocal emotion of the analyst. That is, if the analyst asks a question with negative vocal emotion, the manager will also respond with a negative tone. Second, we also show a gender gap in vocal expressions of emotions during the analyst-manager dialogue. Female managers are likely to speak with more negative vocal emotions compared to male managers. More interestingly, we find that managers adjust their vocal emotions depending on the gender of the analyst. Managers are less likely to display negative vocal emotions when answering a female analyst's question than when answering a male analyst's question. Third, conditional on the order of questions during the Q&A session, managers appear to express more negative vocal emotions towards the end of the session. Finally, we document an age gap in managerial emotional states that older managers are less likely to exhibit negative vocal emotions than younger managers. Our results are robust to additional regression specifications with alternative measures.

To shed more light on how managers communicate when responding to analysts' questions, we investigate how the management-analyst dyad interactions affect the strength of vocal emotion determinants. We first find that managers' reciprocal vocal response to analysts is stronger when a female manager provides the answer. This result suggests that female managers, on average, are more reciprocal and adaptive to analysts' questions. Motivated by the out-group bias in financial markets that analysts behaved differently to firms headed by in-group and out-group CEOs (Jannati et al., 2020), we study the role of the dyad gender composition of analyst-manager conversations in shaping the vocal emotion of answers. However, we observe no difference between the same-gender dyad and mixed-gender dyad in vocal expressions. In other words, there is no in-group or out-group gender bias in analyst-

manager conversations. Further analysis of managers' positions shows that both CEOs and CFOs are more likely to exhibit less negative vocal emotions when responding to a female analyst's question than when answering a male analyst's question, compared to other senior managers. Finally, also consider the analyst-manager dynamic interactions and find that managers exhibit reciprocal responses not only to the current question raised by analysts but also to earlier questions. In other words, the vocal emotions of prior questions also shape managers' subsequent vocal responses.

Drawing from prior literature on the informational role of vocal cues in financial markets (Mayew and Venkatachalam, 2012; Hobson et al., 2012; Gorodnichenko et al., 2021; Alexopoulos et al., 2022), we investigate whether and how the vocal emotions exhibited by managers during the Q&A sessions influence the market participants (i.e., investors and analysts). Our results show that managers' vocal negativity has a negative contemporaneous stock return effect. However, we observe no significant relationship between analyst vocal emotions and contemporaneous abnormal stock returns, which suggests that investors do not react to analysts' vocal emotions. We also examine whether there is a delayed response in incorporating managers' vocal cues. The cumulative abnormal returns over a 60-trading-day window following the earnings conference call period are not statistically associated with managers' vocal emotions. The distinctive effects of vocal emotions on contemporary and delayed returns indicate that investors tend to understand the negative information embedded in managers' negative vocal emotions immediately during the conference call period, and there is no evidence of under- or over-reaction to managers' vocal cues by investors.

Finally, we assess analysts' responses to managers' vocal emotions during the Q&A session of earnings conference calls. We argue that if managers' vocal emotions carry value-relevant information, analysts should incorporate the information embedded in vocal cues into earnings estimates similarly to investors. Specifically, we study the relationship between managers' vocal emotions and near-term one-quarter-ahead earnings forecast errors. Indeed, our results suggest that the negative vocal emotion exhibited by managers is strongly associated with more pessimistic earnings forecasts by analysts.

Our paper contributes to the literature on manager-analyst communications. While very little research examines interactions between managers and financial analysts, it generally focuses on the personal attributes and analysts' questioning behaviours during the Q&A session of earnings conference calls. For example, De Amicis et al. (2021) find that financial analysts are less positive in the presence of a female executive. Comprix et al. (2022) find evidence of male analysts being more verbally aggressive when questioning female CEOs than questioning

male CEOs. Mayew et al. (2022) find that analysts whose forecasts are missed engage in longer conversations with managers and speak with a more negative text tone. We extend the literature by examining how analyst-manager interactive characteristics shape managers' responses. Utilizing a granular question-and-answer pair analysis, we are able to investigate the anatomy of analyst-manager dynamics. Our study provides novel evidence that managers' responses are affected by how the questions are asked (the emotion of analysts), and who asks the questions (the gender of analysts). During a conversation, managers respond to analysts in a similar emotion as analysts do and show a more positive attitude to female analysts. Our evidence highlights the importance of interactions among managers, financial analysts and investors during earnings conference calls, financial press appearances, road shows, etc.

Our paper also contributes to the literature on corporate disclosure. A large body of literature has explored the information content of earnings conference calls mainly through the linguistic characteristics of managers and analysts (e.g., the use of language, verbal tone, and text length) (e.g., Larcker and Zakolyukina, 2012; Price et al., 2012; Huang et al., 2014; Blau et al., 2015; Davis et al., 2015; Chen et al., 2018; Jiang et al., 2019; Suslava, 2021; Noh and Zhou, 2022). Motivated by the psychology research that vocal expressions carry prominent signals of emotions beyond the verbal and bodily channels (Zuckerman et al., 1982; Scherer et al., 2003), we add to the literature by focusing on information disclosure via managers' vocal cues.

Our paper is closely related to the work by Mayew and Venkatachalam (2012), who find that managerial vocal cues during earnings conference calls are informative to market participants and affect future profitability and returns. However, our work is distinct in several dimensions. First, while Mayew and Venkatachalam (2012) use a commercial voice analysis software (Layered Voice Analysis software) to extract the cognitive dissonance level as a negative affective state and the emotion excitement level as a positive affective state,² we instead develop a machine learning model to detect five vocal emotions: anger, happiness, neutral, pleasantly surprised, and sadness. These emotion measures are widely used in psychology and computer science studies on speech emotion recognition. Second, due to the constraint of resources and computing techniques, Mayew and Venkatachalam (2012) analyse the managerial vocal emotions at the conference call level. In our paper, we focus on the vocal emotions of both analysts and managers at the question-and-answer level of conference calls.

² The usage of LVA technology for speech emotion analysis has been questioned in the linguistics literature (Lacerda, 2012).

This microstructure analysis enables us to investigate whether and to what extent managers' vocal emotions are affected by analysts' questioning. Finally, we advance the literature by providing new evidence that managers' vocal expressions of discrete emotions (anger, happiness, neutral, pleasantly surprise, and sadness) disclose value-relevant information and that how managers respond to analysts matters to financial markets.

We also contribute to the growing literature on gender and corporations. Our study complements the work on behavioural differences between male and female managers. Previous studies document that female managers are less overconfident and more risk-avoidant (e.g., Huang and Kisgen, 2013; Faccio et al., 2016); place a stronger emphasis and are more sensitive to environmental, corporate and social responsibility (Post et al., 2011; Atif et al., 2020); adopt more conservative financial reporting policies (Ho et al., 2015); are associated with greater voluntary disclosure, and provide more detailed tables in annual reports (Nalikka, 2009; Kim and Chung, 2014). We extend the literature by exploring the gender difference in managers' communication styles. Our paper is similar in spirit to De Amicis et al. (2021), who document a gender gap in managerial verbal communications that female CEOs speak with more positive and less vague words during earnings conference calls compared to their male colleagues. Beyond the verbal content of managers' speeches, we provide new insights that male and female executives exhibit distinct vocal communication styles. Specifically, our finding suggests that female managers exhibit more negative vocal emotions compared to male managers.

The remainder of the paper is organized as follows. Section 2 describes the data sources and samples. Section 3 reports estimates of managers' vocal emotions during analyst-manager conversations. Section 4 studies the market implications of managerial vocal emotions. Section 5 concludes.

2. Data and Summary Information

2.1 Data Source and Sample selection

We collect audio recordings of quarterly earnings conference calls from Capital IQ, which has been archiving conference call audio files since 2010 and call transcripts since 2006. As we must manually extract audio recordings, we restrict our analysis to companies that belong to or have ever been part of the S&P 500 index since 2010 and extract all their earnings conference call audio files available on Capital IQ to accommodate the constraint. For each audio file, we also collect the corresponding transcript from Capital IQ.

The conference call contains a presentation session delivered by managers and a question-and-answer (Q&A) session during which analysts ask questions and managers respond to them. In this study, we focus only on the Q&A session, which involves the dynamics between the management (e.g., CEO, CFO, investor relation officer, COO) and analysts, and tends to be less scripted and more spontaneous than the presentation. The transcript records the date and time of the call and company details (i.e., name and ticker). In the transcript of the Q&A session, each participant (i.e., operator, analyst, manager) is listed in separate conversation paragraphs. The name and affiliation of the analyst asking the questions and the name and title of the manager answering the questions are provided at the beginning of each conversation. Analysts and managers take turns speaking during the Q&A session, and operators introduce the analyst before each question. This enables us to partition the transcripts of Q&A sessions into sequential individual unique talks by analysts, managers, and the operator. After that, we synchronize transcripts of the Q&A session with audio files to determine the start time and end time of each individual talk and then cut the audio files into clips based on these timestamps of individual talks.

To study the analyst-manager conversation, we construct Q&A pairs between analysts and managers based on their unique sequential talks.³ Each Q&A pair starts with the name of the analyst and ends with the name of the next analyst (the same analyst or a different analyst). We exclude individual talks that are not related to questions or answers.⁴ During the Q&A session, one or multiple managers may answer the same question raised by a specific analyst. In case of multiple answers (by multiple managers) per question, we repeat the question for all corresponding responses so that each Q&A pair contains one answer from a specific manager and its corresponding question raised by the analyst.

We match the name of each manager in the Q&A pair sample with BoardEx and Capital IQ in order to obtain the demographic information (i.e., gender and age). To determine the gender of analysts, we extract the name of each analyst and use an application programming interface (API) provided by Namsor to detect gender.⁵ We complement the gender data by manually searching Capital IQ. If relevant information for managers or analysts is not available, we exclude the particular Q&A pair from our analysis. We then use the company identifier to merge the conference call data with financial data from Compustat, CRSP, and analysts'

³ We remove the operator remarks in the audio and textual analysis.

⁴ For example, talks like “My questions have been asked and answered.”, or “Thank you, everybody, for joining us on the call today.” are removed from our analysis.

⁵ <https://namsor.app/> uses machine learning techniques to classify names by ethnicity, gender, and religion. It offers a very high degree of accuracy and recall, and a global coverage for gender name inference.

forecast data from Capital IQ. After removing firms with missing data, we have a final Q&A sample of 505,861 answers by 3,901 managers from S&P 500 companies. We also construct a sample of 20,442 conference calls that occurred between 2010 and 2021 for the fiscal year 2009 fourth-quarter earnings until 2021 fourth-quarter earnings in the analyses of market reactions.

2.2 Measuring Vocal Communication

To measure vocal emotions, we develop a neural network model to quantify the emotional state of vocal communication. Our approach is similar to Gorodnichenko et al. (2021). We first synchronize the audio files with corresponding transcripts to obtain the time-coded sequential text chunks. Each text chunk corresponds to a speech by an individual analyst or a manager. This process provides the start and end times for each question and each answer in the audio recording. In our audio sample, most questions last for less than 1 minute, and most answers run for 10 seconds to 3 minutes. We then cut each conference call audio file into individual clips based on the timestamp of each question and each answer. These audio clips are the speech signal inputs in our neural network model.

Following prior literature on speech emotion recognition (e.g., Livingstone, and Russo, 2018; Bhavan et al., 2019; Issa et al., 2020), we use the Ryson Audio-Visual Database of Emotional Speech and Song (RAVDESS) and the Toronto Emotional Speech Set (TESS), two widely used datasets of voice emotions in computer science studies, to train and validate our proposed neural network model. RAVDESS contains the voices of 12 female and 12 male actors speaking English sentences in eight emotional states: happy, pleasantly surprised, fearful, calm, neutral, disgust, sad and angry. TESS has a set of 200 words that were spoken by two English actresses in seven emotions (happiness, pleasantly surprise, anger, disgust, fear, sadness and neutral). Considering that participants are less likely to display emotions of fear and disgust during earnings conference calls, in our study, we are interested in five emotions, including happy, pleasantly surprised, neutral, sad and angry, exhibited by managers and analysts during the Q&A session.

We utilize the *Librosa* audio library to extract acoustic features of emotions from the RAVDESS and TESS. Given that the use of several audio features can produce a richer description of a sound and improve the performance of speech emotion recognition, we focus on three different spectral representations of a sound: Mel-frequency cepstral coefficients (MFCCs), Chromagram, and Mel Spectrogram Frequency (Mel) (Likitha et al., 2017; Issa et al., 2020; Patni et al., 2021). Specifically, MFCCs and Mel are decent in tracking the timbre

fluctuation of a sound, while Chromagram deals with the identification of pitch classes and harmony.

Based on the acoustic features extracted from the RAVDESS and TESS, we build a neural network model, a computing system that mimics the information processing of the human brain, to classify emotional states of vocal communications. The neural network model includes three fully connected layers. The input layer has three nodes, each of which represents an acoustic feature (Mel coefficients, MFCCs, and chroma coefficients). The hidden layer contains activation functions of the input layer, and the output layer has five nodes, each of which represents five emotional states (happy, pleasantly surprised, neutral, sad and angry). We use 80% of the RAVDESS dataset for training and 20% for testing. After experimenting with different types of layers, layer combinations and activation functions, we obtain a network with three fully connected layers with 512 (128) nodes in the first (second) hidden layer, 0.1 dropout after each hidden layer, and the RELU SoftMax activation function. Our trained model achieves a validation accuracy of 90%. For each emotional state, we achieve an accuracy score of 88% for “happy”, 71% for “pleasantly surprised”, 92% for “neutral”, 92% for “sad”, and 94% for “angry” emotions. Finally, we apply the trained model to audio clips of conference calls and classify the emotional state for each question asked by the analyst and each answer responded to by the manager.

For each question and each answer, we create two variables to measure vocal emotions. *Voice Question or Voice Answer* is coded as -1 for negative emotions (i.e., sad and angry), 0 for neutral emotions, and 1 for positive emotions (i.e., happy and pleasantly surprised). *Negative Voice Question or Negative Voice Answer* is a negative emotion indicator that takes a value of one if the emotion is angry or sad, and zero otherwise. For each conference call, we take the aggregated vocal emotions of managers and analysts as follows:

$$\text{Negativity Voice} = \frac{\text{number of negative answers/questions} - \text{number of positive answers/questions}}{\text{number of negative answers/questions} + \text{number of positive answers/questions}}$$

2.3 Measuring Verbal Communication

To measure the text tone in verbal communications, we use FinBERT, a pretrained language model based on Bidirectional Encoder Representations from a transformers model (BERT). The BERT language model is powerful in interpreting texts and has advantages over other natural language processing tools. Unlike context-free models and unidirectional contextual models, BERT generates an embedding of a word based on both preceding and subsequent context, and, as a result, it achieves high accuracy on several natural language

processing tasks (Devlin et al., 2018). Based on BERT, Araci (2019) introduced FinBERT which is fine-tuned for financial domain language to classify text sentiment and documents that the FinBERT model outperforms other state-of-the-art machine learning methods in tackling natural language processing tasks in the financial domain.

We first partition the call transcripts into text clips. Each clip corresponds to one question or one answer. We feed individual question and answer clips into the pre-trained FinBERT model. The FinBERT sentiment classifier assigns three sentiment states to each question and each answer: positive, neutral, and negative, along with the corresponding value that indicates the probabilistic output of each emotion classification. Among these three states, we keep the emotional state with the highest sentiment score (i.e., probabilistic output).⁶ For each Q&A, we create two new emotional indicators, *Text Answer* and *Text Question*, taking the value of 1 for the positive emotional state, 0 for the neutral state, and -1 for the negative emotional state. For each conference call, we calculate the average emotion scores for each manager (*Text Manager*) and each analyst (*Text Analyst*). In the analyses of market reactions, we define the text tone as the negative value of average emotion scores for all managers (*Negative Text Manager*), all analysts (*Negative Text Analyst*), CEOs and CFOs (*Negative Text CEOCFO*), separately.

2.4 Descriptive Statistics

Table 1 reports descriptive statistics for our sample. Panel A provides summary information on Q&A pair-level characteristics. It shows that participants, on average, are more likely to display positive vocal emotions during earnings conference calls. The average vocal emotion, coded as -1 (negative), 0 (neutral) and 1 (positive), is 0.793 for answers and 0.575 for questions. The average negative vocal emotion indicator (sad or angry) also shows a difference between answers (0.103) and questions (0.212). This suggests that managers exhibit more positive vocal affects than analysts. A similar pattern is observed in the sentiment of verbal communications. Our data shows that the text tone of answers appears more positive than that of questions. Specifically, the average text tone score for answers, coded from -1 (negative) to 1 (positive), is 0.24, whereas for questions, it is 0.02.

<Insert Table 1 about here>

⁶ For example, if a question has a positive sentiment score of 20%, a negative sentiment score of 70% and a neutral sentiment score of 10%, we keep the negative emotional state for this question. In other words, we consider this question to have a negative one.

Panel B presents the summary information on call-level characteristics. For each conference call, it is apparent that CEOs and CFOs are more likely to exhibit positive vocal emotions than other participating managers, with a mean vocal negativity of -0.243 for the CEO and CFO sample and -0.789 for the full manager sample. As for verbal communications, the text tone of all participating managers, on average, is more positive than that of analysts, which is consistent with Chen et al. (2018) that analysts speak with more negative words when asking questions.

3. Managers' vocal emotions in earnings conference calls

3.1 Predictors of vocal emotion

We begin our analysis by assessing whether and to what extent managers communicate with vocal emotions during the Q&A session of earnings conference calls. Specifically, we perform the following regression at the Q&A pair level to examine how analysts' questions are answered by managers via the vocal dimension:

$$\text{Negative Voice Answer}_{i,j,t} = \alpha + \beta_1 X_{i,j,t} + \beta_2 Z_{j,t} + \mu_j + \theta_t + \varepsilon_{i,j,t} \quad (1)$$

where i, j, t index the Q&A pair, firm and year-quarter, respectively. The dependent variable, $\text{Negative Voice Answer}_{i,j,t}$, is the negative vocal emotion indicator of the answer in Q&A pair i of firm j in year-quarter t . $X_{i,j,t}$ is a vector of question-and-answer pair related variables that could affect the vocal emotion of the manager's answer, including the negative vocal emotion indicator of the question (*Negative Voice Question*), the order of the question in the Q&A session (*Order*), the gender indicator of the manager (*Female Manager*) and the analyst (*Female Analyst*), the text tone of the answer (*Text Answer*) and the question (*Text Question*), the manager's age (*Manager Age*), the manager's position (*CEO or CFO*) and the analyst's experience in covering the firm (*New Analyst*). The vector of controls, $Z_{j,t}$, comprises market capitalization (*MC*) and total assets (*TA*) to control for firm size, book-to-market value (*BM*) to control for growth, and daily return volatility over the previous quarter (*Vol*) to control for risk. The controls also include forecast errors (*FE*), return on assets (*ROA*), stock return over the previous quarter (*Stock Return*), and turnover over the previous year (*Turnover*). In all specifications, we include both firm and year-quarter fixed effects to control for time-invariant firm heterogeneity and time trends.

The regression results are presented in Table 2. In column (1), we regress *Negative Voice Answer* on our Q&A pair-related variables as well as firm fixed effects and year-quarter

fixed effects, while in column (2), we include additional firm controls. The results show that the negative vocal emotion of the question is an important determinant of the negative vocal emotion of the subsequent answer. In both columns, the estimated coefficients on *Negative Voice Question* are negative and statistically significant at the 1% level. A one-standard-deviation increase in *Negative Voice Question* is associated with a 1.92% higher likelihood of exhibiting negative vocal emotion (sad or angry) in the subsequent answer. The finding suggests that how questions are answered depends on how questions are asked. When the analyst raises a question with negative vocal emotion, the manager will also respond with a negative vocal emotion. Our result can be explained by the reciprocal effect documented in the psychology research that people adapt their interaction style to one another (Burgoon et al., 1987). During a conversation, interacting parties might focus on each other and respond to the interacting partner with a reciprocal or matching behaviour. That is, if the analyst exhibits a positive vocal emotion when asking the question, the manager will also respond positively.

Also, we find that the gender of managers and analysts affects the vocal emotion of the answers. The result shows that female managers are likely to speak with more negative vocal emotions. After including all control variables, the estimated coefficient on *Female Manager* suggests that female managers have a 9.3% higher likelihood of exhibiting sad and angry vocal emotions compared to their male colleagues, with the effect significant at the 1% level. Our result provides new evidence of the distinctive vocal expression styles between males and females in corporate communications. Such gendered vocal emotion among managers is consistent with prior psychology and sociology studies in which experiments generally show that females are more emotionally expressive and tend to report more negative affect than men do (e.g., Fujita et al., 1991; Birditt and Fingerman, 2003).

More interesting, we also find that managers adjust their vocal emotions depending upon the gender of the analysts. As suggested by the statistically significant coefficient on *Female Analyst* from columns (1) to (2), the respondent manager has a 0.5% lower likelihood of displaying negative vocal emotions when answering a female analyst's question than when answering a male analyst's question. This result suggests that how questions are answered depends on who asked them. The respondent manager, on average, shows a more friendly and positive attitude towards female analysts than male analysts. The results together highlight the importance of gender in shaping managers' vocal responses in oral communications.

<Insert Table 2 about here>

Turning to managers' age, after controlling for firm-level controls, we find that older managers are less likely to display negative vocal emotions than younger managers. This finding confirms that older adults are less likely to report sadness and anger compared with younger adults and are better able to control their emotions (Gross et al., 1997). In addition, conditional on the order of questions during the Q&A session, we also show that managers appear to express more negative vocal emotions towards the end of the session. This is similar to Chen et al. (2018), who find that the time of day influences human mood, with managers becoming more negative in text tone as the day wears on. Our results show no statistical association between managers' position and their vocal emotions in response to analysts' questions. Compared with other participants from the management team, CEOs and CFOs are indifferent in their vocal emotions from others in the management team during the conference call.

Focusing on other vocal and linguistic characteristics, we find that managers' text tone comoves with their vocal emotions. As suggested by the coefficient on *Text Answer*, managers who speak with more positive words are less likely to display negative vocal emotions. For other control variables, we also observe that firm financial fundamentals are predictive of managers' vocal emotions. Managers tend to display less negative vocal emotion when the firm has high book-to-market value and greater stock return volatility.

In columns (3) to (4), we repeat the analysis using *Voice Answer*, an emotion measure that captures negative, neutral and positive affective states, as the dependent variable. Consistent with regression specifications using *Negative Voice Answer* as the dependent variable, we still find that the vocal emotion of the answer is positively associated with the vocal emotion of the question and the text tone of the answer but negatively related to the order of questions. Female and older managers generally tend to exhibit significantly less positive vocal emotions relative to male and younger manager participants. Further, we also find that gender of the analyst asking the question matters to the vocal emotion of the answer.⁷

3.2 Manager-analyst interactions

Our results presented thus far have shown that managers communicate with vocal emotions during the Q&A session of earnings conference calls. To shed more lights on how managers communicate when responding to analysts' questions, we next investigate the extent

⁷ To check the robustness of results in our linear probability model (Table 2), we re-estimate logit regressions with firm and year-quarter fixed effects. The findings are consistent with those in Table 2.

to which management-analyst dyad interactions affect the predictive strength of vocal emotion determinants.

First, we estimate how the dynamics between the vocal emotion of the question and other Q&A pair characteristics affect the vocal emotion of answers, with a focus on the question order, the gender of both the analyst and the manager, and managerial positions. Table 3 reports the results of extended regressions conditional upon the vocal emotion of the question. As shown in columns (1) and (2), we still find that the vocal emotion of the answer is positively associated with the vocal emotion of the question, which is in line with our previous result. More interesting, we observe that such effects become stronger when the answer is provided by a female manager, as suggested by the positive and statistically significant coefficients on *Negative Voice Question*Female Manager*. This result suggests that female managers, on average, are more likely to display reciprocal or adaptive responses when communicating with analysts. This result also confirms the psychology finding that is more emotionally expressive than men and are more likely to report negative emotionality (Fujita et al., 1991; Birditt and Fingerman, 2003). When the analyst asks a question with negative vocal emotion, female managers will respond with a more negative vocal emotion than male managers. However, we observe no statistical effect on other interactions between the vocal emotion of the question and the gender of the analyst, the order of the question and the manager's positions. Our results are robust to using *Voice Answer* as the dependent variable in columns (3) and (4).

<Insert Table 3 about here>

We next study how the dyad gender composition in manager-analyst interactions shapes the vocal emotion of answers. This analysis is motivated by the out-group bias in financial markets in that analysts behave differently to firms headed by in-group and out-group CEOs (Jannati et al., 2020). Specifically, we investigate whether same-gender Q&A pairs differ from mixed-gender pairs in vocal emotions. We construct an indicator for the gender dyad, *Mixed-gender dyad*, which takes value of one if the analyst asking the question has different gender from the manager answering the question (i.e., female analyst-male manager pair or male analyst-female manager pair). Table 4 presents the results of the extended regressions. As shown in the table, we still find that female managers are more likely to exhibit negative vocal emotions than male managers. However, we observe no statistical association between vocal emotion of managers and the mixed-gender pair, as suggested by the insignificant coefficients on *Mixed-gender dyad* in all specifications. This finding suggests that there is a

gender gap in managers' vocal communication styles but no "in-group" or "out-group" gender bias in vocal expressions of emotions during the analyst-manager conversations.

<Insert Table 4 about here>

We also consider the dynamics between the manager's position and other Q&A pair-level characteristics (i.e., analyst's gender and order of the question). The regression results are reported in Table 5. As shown in columns (1) and (2), after including all control variables and the firm and year-quarter fixed effects, the estimated coefficient on *CEO or CFO * Female Analyst* is negative and statistically significant. This result suggests that relative to other call participants in the management team, both CEOs and CFOs are more likely to exhibit less negative vocal emotions when responding to a female analyst's question than when answering a male analyst's question. However, the coefficients on other interaction terms between manager position and question order are statistically insignificant. This implies that the vocal emotions of CEOs and CFOs are affected by the gender of the analyst but immune from the question order.

<Insert Table 5 about here>

Our analysis so far focuses on how managers respond to the vocal emotion of the current question. During a conference call, it is possible that previous questions raised by analysts could also have an influence on managers' subsequent responses. For example, if an analyst exhibits an extremely negative emotion in an earlier question, it is likely that managers will accommodate to the negative mood throughout the call and then respond with negative emotion in later questions. To provide a complete picture of the overall implications of analysts' emotions on managers' vocal responses, we next focus on the analyst-manager dynamic interactions and investigate whether and to what extent prior questions affect managers' current vocal emotions. In particular, we create a variable, the cumulative vocal emotions of questions, which is defined as the average vocal emotions of all earlier questions.

<Insert Table 6 about here>

We present the results in Table 6. As shown in columns (1) to (4), we still find evidence of reciprocal response by managers, as suggested by positive and significant coefficients on *Negative Voice Question* and *Voice Question*. Consistent with our argument, we find that the estimated coefficients on *Cumulative Negative Voice Question* and *Cumulative Voice Question*

are significantly positive. This result suggests that not only the vocal emotions of a current question but also the vocal emotions exhibited by analysts in earlier questions shape managers' vocal responses. We provide novel evidence that analysts' questioning behaviours have an influence on managers' answering behaviours throughout the Q&A session of earnings conference calls. If an analyst asks a question with negative vocal emotion, the interacting manager will adapt to the negative mood and respond with similar vocal emotion. We next investigate whether the effect of current and cumulative vocal emotions exhibited by analysts on managers' vocal responses varies across managers in columns (5) to (8). Specifically, we focus on managers' positions and managers' gender. Similar to our prior result in Table 3, we show that female managers are more likely to display reciprocal responses to both current and earlier questions raised by analysts than male colleagues. However, compared with other senior managers, CEOs and CFOs do not exhibit stronger reciprocal responses to analysts' current or earlier questions.

Taken together, the analysis above suggests that the vocal emotions displayed by managers during the Q&A session of earnings conference calls are shaped by the characteristics of manager-analyst interactions.

4. The impact of vocal emotions on firms

Research in linguistics (e.g., Caffi and Janney, 1994) has recognised that the voice contains incremental information beyond the verbal text. Extending to the context of financial markets, recent studies on central bank communications (Gorodnichenko et al., 2021 and Alexopoulos et al., 2022) document that Federal Reserve Chairs' vocal cues contain information regarding the monetary policy stance and thus shape market response. Focusing on corporate communications, Mayew and Venkatachalam (2012) examine managers' vocal cues during earnings conference calls and confirm that managers' affective states convey value-relevant information and thus are predictive of future stock returns and firm performance. Hobson et al. (2012) provide novel evidence that the cognitive dissonance in managers' speech during earnings conference calls is useful for detecting financial misreporting. Drawing on the informational role of vocal cues from prior literature, in this section, we investigate whether and how the vocal negativity exhibited by managers during the Q&A session of earnings conference calls influences the market participants (investors and analysts).

4.1 Investor reaction

As a starting point, we investigate how investors react to the vocal emotions exhibited by managers during the conference call. Specifically, we estimate the relationship between the vocal negativity of managers and immediate stock return by performing the following regression:

$$CAR[0,1]_{i,t} = \alpha + \beta_1 \text{Negativity Voice}_{i,t} + \gamma X_{i,t} + \mu_i + \theta_t + \varepsilon_{i,t} \quad (3)$$

where $CAR[0,1]_{i,t}$ is the cumulative abnormal return over a two-trading-day window relative to the earnings conference call date, where expected returns are derived from the market model estimated using the CRSP value-weighted index. The variable of interest, $\text{Negativity Voice}_{i,t}$, is the aggregated vocal negativity of managers for firm i in firm-quarter t , either for all managers (*Negativity Voice Management*) or CEOs and CFOs (*Negativity Voice CEOCFO*). The vector, $X_{i,t}$, contains other vocal and textual features of the call, including aggregated vocal negativity of analysts (*Negativity Voice Analysts*), aggregated negative text tone for all managers (*Negative Text Management*) or for CEOs and CFOs (*Negative Text CEO and CFO*) and all analysts (*Negative Text Analysts*). The controls also include the same set of firm financials used in previous equations. Firm fixed effects and year-quarter fixed effects are included in all specifications to control for time-invariant firm heterogeneity and time trends.

Table 7 presents the regression results of Equation (3). We separately estimate the vocal negativity of the management team in column (1) and the vocal negativity of the CEO and CFO sample in column (2). As shown in column (1), the vocal negativity exhibited by all managers during the Q&A session is predictive of negative immediate stock returns around the earnings conference call. A one-standard-deviation increase in *Negativity Voice Management* is associated with a 0.2 percentage point decrease in cumulative abnormal returns over a two-trading-day period. This corresponds to an 8.7% lower stock return relative to the sample mean. Similar results are observed in the CEO and CFO sample. In column (2), the estimated coefficient on *Negativity Voice CEOCFO* is also negative and statistically significant at the 5% level, which suggests that the vocal negativity of CEOs and CFOs is negatively associated with contemporaneous stock return. A one-standard-deviation increase in *Negativity Voice CEOCFO* leads to a 3.87% decrease in $CAR[0,1]$, relative to the sample mean. Taken together, the results suggest that investors perceive the vocal negativity of managers as negative signals about a firm's financial prospects. They understand and digest the negative value-relevant information contained in managers' vocal negativity during the conference call and then incorporate this into stock price immediately. By contrast, we observe no significant

relationship between analyst vocal emotions and contemporaneous abnormal stock return, which suggests that investors do not react to analysts' vocal expressions.

<Insert Table 7 about here>

As suggested by the negative and statistically significant coefficients on *Negative Text Management* and *Negative Text CEO CFO*, our result also reveals that investors respond strongly to information conveyed in the textual tone delivered by managers. Consistent with prior studies (e.g., De Amicis et al., 2021; Suslava, 2021), investors perceive negative information from the negative text tone exhibited by managers and thus incorporate this signal into the stock price. As a result, a more negative text tone predicts worse contemporaneous stock returns. With respect to other control variables, the positive and significant coefficient on *FE* suggests that the market reacts to a firm's earnings news strongly. That is, firms that meet analysts' earnings expectations experience a higher stock return.

We next turn to the subsequent stock return in the post-earnings announcement period. In columns (3) and (4), we repeat the analysis using $CAR[2,60]$, the cumulative abnormal return over a 60-trading-day window following the earnings conference call period, as the dependent variable. The estimates on managers' vocal emotions all yield statistically insignificant coefficients. This finding implies that the vocal negativity of managers is not predictive of the subsequent stock returns after the earnings conference call. By contrast, we observe a statistical association between the text tone of all managers and the subsequent abnormal stock return, as suggested by the positive coefficient on *Negative Text Management* in column (3). This result suggests that investors may overreact to the information contained in managers' text tone in the short term and then slowly correct it over the next 60 days following the earnings conference call.

Taken together, the distinctive effects of vocal emotions on contemporary and delayed returns indicate that investors tend to understand the negative information embedded in managers' negative vocal emotions immediately during the conference call period, and there is no evidence of underreaction to managers' vocal expression by investors.

4.2 Analyst reaction

In this section, we examine how another important group of market participants, analysts, react to the vocal emotions of managers delivered during the earnings conference call. In particular, we estimate whether security analysts incorporate the information contained in managers' vocal cues into their near-term one-quarter-ahead earnings forecasts using the same

equation for the stock return analyses above. Following prior research, we focus on two measures of the earnings forecast (Hirshleifer and Sheng, 2021; Noh and Zhou, 2022). The first one, forecast errors (*FE*), is the difference between the actual earnings per share (EPS) and the consensus median forecast of EPS, scaled by the stock price three days before the earnings conference call. This measure distinguishes between overestimating and underestimating actual earnings. The forecast error can be interpreted as the directional analyst forecasting bias. A positive value of forecast errors is associated with a more pessimistic forecast. The second measure is forecast quality, which is defined as the absolute value of forecast errors (*Absolute FE*). A higher value of *Absolute FE* indicates a low forecast quality.

<Insert Table 8 about here>

We report the regression results of the earnings forecast in Table 8. Column (1) shows that the negative vocal emotion exhibited by managers is significantly associated with more pessimistic earnings forecasts by analysts. A one-standard-deviation increase in *Negativity Voice Management* leads to an increase of 7.16% in forecast errors relative to the sample mean. As shown in column (2), the estimated coefficient on *Negativity Voice CEO CFO* is positive and statistically significant. This finding suggests that the vocal negativity of CEOs and CFOs is also strongly related to the pessimism in analysts' earnings forecasts. All else equal, a one-standard-deviation increase in *Negativity Voice CEO CFO* is associated with an increase in forecast errors equal to 2.47% of the sample mean. The evidence in columns (1) and (2) suggests that analysts incorporate the negative value-relevant information contained in managers' vocal cues when making future earnings forecasts and issue more pessimistic estimates, which tones down the over-optimistic recommendations, given that security analysts are inclined to be positively biased in making forecast (Hong and Kubik, 2003). As a result, firms are more likely to exceed than fall below analyst expectations.

When turning to verbal communications, we observe a negative and statistically significant coefficient on *Negative Text Management*, which is consistent with Noh and Zhou (2022) that analysts do not immediately understand the negative information embedded in managers' text tone, but they might slowly incorporate such information into future forecasts. Turning to columns (3) and (4), however, we find no predictive power of managers' vocal emotions on forecast quality. The estimated coefficients on managers' negative vocal emotions are statistically insignificant in both specifications.

Taken together, the analyses of earnings forecasts indicate that analysts perceive negative information from managers' negative vocal emotions and generate more pessimistic but not more accurate estimates.

5. Conclusion

Corporations relay quantitative and qualitative information to the public through earnings conference calls. Particularly, the Q&A session is believed to be the most informative given the involvement of financial analysts. An extensive amount of literature has explored what managers actually say during the conference call by analysing managers' strategic use of words and linguistic tone (e.g., Larcker and Zakolyukina, 2012; Blau et al., 2015; Huang et al., 2015; Chen et al., 2018; Jiang et al., 2019; De Amicis et al., 2021; Suslava, 2021; Comprix et al., 2022; Noh and Zhou, 2022). We advance the literature by examining how managers communicate with financial analysts, with a focus on vocal expressions of emotions.

Focusing on analyst-manager conversations, we utilize a granular analysis at the question-and-answer level to analyse managers' vocal responses to analysts' questions. We find that the vocal emotion of managers answering the question is affected by the vocal emotion of analysts, the gender of analysts and the order of the question. First, when the analyst asks a question with negative vocal emotion, the manager will become more negative in response. This finding is consistent with the reciprocal effect documented in the psychology research that individuals respond with a matching or reciprocal behavioural pattern to interacting partners. Second, we find that female managers are more likely to exhibit negative vocal emotions, while managers generally respond with a more positive vocal emotion to a female analyst than to a male analyst. Third, our results show that managers become more negative in vocal expressions as the Q&A session wears on. We interpret this finding as a result of exhaustion towards the end of the call. Finally, we find evidence that older managers are less likely to exhibit negative vocal emotions than younger ones.

We next investigate whether the predictive strength of managers' vocal emotion determinants varies depending upon the characteristics of analyst-manager dyad interactions. We first show that managers' reciprocal responses to analysts' questions become stronger when the manager is female. This result confirms the finding in the field of psychology that females, in general, tend to be more emotional than men and are more likely to experience negative emotionality (Fujita et al., 1991; Birditt and Fingerman, 2003). Our results also suggest that female managers are more likely to display reciprocal or adaptive responses than male colleagues when communicating with analysts. We then show that there is no in-group or out-

group gender bias in vocal emotions during analyst-manager conversations. We next show that CEOs and CFOs, compared to other senior managers, exhibit less negative vocal emotions when responding to a female analyst's question than when answering a male analyst's question. Finally, we find that managers' reciprocal response is also shaped by the vocal emotions of earlier questions raised by analysts.

Further evidence on the market implications of managers' vocal emotions suggests that investors understand the negative information embedded in negative vocal emotions immediately during the conference call period, and, as a result, stock prices react to the negative vocal emotions negatively. We also find that analysts incorporate the negative value relevant information contained in the vocal emotion when making near-term earnings forecasts and tend to issue more pessimistic estimates.

Our results speak to the significance of non-verbal expressions in corporate communications. We contribute to the literature on earnings conference calls and provide new insights into analyst-manager conversations that how questions are answered matters to financial markets, and that vocal communications can be an important information channel in addition to verbal communications. Our study indicates that investors, analysts, and other stakeholders should pay particular attention to the potentially significant effects of analyst-manager interactions on corporate information disclosure due to the important variations in human emotional behaviours. Speech analysis can be conducted in activities involving managerial communications. Notably, when recruiting managers, companies should be aware of the candidates' communication skills, especially the capability to control their voices.

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Table 1 Summary statistics

This table reports descriptive statistics. Panel A reports summary information for the Q&A pair-level variables. Panel B reports summary information for call-level variables. All variables are defined in Appendix A.

Vars	N	Mean	Std	P10	Median	P90
<i>Panel A: Q&A pair-level</i>						
Voice Answer	505,861	0.793	0.608	-1.000	1.000	1.000
Voice Question	505,861	0.575	0.817	-1.000	1.000	1.000
Negative Voice Answer	505,861	0.103	0.304	0.000	0.000	1.000
Negative Voice Question	505,861	0.212	0.409	0.000	0.000	1.000
Text Answer	505,861	0.240	0.595	0.000	0.000	1.000
Text Question	505,861	0.020	0.438	0.000	0.000	1.000
Female Manager	505,861	0.068	0.251	0.000	0.000	0.000
Female Analyst	505,861	0.108	0.310	0.000	0.000	1.000
Order	505,861	2.301	0.916	1.099	2.485	3.332
Manager Age	505,861	3.999	0.118	3.850	4.007	4.143
CEO or CFO	505,861	0.727	0.446	0.000	1.000	1.000
New Analyst	505,861	0.081	0.273	0.000	0.000	0.000
<i>Panel B: Call-level</i>						
Negativity Voice Management	20,442	-0.789	0.368	-1.000	-0.953	-0.302
Negativity Voice CEOCFO	20,443	-0.243	0.178	-0.474	-0.235	-0.029
Negative Text Management	19,536	-0.795	0.400	-1.000	-1.000	-0.273
Negative Text CEOCFO	19,536	-0.234	0.213	-0.500	-0.222	0.000
Negativity Voice Analyst	20,443	-0.582	0.344	-1.000	-0.636	-0.111
Negative Text Analyst	20,443	-0.026	0.114	-0.167	0.000	0.111
CAR[0,1]	20,443	0.023	0.110	-0.104	0.022	0.148
CAR[2,60]	20,443	-0.005	0.145	-0.163	-0.005	0.157
FE (%)	20,443	0.108	0.375	-0.074	0.049	0.359
Absolute FE (%)	20,443	0.189	0.341	0.008	0.076	0.448
MC	20,443	9.645	1.117	8.255	9.552	11.198
BM	20,443	0.391	0.332	0.068	0.313	0.817
Vol	20,443	0.020	0.010	0.011	0.017	0.032
Turnover	20,443	0.010	0.007	0.005	0.008	0.018
ROA	20,443	0.035	0.028	0.008	0.033	0.064
TA	20,443	9.565	1.378	7.881	9.483	11.313
Stock Return	20,443	0.026	0.158	-0.155	0.039	0.196

Table 2 Predictors of managers' vocal emotions

This table reports the regression results for the predictors of managers' vocal emotion at the Q&A pair level. In columns (1) and (2), *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). In columns (3) and (4), *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer (1)	Negative Voice Answer (2)	Voice Answer (3)	Voice Answer (4)
Negative Voice Question	0.048*** (22.738)	0.047*** (20.288)		
Voice Question			0.048*** (22.731)	0.047*** (20.277)
Order	0.003*** (3.599)	0.003*** (3.435)	-0.005*** (-3.628)	-0.006*** (-3.462)
Female Manager	0.106*** (6.792)	0.093*** (6.898)	-0.215*** (-6.924)	-0.189*** (-7.053)
Female Analyst	-0.008*** (-4.156)	-0.005*** (-2.613)	0.016*** (4.282)	0.010*** (2.702)
Manager Age	-0.031 (-1.420)	-0.046** (-1.996)	0.058 (1.322)	0.088* (1.932)
CEO or CFO	0.000 (0.081)	-0.004 (-0.672)	-0.001 (-0.056)	0.007 (0.692)
New Analyst	0.001 (0.324)	-0.001 (-0.275)	-0.001 (-0.284)	0.001 (0.284)
Text Answer	-0.003*** (-3.443)	-0.004*** (-4.067)	0.006*** (3.431)	0.007*** (4.019)
Text Question	0.000 (0.236)	0.000 (0.193)	-0.000 (-0.264)	-0.000 (-0.237)
Firm Controls	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Obs.	600,239	505,861	600,239	505,861
R2	0.111	0.109	0.111	0.109

Table 3 Manager-analyst interactions: Vocal emotion of question

This table reports the regression results for the effects of management-analyst interactions on managers' vocal emotions conditional on the vocal emotion of question at the Q&A pair level. In columns (1) and (2), *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). In columns (3) and (4), *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer	Negative Voice Answer	Voice Answer	Voice Answer
	(1)	(2)	(3)	(4)
Negative Voice Question	0.042*** (8.528)	0.042*** (7.552)		
Voice Question			0.043*** (8.604)	0.042*** (7.552)
Negative Voice Question*Female Analyst	-0.009** (-2.129)	-0.004 (-0.860)		
Negative Voice Question *Female Manager	0.042*** (4.351)	0.038*** (3.658)		
Negative Voice Question *CEOCFO	-0.001 (-0.206)	-0.001 (-0.166)		
Negative Voice Question *Order	0.002 (1.524)	0.002 (1.066)		
Voice Question*Female Analyst			-0.008** (-2.018)	-0.003 (-0.729)
Voice Question*Female Manager			0.042*** (4.326)	0.037*** (3.613)
Voice Question*CEOCFO			-0.001 (-0.279)	-0.001 (-0.211)
Voice Question*Order			0.002 (1.382)	0.002 (1.034)
Order	0.002*** (2.935)	0.002*** (2.935)	-0.007*** (-3.586)	-0.006*** (-3.307)
Female Manager	0.097*** (6.652)	0.085*** (6.721)	-0.239*** (-6.993)	-0.211*** (-7.069)
Female Analyst	-0.005*** (-2.608)	-0.004* (-1.852)	0.019*** (4.336)	0.011** (2.540)
Manager Age	-0.031 (-1.421)	-0.045** (-1.991)	0.058 (1.323)	0.088* (1.927)
CEO or CFO	0.001 (0.126)	-0.003 (-0.676)	0.000 (0.010)	0.008 (0.662)
New Analyst	0.001 (0.309)	-0.001 (-0.280)	-0.001 (-0.269)	0.001 (0.290)
Text Answer	-0.003*** (-3.427)	-0.004*** (-4.051)	0.006*** (3.416)	0.007*** (4.003)
Text Question	0.000 (0.239)	0.000 (0.190)	-0.001 (-0.266)	-0.000 (-0.235)
Firm Controls	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Obs.	600,239	505,861	600,239	505,861
R2	0.111	0.109	0.111	0.109

Table 4 Manager-analyst interactions: Dyad gender composition

This table reports the regression results for the effects of management-analyst interactions on managers' vocal emotions conditional on the gender of managers and analysts at the Q&A pair level. In columns (1) and (2), *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). In columns (3) and (4), *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer	Negative Voice Answer	Voice Answer	Voice Answer
	(1)	(2)	(3)	(4)
Negative Voice Question	0.048*** (22.736)	0.047*** (20.289)		
Voice Question			0.048*** (22.730)	0.047*** (20.278)
Mixed Gender Dyad	0.007 (0.641)	-0.004 (-0.358)	-0.014 (-0.610)	0.008 (0.398)
Order	0.003*** (3.598)	0.003*** (3.436)	-0.005*** (-3.626)	-0.006*** (-3.464)
Female Manager	0.106*** (6.589)	0.092*** (6.618)	-0.216*** (-6.713)	-0.188*** (-6.764)
Female Analyst	-0.014 (-1.323)	-0.001 (-0.125)	0.028 (1.320)	0.002 (0.106)
Manager Age	-0.031 (-1.418)	-0.046** (-1.998)	0.058 (1.320)	0.088* (1.934)
CEO or CFO	0.000 (0.078)	-0.004 (-0.671)	-0.001 (-0.054)	0.007 (0.691)
New Analyst	0.001 (0.327)	-0.001 (-0.276)	-0.001 (-0.287)	0.001 (0.286)
Text Answer	-0.003*** (-3.438)	-0.004*** (-4.069)	0.006*** (3.427)	0.007*** (4.022)
Text Question	0.000 (0.234)	0.000 (0.195)	-0.000 (-0.262)	-0.000 (-0.239)
Firm Controls	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Obs.	600,239	505,861	600,239	505,861
R2	0.111	0.109	0.111	0.109

Table 5 Manager-analyst interactions: Manager position

This table reports the regression results for the effects of management-analyst interactions on managers' vocal emotions conditional on managers' positions at the Q&A pair level. In columns (1) and (2), *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). In columns (3) and (4), *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer (1)	Negative Voice Answer (2)	Voice Answer (3)	Voice Answer (4)
Negative Voice Question	0.049*** (22.736)	0.047*** (20.293)		
Voice Question			0.048*** (22.730)	0.047*** (20.283)
CEO or CFO * Female Analyst	-0.007 (-1.479)	-0.011** (-2.140)	0.015 (1.509)	0.021** (2.165)
CEO or CFO * Order	0.001 (0.261)	0.001 (0.327)	-0.001 (-0.320)	-0.002 (-0.350)
Order	0.002 (1.263)	0.002 (1.185)	-0.004 (-1.223)	-0.004 (-1.173)
Female Manager	0.106*** (6.789)	0.093*** (6.897)	-0.214*** (-6.921)	-0.189*** (-7.053)
Female Analyst	-0.002 (-0.580)	0.003 (0.701)	0.005 (0.620)	-0.005 (-0.678)
Manager Age	-0.031 (-1.425)	-0.046** (-2.001)	0.058 (1.327)	0.088* (1.937)
CEO or CFO	-0.000 (-0.013)	-0.004 (-0.682)	0.001 (0.081)	0.009 (0.717)
New Analyst	0.001 (0.332)	-0.001 (-0.264)	-0.001 (-0.292)	0.001 (0.273)
Text Answer	-0.003*** (-3.449)	-0.004*** (-4.078)	0.006*** (3.438)	0.007*** (4.030)
Text Question	0.000 (0.235)	0.000 (0.193)	-0.000 (-0.263)	-0.000 (-0.238)
Firm Controls	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Obs.	600,239	505,861	600,239	505,861
R2	0.111	0.109	0.111	0.109

Table 6 Manager-analyst dynamic interactions

This table reports the regression results for the effects of management-analyst interactions on managers' vocal emotions conditional on the order dynamics at the Q&A pair level. *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer (1)	Negative Voice Answer (2)	Voice Answer (3)	Voice Answer (4)	Negative Voice Answer (5)	Negative Voice Answer (6)	Voice Answer (7)	Voice Answer (8)
Negative Voice Question	0.037*** (22.694)	0.035*** (20.603)			0.035*** (13.154)	0.035*** (12.144)		
Cumulative Negative Voice Question _{t-1}	0.121*** (18.839)	0.118*** (16.571)			0.123*** (11.954)	0.115*** (10.247)		
Voice Question			0.036*** (22.704)	0.035*** (20.635)			0.035*** (13.252)	0.035*** (12.209)
Cumulative Voice Question _{t-1}			0.121*** (18.723)	0.117*** (16.468)			0.123*** (11.901)	0.115*** (10.155)
Negative Voice Question* CEO or CFO					-0.001 (-0.299)	-0.001 (-0.413)		
Negative Voice Question* Female Manager					0.030*** (4.191)	0.024*** (3.281)		
Voice Question * CEO or CFO							-0.001 (-0.376)	-0.002 (-0.472)
Voice Question* Female Manager							0.030*** (4.178)	0.023*** (3.235)
Cumulative Negative Voice Question _{t-1} * CEO or CFO					-0.010 (-0.864)	-0.005 (-0.359)		
Cumulative Negative Voice Question _{t-1} * Female Manager					0.085*** (3.018)	0.088*** (2.850)		
Cumulative Voice Question _{t-1} * CEO or CFO							-0.011 (-0.886)	-0.004 (-0.337)
Cumulative Voice Question _{t-1} * Female Manager							0.083*** (2.948)	0.086*** (2.781)
Firm Controls	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	569,353	479,791	569,353	479,791	569,353	479,791	569,353	479,791
R2	0.117	0.115	0.117	0.115	0.118	0.116	0.118	0.116

Table 7 Vocal emotions and stock returns

This table reports the regression results for the effects of managers' vocal emotions on stock market return. In columns (1) and (2), the dependent variable is the cumulative abnormal return over a 2-trading-day window around the earnings conference call date, i.e., $CAR[0,1]$. In columns (3) and (4), the dependent variable is the cumulative abnormal return over a 60-trading-day window following the earnings conference call period, i.e., $CAR[2, 60]$. Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	CAR[0,1]	CAR[0,1]	CAR[2,60]	CAR[2,60]
	(1)	(2)	(3)	(4)
Negativity Voice Management	-0.006** (-2.287)		0.005 (1.584)	
Negative Text Management	-0.043*** (-8.259)		0.019*** (2.651)	
Negativity Voice CEOCFO		-0.005** (-2.000)		0.002 (0.642)
Negative Text CEOCFO		-0.025*** (-5.460)		0.007 (1.307)
Negativity Voice Analyst	0.002 (0.950)	0.002 (0.886)	0.000 (0.099)	0.001 (0.193)
Negative Text Analyst	-0.094*** (-12.950)	-0.099*** (-13.308)	0.007 (0.772)	0.010 (1.106)
MC	-0.024*** (-5.417)	-0.025*** (-5.618)	-0.055*** (-10.079)	-0.056*** (-9.444)
BM	-0.003 (-0.377)	-0.003 (-0.345)	0.070*** (6.077)	0.071*** (5.767)
FE	0.035*** (7.458)	0.033*** (6.965)	0.002 (0.565)	0.003 (0.804)
Vol	0.393** (2.102)	0.433** (2.243)	0.803** (2.336)	0.860** (2.428)
Turnover	0.200 (0.580)	0.076 (0.212)	-1.769*** (-4.184)	-2.114*** (-4.855)
TA	0.016*** (3.175)	0.017*** (3.187)	0.032*** (5.190)	0.032*** (4.777)
Stock Return	0.035*** (4.447)	0.038*** (4.597)	-0.308*** (-35.885)	-0.309*** (-35.244)
ROA	0.283*** (3.613)	0.299*** (3.626)	0.038 (0.542)	0.025 (0.334)
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Obs.	20,442	19,535	20,442	19,535
R2	0.139	0.137	0.176	0.177

Table 8 Vocal emotions and earnings forecast

This table reports the regression results for the effects of managers' vocal emotions on future earnings forecast. In columns (1) and (2), the dependent variable is the one-quarter-ahead earnings forecast errors. In columns (3) and (4), the dependent variable is the absolute value of the one-quarter-ahead earnings forecast errors. Constant is included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	FE_{t+1}	FE_{t+1}	$Absolute\ FE_{t+1}$	$Absolute\ FE_{t+1}$
	(1)	(2)	(3)	(4)
Negativity Voice Management	0.021** (2.054)		-0.001 (-0.081)	
Negative Text Management	-0.039* (-1.789)		0.011 (0.745)	
Negativity Voice CEOCFO		0.015* (1.660)		-0.001 (-0.167)
Negative Text CEOCFO		-0.009 (-0.560)		0.025** (2.000)
Negativity Voice Analyst	-0.008 (-0.873)	-0.006 (-0.622)	-0.010 (-1.388)	-0.010 (-1.411)
Negative Text Analyst	0.005 (0.183)	0.008 (0.300)	0.038** (2.236)	0.033* (1.893)
MC	-0.102*** (-5.138)	-0.100*** (-5.226)	-0.168*** (-8.881)	-0.162*** (-8.998)
BM	0.039 (0.778)	0.044 (0.839)	0.072* (1.843)	0.075* (1.960)
FE	0.089*** (3.745)	0.082*** (3.369)	0.041*** (2.720)	0.042*** (2.819)
Vol	0.922 (1.155)	0.708 (0.878)	2.618*** (4.228)	2.462*** (3.997)
Turnover	-1.993 (-1.197)	-1.277 (-0.751)	2.141* (1.927)	2.544** (2.165)
TA	0.041* (1.816)	0.039* (1.730)	0.076*** (4.048)	0.070*** (3.836)
Stock Return	0.049** (2.007)	0.036 (1.424)	0.003 (0.190)	0.003 (0.165)
ROA	-0.409* (-1.804)	-0.373* (-1.711)	-0.370** (-2.359)	-0.376** (-2.389)
Firm FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Obs.	19,316	18,479	19,316	18,479
R2	0.184	0.185	0.494	0.494

Appendix A Variable Definition

Table A.1 Variable Definition

Vars	Definition
<i>Q&A pair-level variables</i>	
Voice Answer	Vocal emotions for each answer: -1 for negative emotions, 0 for neutral emotions and 1 for positive emotions.
Voice Question	Vocal emotions for each question: -1 for negative emotions, 0 for neutral emotions and 1 for positive emotions.
Negative Voice Answer	A dummy takes the value of one if the emotion of the answer is angry or sad, and zero otherwise.
Negative Voice Question	A dummy takes the value of one if the emotion of the question is angry or sad, and zero otherwise.
Text Answer	Text tone for each answer: -1 for negative tone, 0 for neutral tone and 1 for positive tone.
Text Question	Text tone for each question: -1 for negative tone, 0 for neutral tone and 1 for positive tone.
Female Analyst	A dummy takes the value of one for female analyst, and zero otherwise.
Female Manager	A dummy takes the value of one for female manager, and zero otherwise.
Order	Natural logarithm of question-and-answer pair order in a given call.
Manager Age	Natural logarithm of manager's age.
CEO or CFO	A dummy takes the value of one for CEO or CFO, and zero otherwise
New Analyst	A dummy takes the value of one if the analyst joins the conference call for the first time, and zero otherwise.
<i>Call-level variables</i>	
Negativity Voice Management	Aggregated vocal negativity for all manager in a given call (defined as difference of each manager's negative answers and positive answers scaled by the sum of each manager's negative answers and positive answers).
Negativity Voice CEOCFO	Aggregated vocal negativity for CEO and CFO in a given call (defined as difference of male managers' negative answers and positive answers scaled by the sum of female managers' negative answers and positive answers).
Negative Text Management	Negative value of average text tone for all managers in a given call (defined as average value of <i>Text Answer</i>).
Negative Text CEOCFO	Negative value of average text tone for CEO and CFO in a given call (defined as average value of <i>Text Answer</i>).
Negativity Voice Analyst	Aggregated vocal negativity for all analysts in a given call (defined as difference of each analyst's negative answers and positive answers scaled by the sum of each analyst's negative answers and positive answers).
Text Analyst	Aggregated text tone for all analysts in a given call (defined as average value of <i>Text Question</i>).
CAR[i,j]	Daily cumulative abnormal return over days i through j relative to the earnings conference call date, where expected returns are derived from the market model estimated using the CRSP value-weighted index
FE	Difference between actual earnings per share and analyst consensus median earnings per share scaled by price three days before the conference call, multiplied by 100.
Absolute FE	Absolute value of FE.
MC	Natural logarithm of the market capitalization.
BM	Ratio of book value of equity to the market value of equity.
Vol	Volatility of daily stock return over the previous year.
Turnover	Number of shares traded scaled by the total number of shares outstanding in the past year.
ROA	Ratio of operating income before depreciation to total assets at the fiscal quarter end.
TA	Natural logarithm of total assets at the fiscal quarter end.
Stock Return	The natural logarithm of the share price at the end of the fiscal quarter t relative to the previous quarter.

Appendix B Full tables

Table B.1 Predictors of managers' vocal emotion

This table reports the regression results for the predictors of managers' vocal emotion at the Q&A pair level. In columns (1) and (2), *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). In columns (3) and (4), *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer (1)	Negative Voice Answer (2)	Voice Answer (3)	Voice Answer (4)
Negative Voice Question	0.048*** (22.738)	0.047*** (20.288)		
Voice Question			0.048*** (22.731)	0.047*** (20.277)
Order	0.003*** (3.599)	0.003*** (3.435)	-0.005*** (-3.628)	-0.006*** (-3.462)
Female Manager	0.106*** (6.792)	0.093*** (6.898)	-0.215*** (-6.924)	-0.189*** (-7.053)
Female Analyst	-0.008*** (-4.156)	-0.005*** (-2.613)	0.016*** (4.282)	0.010*** (2.702)
Manager Age	-0.031 (-1.420)	-0.046** (-1.996)	0.058 (1.322)	0.088* (1.932)
CEO or CFO	0.000 (0.081)	-0.004 (-0.672)	-0.001 (-0.056)	0.007 (0.692)
New Analyst	0.001 (0.324)	-0.001 (-0.275)	-0.001 (-0.284)	0.001 (0.284)
Text Answer	-0.003*** (-3.443)	-0.004*** (-4.067)	0.006*** (3.431)	0.007*** (4.019)
Text Question	0.000 (0.236)	0.000 (0.193)	-0.000 (-0.264)	-0.000 (-0.237)
MC		-0.008 (-0.832)		0.015 (0.813)
BM		-0.048*** (-3.010)		0.095*** (2.971)
FE		0.536 (1.451)		-1.056 (-1.426)
Vol		-0.777* (-1.912)		1.550* (1.903)
Turnover		0.420 (0.723)		-0.858 (-0.732)
AT		0.020* (1.751)		-0.040* (-1.743)
Stock Return		0.005 (0.649)		-0.012 (-0.746)
ROA		0.061 (0.811)		-0.125 (-0.826)
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Obs.	600,239	505,861	600,239	505,861
R2	0.111	0.109	0.111	0.109

Table B.2 Manager-analyst interactions: Vocal emotion of question

This table reports the regression results for the effects of management-analyst interactions on managers' vocal emotions conditional on the vocal emotion of question at the Q&A pair level. In columns (1) and (2), *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). In columns (3) and (4), *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer	Negative Voice Answer	Voice Answer	Voice Answer
	(1)	(2)	(3)	(4)
Negative Voice Question	0.042*** (8.528)	0.042*** (7.552)		
Voice Question			0.043*** (8.604)	0.042*** (7.552)
Negative Voice Question*Female Analyst	-0.009** (-2.129)	-0.004 (-0.860)		
Negative Voice Question *Female Manager	0.042*** (4.351)	0.038*** (3.658)		
Negative Voice Question *CEO or CFO	-0.001 (-0.206)	-0.001 (-0.166)		
Negative Voice Question *Order	0.002 (1.524)	0.002 (1.066)		
Voice Question*Female Analyst			-0.008** (-2.018)	-0.003 (-0.729)
Voice Question*Female Manager			0.042*** (4.326)	0.037*** (3.613)
Voice Question*CEO or CFO			-0.001 (-0.279)	-0.001 (-0.211)
Voice Question*Order			0.002 (1.382)	0.002 (1.034)
Order	0.002*** (2.935)	0.002*** (2.935)	-0.007*** (-3.586)	-0.006*** (-3.307)
Female Manager	0.097*** (6.652)	0.085*** (6.721)	-0.239*** (-6.993)	-0.211*** (-7.069)
Female Analyst	-0.005*** (-2.608)	-0.004* (-1.852)	0.019*** (4.336)	0.011** (2.540)
Manager Age	-0.031 (-1.421)	-0.045** (-1.991)	0.058 (1.323)	0.088* (1.927)
CEO or CFO	0.001 (0.126)	-0.003 (-0.676)	0.000 (0.010)	0.008 (0.662)
New Analyst	0.001 (0.309)	-0.001 (-0.280)	-0.001 (-0.269)	0.001 (0.290)
Text Answer	-0.003*** (-3.427)	-0.004*** (-4.051)	0.006*** (3.416)	0.007*** (4.003)
Text Question	0.000 (0.239)	0.000 (0.190)	-0.001 (-0.266)	-0.000 (-0.235)
MC		-0.008 (-0.823)		0.015 (0.805)
BM		-0.048*** (-3.010)		0.095*** (2.970)
FE		0.538 (1.455)		-1.059 (-1.430)
Vol		-0.781* (-1.922)		1.558* (1.914)
Turnover		0.433 (0.746)		-0.883 (-0.755)
AT		0.020* (1.741)		-0.040* (-1.734)
Stock Return		0.005 (0.631)		-0.012 (-0.728)
ROA		0.061 (0.819)		-0.126 (-0.834)
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Obs.	600,239	505,861	600,239	505,861
R2	0.111	0.109	0.111	0.109

Table B.3 Manager-analyst interactions: Dyad gender composition

This table reports the regression results for the effects of management-analyst interactions on managers' vocal emotions conditional on the gender of managers and analysts at the Q&A pair level. In columns (1) and (2), *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). In columns (3) and (4), *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer (1)	Negative Voice Answer (2)	Voice Answer (3)	Voice Answer (4)
Negative Voice Question	0.048*** (22.736)	0.047*** (20.289)		
Voice Question			0.048*** (22.730)	0.047*** (20.278)
Mixed Gender Dyad	0.007 (0.641)	-0.004 (-0.358)	-0.014 (-0.610)	0.008 (0.398)
Order	0.003*** (3.598)	0.003*** (3.436)	-0.005*** (-3.626)	-0.006*** (-3.464)
Female Manager	0.106*** (6.589)	0.092*** (6.618)	-0.216*** (-6.713)	-0.188*** (-6.764)
Female Analyst	-0.014 (-1.323)	-0.001 (-0.125)	0.028 (1.320)	0.002 (0.106)
Manager Age	-0.031 (-1.418)	-0.046** (-1.998)	0.058 (1.320)	0.088* (1.934)
CEO or CFO	0.000 (0.078)	-0.004 (-0.671)	-0.001 (-0.054)	0.007 (0.691)
New Analyst	0.001 (0.327)	-0.001 (-0.276)	-0.001 (-0.287)	0.001 (0.286)
Text Answer	-0.003*** (-3.438)	-0.004*** (-4.069)	0.006*** (3.427)	0.007*** (4.022)
Text Question	0.000 (0.234)	0.000 (0.195)	-0.000 (-0.262)	-0.000 (-0.239)
MC		-0.008 (-0.831)		0.015 (0.813)
BM		-0.048*** (-3.011)		0.095*** (2.972)
FE		0.536 (1.452)		-1.056 (-1.427)
Vol		-0.776* (-1.911)		1.549* (1.903)
Turnover		0.419 (0.721)		-0.856 (-0.730)
AT		0.020* (1.751)		-0.040* (-1.744)
Stock Return		0.005 (0.648)		-0.012 (-0.745)
ROA		0.061 (0.811)		-0.125 (-0.826)
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Obs.	600,239	505,861	600,239	505,861
R2	0.111	0.109	0.111	0.109

Table B.4 Manager-analyst interactions: Manager position

This table reports the regression results for the effects of management-analyst interactions on managers' vocal emotion conditional on managers' positions at the Q&A pair level. In columns (1) and (2), *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). In columns (3) and (4), *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer (1)	Negative Voice Answer (2)	Voice Answer (3)	Voice Answer (4)
Negative Voice Question	0.049*** (22.736)	0.047*** (20.293)		
Voice Question			0.048*** (22.730)	0.047*** (20.283)
CEO or CFO * Female Analyst	-0.007 (-1.479)	-0.011** (-2.140)	0.015 (1.509)	0.021** (2.165)
CEO or CFO * Order	0.001 (0.261)	0.001 (0.327)	-0.001 (-0.320)	-0.002 (-0.350)
Order	0.002 (1.263)	0.002 (1.185)	-0.004 (-1.223)	-0.004 (-1.173)
Female Manager	0.106*** (6.789)	0.093*** (6.897)	-0.214*** (-6.921)	-0.189*** (-7.053)
Female Analyst	-0.002 (-0.580)	0.003 (0.701)	0.005 (0.620)	-0.005 (-0.678)
Manager Age	-0.031 (-1.425)	-0.046** (-2.001)	0.058 (1.327)	0.088* (1.937)
CEO or CFO	-0.000 (-0.013)	-0.004 (-0.682)	0.001 (0.081)	0.009 (0.717)
New Analyst	0.001 (0.332)	-0.001 (-0.264)	-0.001 (-0.292)	0.001 (0.273)
Text Answer	-0.003*** (-3.449)	-0.004*** (-4.078)	0.006*** (3.438)	0.007*** (4.030)
Text Question	0.000 (0.235)	0.000 (0.193)	-0.000 (-0.263)	-0.000 (-0.238)
MC		-0.008 (-0.831)		0.015 (0.813)
BM		-0.048*** (-3.016)		0.095*** (2.976)
FE		0.536 (1.451)		-1.056 (-1.426)
Vol		-0.776* (-1.911)		1.549* (1.902)
Turnover		0.420 (0.722)		-0.858 (-0.731)
AT		0.020* (1.755)		-0.041* (-1.748)
Stock Return		0.005 (0.647)		-0.012 (-0.744)
ROA		0.061 (0.813)		-0.125 (-0.828)
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Obs.	600,239	505,861	600,239	505,861
R2	0.111	0.109	0.111	0.109

Table B.5 Manager-analyst dynamic interactions

This table reports the regression results for the effects of management-analyst interactions on managers' vocal emotions conditional on the order dynamics at the Q&A pair level. *Negative Voice Answer* is a dummy which takes the value of one if the vocal emotion of the answer is negative (sad and angry). *Voice Answer* is the vocal emotion of the answer, which is coded as -1 for negative emotions (sad and angry), 0 for neutral emotions and 1 for positive emotions (happy and pleasantly surprised). Constants are included in the estimation but not reported. All variables are defined in Appendix A. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * represent significance at 1%, 5% and 10% level, respectively.

	Negative Voice Answer	Negative Voice Answer	Voice Answer	Voice Answer	Negative Voice Answer	Negative Voice Answer	Voice Answer	Voice Answer
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Negative Voice Question	0.037*** (22.694)	0.035*** (20.603)			0.035*** (13.154)	0.035*** (12.144)		
Cumulative Negative Voice Question _{t-1}	0.121*** (18.839)	0.118*** (16.571)			0.123*** (11.954)	0.115*** (10.247)		
Voice Question			0.036*** (22.704)	0.035*** (20.635)			0.035*** (13.252)	0.035*** (12.209)
Cumulative Voice Question _{t-1}			0.121*** (18.723)	0.117*** (16.468)			0.123*** (11.901)	0.115*** (10.155)
Negative Voice Question* CEO or CFO					-0.001 (-0.299)	-0.001 (-0.413)		
Negative Voice Question* Female Manager					0.030*** (4.191)	0.024*** (3.281)		
Voice Question * CEO or CFO							-0.001 (-0.376)	-0.002 (-0.472)
Voice Question* Female Manager							0.030*** (4.178)	0.023*** (3.235)
Cumulative Negative Voice Question _{t-1} * CEO or CFO					-0.010 (-0.864)	-0.005 (-0.359)		
Cumulative Negative Voice Question _{t-1} * Female Manager					0.085*** (3.018)	0.088*** (2.850)		
Cumulative Voice Question _{t-1} * CEO or CFO							-0.011 (-0.886)	-0.004 (-0.337)
Cumulative Voice Question _{t-1} * Female Manager							0.083*** (2.948)	0.086*** (2.781)
Order	0.003*** (3.222)	0.003*** (3.140)	-0.006*** (-3.259)	-0.006*** (-3.162)	0.003*** (3.253)	0.003*** (3.154)	-0.006*** (-3.288)	-0.006*** (-3.175)
Female Manager	0.107*** (6.829)	0.094*** (6.967)	-0.217*** (-6.958)	-0.191*** (-7.120)	0.083*** (6.103)	0.072*** (5.851)	-0.283*** (-6.521)	-0.257*** (-6.395)
Female Analyst	-0.007*** (-3.615)	-0.004** (-2.167)	0.014*** (3.730)	0.008** (2.243)	-0.007*** (-3.602)	-0.004** (-2.156)	0.014*** (3.717)	0.008** (2.232)
Manager Age	-0.033 (-1.509)	-0.048** (-2.112)	0.062 (1.403)	0.093** (2.040)	-0.033 (-1.504)	-0.048** (-2.088)	0.062 (1.398)	0.092** (2.016)
CEO or CFO	0.001 (0.165)	-0.003 (-0.565)	-0.001 (-0.144)	0.006 (0.583)	0.003 (0.698)	-0.002 (-0.310)	0.005 (0.349)	0.010 (0.597)
New Analyst	0.001 (0.293)	-0.001 (-0.328)	-0.001 (-0.254)	0.001 (0.338)	0.000 (0.251)	-0.001 (-0.354)	-0.001 (-0.212)	0.001 (0.363)

Text Answer	-0.003***	-0.004***	0.006***	0.008***	-0.003***	-0.004***	0.006***	0.008***
	(-3.705)	(-4.253)	(3.696)	(4.229)	(-3.637)	(-4.202)	(3.631)	(4.179)
Text Question	0.001	0.001	-0.001	-0.001	0.001	0.001	-0.001	-0.001
	(0.636)	(0.565)	(-0.682)	(-0.625)	(0.638)	(0.558)	(-0.685)	(-0.618)
MC		-0.007		0.015		-0.007		0.014
		(-0.817)		(0.802)		(-0.774)		(0.761)
BM		-0.049***		0.096***		-0.048***		0.095***
		(-3.032)		(2.990)		(-3.015)		(2.974)
FE		0.536		-1.048		0.539		-1.053
		(1.449)		(-1.413)		(1.456)		(-1.420)
Vol		-0.737*		1.468*		-0.748*		1.490*
		(-1.822)		(1.812)		(-1.851)		(1.840)
Turnover		0.447		-0.912		0.494		-1.005
		(0.771)		(-0.781)		(0.859)		(-0.866)
AT		0.021*		-0.041*		0.020*		-0.041*
		(1.803)		(-1.801)		(1.769)		(-1.768)
Stock Return		0.004		-0.009		0.003		-0.008
		(0.468)		(-0.561)		(0.414)		(-0.509)
ROA		0.047		-0.097		0.048		-0.100
		(0.641)		(-0.661)		(0.658)		(-0.677)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	569,353	479,791	569,353	479,791	569,353	479,791	569,353	479,791
R2	0.117	0.115	0.117	0.115	0.118	0.116	0.118	0.116