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Sentiment Analysis and Gender Differences in Earnings Conference Calls

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Abstract:	We apply textual analysis to the transcripts of nearly 78,000 earnings conference calls between 2004 and 2018, comparing the difference in sentiment between female and male senior managers (CEOs and CFOs). We focus on two main measures of sentiment: tone and vagueness. Our contribution is twofold. Firstly, we show that female executives employ a more positive and less vague tone than their male colleagues during conference calls. The more positive and less vague tone of female executives does not reflect incremental information content but instead appears to be a linguistic feature that distinguishes female from male executives. Secondly, we find that financial analysts participating in conference calls exhibit a gender bias as they are less positive and more vague when facing a female executive. However, the stock market reaction to the call is affected by the sentiment of the call, but not by the executive's gender.
Response to Reviewers:	

Reply to the Editor and Reviewer comments:

We are glad you found that our revised draft of the manuscript addressed adequately the reviewers' comments.

We are very grateful for the additional feedback which have been very helpful to strengthen the motivation and contribution of the paper as suggested.

Below we outline how we have incorporated them into the resubmitted version of the manuscript. We have worked on the two main concerns raised – a. the motivation and contribution; and b. avenues for future research. We hope you will be satisfied with the changes made.

Your comments are reported in Italics followed by our response in normal text.

I think the authors have done a fine job in responding to the reviewers' comments. I am concerned with 2 interrelated things that might affect the placing of the paper and others' interest in citing it. First, the motivation is weak. You note some ethical differences between men and women found in prior work, and infer that it is therefore appropriate to study women and earnings calls. I think you could improve on the motivation. In particular, by analyzing earnings calls, you are getting more at the underlying issues that give rise to outcome differences (inside the "black box" of the firm so to speak). The details that you have have not yet been explored in other work... you are opening up an area previously unexplored. You need to sell the paper better in the introduction.

- Following your suggestion, we have revised the Introduction to stress more the innovative contribution of the paper. We have done so by highlighting more clearly the advantages of looking at earning conference calls rather than annual reports to investigate gender differences. We have therefore modified the second and third paragraphs of page 2 of the Introduction. Further, we have reinforced our discussion about the contribution of the paper on page 4 of the Introduction. In particular, we have stressed more throughout the Introduction the uniqueness of the sample size which is substantially larger than the samples employed in the existing literature on textual analysis.

Second, you do not explain or suggest much in terms of avenues for future work. Maybe earnings calls and gender is an area related to work on lawsuits or fraud for example - there has been some work on topic https://scholar.google.com/scholar?hl=en&as_sdt=0%2C10&q=gender+diversity+lawsuits&btnG= but not in relation to earnings calls. Or you might identify earnings calls as a motivation for why firms seek cross listings or internationalization for example - see https://scholar.google.com/scholar?hl=en&as_sdt=0%2C10&q=gender+diversity+cross+listings&btnG= - again done before but you have a more interesting angle to suggest with your detailed data. Of course, you might have other suggestions for your readers... these are just a few ideas. I hope this helps.

- Thank you for pointing us to some relevant papers which we have incorporated in the last paragraph of page 1 of the Introduction. Further, at the end of the Conclusion, on page 24, we have included a discussion of what we believe would be interesting avenues for future research. We have also made other small changes to the Conclusion section to make it more effective in reiterating the innovative contribution of the paper.

HIGHLIGHTS

- We analyse the sentiment of 78,000 conference calls of US firms over 14 years.
- Female executives are more positive and less ambiguous than male executives.
- Both financial analysts and the stock market respond to the sentiment of the call.
- Financial analysts participating in the calls exhibit a *gender bias.*

Sentiment Analysis and Gender Differences in Earnings Conference Calls*

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Abstract:

We apply textual analysis to the transcripts of nearly 78,000 earnings conference calls between 2004 and 2018, comparing the difference in sentiment between female and male senior managers (CEOs and CFOs). We focus on two main measures of sentiment: tone and vagueness. Our contribution is twofold. Firstly, we show that female executives employ a more positive and less vague tone than their male colleagues during conference calls. The more positive and less vague tone of female executives does not reflect incremental information content but instead appears to be a linguistic feature that distinguishes female from male executives.

Secondly, we find that financial analysts participating in conference calls exhibit a *gender bias* as they are less positive and more vague when facing a female executive. However, the stock market reaction to the call is affected by the sentiment of the call, but not by the executive's gender.

Keywords: Conference calls, CEO and CFO, gender, market reaction, textual analysis

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1. Introduction

A growing body of literature uses textual analysis to study the language of corporate disclosures. These studies show that managers' linguistic choices when communicating their companies' news and performance are related to the quantity and quality of information disclosed by the firm and that the market reacts to the soft signals conveyed through their linguistic styles (Henry, 2006; Tetlock et al., 2008; Mayew and Venkatachalam, 2012; Price et al., 2012). A recent paper by Davis et al. (2015) however shows that manager-specific characteristics can also significantly influence the tone of spoken corporate disclosure.

Our paper builds on this strand of the literature by focusing on one specific managerial characteristic, gender, which has been so far unexplored by the existing research. Specifically, using a novel sample of nearly 78,000 quarterly earnings conference calls during the period between 2004 and 2018, we investigate whether female executives - CEO and/or CFO – consistently exhibit a gender-specific sentiment when communicating firm news and performance. We measure sentiment through the tone of the language used, i.e. the difference between positive and negative words, and its vagueness, i.e. the number of words indicating uncertainty, using the financial word list compiled by Loughran and McDonald (2011).

An extensive literature in psychology and sociology unanimously suggests that women and men differ significantly in their use of language (Lakoff, 1973; Haas, 1979; Thomson and Murachver, 2001; Newman et al., 2008). Women tend to communicate more emotionally and less assertively and make heavier use of both positive intensifiers such as "really" and uncertainty words such as "seems that", "maybe", "could" (Pennebaker et al. 2003; Colley et al., 2004). Survey based evidence shows that these linguistic traits apply also to female managers and could potentially explain the scarcity of female CEOs (Oakley, 2000).

More recent research also documents different behavioural patterns between female and male executives. For instance, some studies find that female executives tend to be more risk-averse and less overconfident than male executives (Huang and Kisgen, 2013; Faccio et al., 2016).[1] Female managers and directors have also been shown to be more sensitive to ethical issues and place more emphasis on environmental, corporate and social responsibility (ECSR) (Post et al., 2011; Atif et al., 2020), and to be less often involved in environmental infringements (Liu, 2018). They are also associated to more

[1] Other papers show however that observed differences in risk aversion and overconfidence between men and women weaken in the managerial and professional population, particularly for women that have broken through the glass ceilings (Croson and Gneezy, 2009; Adams and Funk, 2012).

conservative accounting practices (Ho et al., 2015), higher accounting quality (Barua et al., 2010) and less securities frauds (Cumming et al. 2015).

The extent to which these documented behavioural differences between male and female executives are likely to be associated also to differences in sentiment and communication styles of corporate disclosures remains however an open question in the literature. This paper aims to fill this gap by investigating the tone and vagueness used by male and female executives in quarterly earnings conference calls.

Earnings calls are widely recognized as one of the most important sources of voluntary information for investors. Evidence shows that firms use these calls to discuss and clarify reported earnings news and that investors react to such information (Hollander et al., 2010; Matsumoto et al., 2011). More importantly, in contrast to the "static" and scripted nature of formal documents and filings, such as annual reports, press releases and news articles, the information environment of a conference call is "dynamic" and less structured (Blau et al., 2015). Therefore, conference calls provide greater opportunity to managers to let their personal communication style emerge more spontaneously, and, therefore, represent an ideal laboratory for our research question.

Conference calls are divided into two sessions: the *management discussion* session (hereafter, MD) and the *question and answer* session (hereafter, QA). During the MD, managers present the firm's quarterly results following a previously prepared scripted presentation. In the QA, on the other hand, financial analysts can intervene to ask questions and request clarifications. Therefore, while the scripted nature of the MD allows managers to set the tone of their speech, the extemporaneity of the QA challenges their ability to maintain the same degree of control over the content and language of the disclosure.

Our findings show that female managers are on average more positive yet less vague than their male colleagues during both sessions of the call. This result holds true after controlling for several firm and manager specific characteristics and correcting for the possible endogeneity of the appointment of a female executive. Interestingly, we do not find evidence that the sentiment of female managers is associated with better future firm performance, therefore this cannot be an explanation for the documented linguistic differences between male and female executives. Instead, we conjecture that the different communication styles of male and female executives are a possible consequence of the pressure on female executives to assert their leadership.

Next, we study how market participants react to the sentiment of the calls and the manager's gender. We capture market reaction in two ways. Firstly, we analyse the sentiment of the financial analysts' interventions in the QA and, secondly, we measure the cumulative abnormal returns (CAR)

from the day of the conference call to the day immediately after. We find that both are positively correlated with the tone of the call and negatively correlated with its vagueness. This suggests that market participants view the sentiment of the call as having some information value. However, we also find that financial analysts exhibit a *gender bias* in that they are less positive and more vague when interacting with a female manager. By contrast, the stock market reaction is unaffected by the gender of the executive holding the call.

Our paper makes several important contributions to the existing literature. First, our paper is the only one that uses conference calls to examine whether female and male executives use different linguistic styles to communicate corporate information to investors as the majority of previous papers have used annual reports. Nalikka (2009) shows that firms with female CFOs are associated with greater voluntary disclosures in annual reports, while Kim and Chung (2014) show that annual reports supervised by female CFOs tend to contain less complicated words and more detailed tables. However, formal written disclosures do not allow to isolate the effect of the executive's gender as they are usually drafted and edited by several individuals who may or may not be firm executives (Larcker and Zakolyukina, 2012). The only other paper to employ earnings conference calls and control for the impact of gender on the tone of the call is Davis et al. (2015), although they reach inconclusive results. The authors investigate the impact of manager-specific characteristics on the tone of calls by constructing firm-managers pairs but use a limited sample which consists of only 225 firms and 121 individual managers and stops in 2009. By contrast, our paper is the first one to employ an extensive sample that covers 4,978 firms and nearly 78,000 conference calls over a period of 15 years between 2004 and 2018, inclusive.

This paper is also the first to provide some insight on the interplay between company executives and financial analysts during the QA as a means of measuring whether and to what extent market participants respond to different managerial styles and gender differences, thereby opening new avenues for future research. Finally, the paper also contributes to the broader debate about whether investors in the stock market exhibit a gender bias (Huang and Kisgen, 2013; Niessen-Ruenzi and Ruenzi, 2019). We do not find any evidence supporting this but do show that the overall sentiment of the call contributes to explain the stock market reaction.

The rest of the paper is organised as follows: the next section describes our sample and empirical strategy. Sections 3 through 6 present the results of our analysis. Section 7 concludes.

2. Data and Methodology

2.1 Data and sample construction

We obtain the transcripts of quarterly earnings conference calls for US incorporated and listed companies between 2004 and 2018 from FactSet and Bloomberg where they are available in a machine-readable format. Each transcript is organised into two sessions: management discussion (MD) and questions and answers (QA). The MD consists of scripted presentations on the firm's current results and future prospects, presented by senior managers who are typically the CEO and/or CFO, although other executives may also be present. In all the transcripts the presentation of the MD starts with the name and the title of the company representative(s) delivering the speech. This helps us parse each MD and identify the talk of managers in each presentation to perform textual analysis.[2] More specifically, for each company speaker(s) of a given MD, we look at each section of the MD that starts with the same name and title. By combining all such texts, we measure the total speech of the executive(s) in the MD. We retain only those earnings conference calls in which the CEO and/or the CFO speaks. The QA, which follows the MD, consists of a dialogue between the financial analysts invited to participate in the call and the managers. Questions and answers are always marked with "Q" and "A", respectively. This enables us to distinguish between financial analysts and managers and analyse their interventions separately. We match the names of the CEOs and CFOs in the transcripts with Execucomp and BoardEx annual data to obtain their gender and full name or, if they are not mentioned in these sources, do so manually. Observations with missing or unmatched CEO and CFO names are excluded from the final sample. In order to obtain meaningful measures of tone, we require that each executive's intervention in the MD and all managers' answers in the QA consist of at least 200 words, and that analysts' questions are at least 50 words long (Larcker and Zakolyukina, 2012). We exclude all observations that do not satisfy these requirements from the final sample. We then use the ticker symbol and company name indicated in each transcript to merge the transcript data with balance sheet data and information about returns obtained from Compustat and CRSP, respectively. Companies that cannot be merged by ticker symbol are merged manually and all observations with missing records on the Compustat and CRSP databases are excluded. Finally, we match the companies with the IBES database to retrieve analysts' past recommendations. The full and final sample consists of an unbalanced panel of 77,587 quarterly earnings conference calls held by 4,978 unique US listed firms between 2004 and 2018. Table 1 presents a summary description of the sample.

[Insert Table 1 here]

[2] We use Python and PdfMiner3k to parse the pdf files.

Panel A in Table 1 reports the percentage of conference calls in our sample that are held by CEOs or CFOs. Column 2 shows that only 10 per cent of the calls include at least one female executive. These 7,794 calls include 242 observations where both the CEO and CFO are female; 2,272 where only the CEO is female; and 5,280 where only the CFO is female. The figures from Columns 6 and 9 show that CEOs are in charge of conference calls more often than CFOs, although about 74 per cent of calls are held jointly by the CEO and CFO.

Panel B shows the distribution of female and male executives by industry and it is apparent that this is not uniform. The percentage of female executives is higher in the retail and wholesale sectors. By contrast, there are no female executives in agriculture, forestry and fishing and relatively few in mining and construction. Finally, Panel C suggests that the percentage of female executives has experienced a slight increase over time. Column 2 indicates that the percentage of conference calls held by female managers increased by 5 percentage points between 2004 and 2018, while Columns 5 and 8 suggest that this increase was mainly driven by the number of female CFOs, which has grown more than the number of female CEOs.[3]

2.2 Methodology and sentiment measures

Our measures of sentiment are tone and vagueness computed based on positive, negative or uncertain words in the financial wordlist compiled by Loughran and McDonald (2011).[4] This list includes 2,337 negative words, such as *anomaly*, *deterioration*, *weakly* and *serious*; 353 positive words, such as *achieve*, *attain*, *excellent*, *improve* and *profitable*, and 285 words denoting uncertainty, such as *approximate*, *contingency*, *indefinite*, *nearly*, *presume* and *variability*.

Following the literature, e.g. Davis et al. (2015), tone is defined as the difference between positive and negative words scaled by the length of the speech, i.e. the total number of words spoken:

$$K\ TONE = \frac{\#\ of\ positive\ words - \#\ of\ negative\ words}{\#\ of\ words}$$

where K = {MD; CEO; CFO; QA; FA}.

[3] A caveat is in order when interpreting these data as our panel is unbalanced and conference calls are not distributed evenly across the sample period. In particular, we have significantly less observations between 2011 and 2014 and in 2018.

[4] We chose the Loughran and McDonald word list because it refers specifically to financial disclosures, is richer and includes uncertain words. For this reason, we preferred it to Henry's word list (2006). However, untabulated analyses, available from the authors on request, show that results for the tone of conference calls are qualitatively similar when Henry's dictionary is used.

MD Tone combines the tone of the CEO and CFO and is computed as the difference between the sum of CEO and CFO positive words and the sum of CEO and CFO negative words scaled by the sum of the total number of CEO and CFO words in the MD. *CEO* (*CFO*) *Tone* is similarly defined as the difference between the positive and negative words spoken by the CEO (CFO) scaled by the total number of CEO (CFO) words in the MD. For the QA, the format of the transcript does not allow us to identify the name of the analyst asking the question or the name of the manager answering it. Therefore, our textual analysis can only construct an aggregate measure of tone and vagueness for all questions asked by the participating financial analysts and, similarly, for all the answers provided by the executives. Consequently, *FA Tone* measures the tone of financial analysts' questions as the difference between the total number of positive and negative words spoken divided by the total length of the analysts' interventions in the QA. Similarly, *QA Tone* measures the tone of all managers' answers as the difference between the total number of positive and negative words spoken divided by the total length of the managers' interventions.

Vagueness, which indicates a more ambiguous communication style, is calculated as the total number of uncertain words scaled by the total number of words (Dzieliński et al., 2019):

$$K\ Vagueness = \frac{\#\ of\ uncertain\ words}{\#\ of\ words}$$

where K = {MD; CEO; CFO; QA; FA}.

As for tone, *MD Vagueness* is a combined measure of the vagueness of both the CEO and CFO. It is obtained as the sum of uncertain words spoken by the CEO and CFO divided by the sum of the total number of CEO and CFO words in the MD. *CEO* (*CFO*) *Vagueness* is similarly defined as the uncertain words spoken by the CEO (CFO) scaled by the total number of CEO (CFO) words in the MD. For the QA, *FA vagueness* measures the vagueness of all financial analysts' questions and *QA vagueness* the vagueness of all the managers' answers.

The first question we want to address is whether the tone and vagueness of the two sessions of the earnings conference call are affected by the gender of the executive holding the call. To this end, we estimate the following pooled OLS regression model:

$$K\ Tone/Vagueness = \alpha + \beta\ Female_{(Man,\ CEO,\ CFO)} + \delta\ Manager\ Controls + \gamma\ Other\ Controls + Year,\ quarter\ and\ industry\ fixed\ effects + \varepsilon, \quad (1)$$

where K = {MD; CEO; CFO; QA}.

In Equation 1, the variable of interest is $Female_{(Man)}$ which is set equal to one if the CEO and/or CFO holding the call is a woman, and zero otherwise, i.e. neither is a woman. In order to identify a possible effect of the specific executive role, we provide two further specifications of Equation 1, using alternatively $Female_{(CEO)}$ and $Female_{(CFO)}$ as our main variables of interest. They are equal to one if the conference call is held by a female CEO or CFO, respectively, and zero otherwise. *Manager Controls* are a set of manager-specific characteristics that could affect the sentiment of their speech. One such characteristic is the manager's experience in holding conference calls. It can be argued that a more experienced executive is better able to control the sentiment of his/her language. Therefore, for each conference call we define $Experience_{(CEO)}$ and $Experience_{(CFO)}$ as the (log of the) number of previous conference calls in our sample held by the same CEO and CFO, respectively, while $Experience_{(Man)}$ is defined as the (log of the) sum of the experience of the CEO and CFO.

Managerial overconfidence captures the tendency of managers to overestimate their own skills. This may result in excessive optimism about their own and their firm's prospects (Malmendier and Tate, 2005) and may also affect how a manager communicates these prospects. Furthermore, while female executives also exhibit overconfidence (Croson and Gneezy, 2009), this trait is less pronounced than in male executives (Huang and Kisgen, 2013). We thus follow Campbell et al. (2011) and Ahmed and Duellman (2013) and use data on executives' stock option holdings from Execucomp to construct a stock option-based measure of overconfidence similar to that proposed by Malmendier and Tate (2005). Based on this measure, a manager is considered overconfident if he/she holds stock options that are more than 67 per cent in the money or, in other words, the stock price exceeds the exercise price by more than 67 per cent at least twice in our sample period. We thus define the variable *Holder67* as equal to one if the manager is overconfident, and zero otherwise.[5]

In a recent paper, Schoar and Zuo (2017) find that managers who entered the labour force during a period of recession tend to make more conservative corporate decisions. It is, therefore, possible that they are less positive and that this is reflected in their language (Davis et al., 2015). We, therefore, construct the variable *Recession* which is equal to one if the CEO and/or CFO began their career during a recession, and zero otherwise.[6] To calculate this, we follow Schoar and Zuo (2017) and assume that individuals typically enter the labour market at the age of 24. We use data on executives' date of birth from Execucomp and BoardEx to check whether the (calendar) year in which the manager

[5] As in Malmendier and Tate (2005), a manager is defined as overconfident from the first time he/she is recorded as holding stock options that are more than 67 per cent in the money and is assumed to remain overconfident throughout the remaining of our sample period.

[6] In our sample, there are only 1,527 observations, out of 63,441, in which both the CEO and CFO started their career during a recession.

turned 24 corresponded to a recession year, defined as including a trough in the business cycle or falling fully into a period of recession, according to the dating of economic cycles provided by the National Bureau of Economic Research (NBER).

Chen et al. (2018) find that a manager's and financial analysts' tone tend to become less optimistic as the day wears on. Therefore, we control for *CCtime*, defined as the log of the time of day at which each conference call took place. The proportion of women directors on a company's board could also potentially affect the language used by executives in corporate disclosures. A greater presence of women directors has been shown to be associated with stricter monitoring of executives (Adams and Ferreira, 2009; Lai et al., 2017) and also to higher dividend payments (Chen et al., 2017). To control for this, we use data on women directors from Bloomberg and BoardEx to construct the variable *WoB* which is equal to one if the proportion of women on the board corresponds to the top decile of the distribution - equivalent to a quarter of directors being women - and zero otherwise.[7] We also control for *FirmAge*, defined as the logarithm of the firm's age counted from the first year it appears in Compustat, and *MktCap*, defined as the logarithm of quarterly market capitalisation as a proxy of the firm's size.

The remaining controls are firm performance indicators which we would expect to impact the manager's sentiment in the conference call. As measures of current performance, we use the earnings surprise for the quarter (*SUE*); the (log of 1+ the) return on assets for the quarter (*ROA*); quarterly sales growth relative to the previous quarter (*Sales g.*); growth of quarterly earnings per share relative to the previous quarter (*EPS g.*); and a dummy *Dividend* which is equal to one if the firm pays dividends in the relevant financial year. To partially capture growth opportunities and expectations of future performance, we also include the logarithm of firm's quarterly Tobin's *q* (*TobinQ*); quarterly stock returns relative to the previous quarter (*Return*); the logarithm of the volatility of stock returns (*RetVol*) over the previous four quarters; and, lastly, *MeanRec*, defined as the average recommendation of all the analysts following the firm in the three months prior to the call. Data on analysts' recommendations are collected from IBES. Recommendations range from 1 to 5, with 1 being the highest possible score.

[7] The average US firm has between nine and ten directors. Therefore, our chosen threshold is equivalent to requiring boards to have more than two female directors on average. As neither BoardEx nor Bloomberg allows to distinguish between executive and non-executive directors, this reassures us that we are not double counting female executives when they are the only female directors sitting on the board. Our modelling choice is also consistent with the evidence suggesting that for a diverse board to have an impact a critical mass of at least 30% or 3 female directors has to be reached (Torchia et al., 2011; Joecks et al., 2012). Results remain robust if we define WoB as the percentage of female directors and are available from the authors upon request.

We also include quarter, year and industry fixed effects.[8] Definitions of all the variables used are provided in Appendix I.

3. Baseline Results

3.1 Summary statistics

Table 2 presents the summary statistics for all the variables used in our empirical analysis.

[Insert Tables 2 and 3 here]

From the statistics, we can see that managers use more positive words than negative words. This is true for both sessions of the call although, not surprisingly, the tone of the QA is less positive than that of the MD. The average tone decreases from 0.0171 in the MD to 0.0109 in the QA. The opposite occurs with vagueness, which increases slightly in the QA as compared to the MD (0.017 vs. 0.014). The data also show a significant difference in the tone used by CEOs and CFOs. CEOs are, on average, more optimistic than CFOs (0.024 vs. 0.007) and slightly less vague (0.012 vs. 0.016).[9]

Regarding the sentiment of financial analysts, it is immediately apparent that their tone is only marginally positive (0.002). By contrast, their questions are more vague than the managers' answers, with a vagueness of 0.026.

We also report the summary statistics for some of the managerial characteristics we use as controls. CEOs are, on average, more experienced at holding conference calls than CFOs and more likely to be overconfident. This is consistent with the evidence seen in Table 1 that CEOs participate in conference calls more often than CFOs which may contribute to explain the differences in language. The proportion of CEOs who entered the labour market during a recession period is also slightly higher than that of CFOs.

In Table 3, we report the differences in means of our sentiment variables between male and female executives. Results suggest a significantly more positive and less vague tone for both female

[8] We do not have enough changes of CEOs/CFOs in our sample, particularly from male to female and vice versa, to be able to include firm fixed effects in all the specifications of our regression model. However, firm fixed effects do not alter our results in our baseline regression. Results are omitted for the sake of brevity but available from the authors upon request.

[9] As it is typical in sentiment analysis, the number of net positive words (positive minus negative words) is small relatively to the length of the speech. This is due to the fact that only a small number of words in a transcript qualifies as positive, negative or uncertain based on the Loughran and McDonald (2011) wordlist. For instance, given the average length of the MD talk, which is equal to 2,193 words in our sample, the average *MD Tone*, which is equal to 0.0171, corresponds to 37 net positive words in the MD. This number decreases to less than 7 net positive words for the average *CFO Tone*. The same applies to the number of uncertain words which ranges from 22 in the QA to approximately 30 in the MD.

CEOs and CFOs in the MD as well as the QA session. Differences are substantially larger for CEOs. FA sentiment does not appear to be significantly different between male and female executives. Finally, Panel C shows that both female CEOs and CFOs in our sample have slightly less experience in holding earnings conference call. Interestingly, with regards to overconfidence there is no significant difference between male and female CEOs. However, a significant but quite small difference exists between male and female CFOs. This is in line with the evidence showing that observed differences in overconfidence between men and women in the lay population do not always extend to the managerial population (Croson and Gneezy, 2009; Adams and Funk, 2012).

3.2 Sentiment, vagueness and gender

We begin our empirical investigation by estimating the pooled OLS regression model described by Equation 1 to ascertain the impact of the executive gender on the tone and vagueness of the earnings conference calls. In the first set of results, presented in Table 4, the variable of interest is the dummy $Female_{(Man)}$. The first column reports the baseline results for the tone of the MD, showing that female executives use a more positive tone than their male colleagues. The effect is statistically significant at the 1 per cent level. As expected, the tone of the MD is also positively and significantly correlated with the firm's performance and, in line with previous findings, negatively correlated with the time at which the call takes place (Chen et al., 2018). Boards with a larger representation of women directors are generally associated with a significantly more positive tone. In Column 2, we extend the OLS regression to include more company and manager controls. This reduces the number of observations. However, the impact of gender on tone remains positive and statistically significant. The coefficient estimate also increases indicating that the tone of a female executive in the MD is on average 5.3 per cent more positive than the tone of a male executive. Interestingly, more experienced executives have a less positive tone. This is in line with recent evidence reported by Bochkay et al. (2019) that CEOs with longer tenure tend to be less optimistic in their disclosures because they are less uncertain about their managerial ability. A similar argument could also explain why "recession" executives adopt a more positive tone since they may feel a stronger need to prove their leadership skills.

Like experience, overconfidence, measured by *Holder67*, has a negative impact on the tone of the MD but is not statistically significant. In addition, the tone of the MD session becomes more positive if the firm has received better analysts' recommendations in the previous three months (that is, a lower *MeanRec.*) and less positive if the firm pays dividends. Results are consistent for the tone of the QA reported in Columns 5 and 6 of Table 4. Our female dummy remains positive and statistically

significant at the 1 per cent level with an economic significance of 8.2 per cent. We note that the negative impact of overconfidence becomes statistically significant for the QA.

Results for the vagueness of the MD are reported in Columns 3 and 4 of Table 4 and show that female executives are on average less vague than their male colleagues. The effect is statistically significant at the 1 per cent level while, in terms of its magnitude, our findings indicate that the language of the MD is 8 per cent less vague when the conference call is held by a female executive as opposite to a male executive. Female managers' preference for a less ambiguous talk is consistent with the evidence that female executives/directors tend to be more ethically sensitive and adopt more conservative accounting practices (Barua et al., 2010; Ho et al., 2015). Like for tone, we find that the sign of the coefficient estimate of *WoB* is consistent with that of the female dummy, confirming our previous finding that a greater presence of women directors has a significant impact on a company's communication style. As we would expect, a better company performance generally reduces the vagueness of the MD whereas overconfidence and experience increase it. The last two columns of Table 4 report the results for the vagueness of the QA and are in line with the previous ones. The female dummy is negatively correlated with the vagueness of the QA but, as expected, the magnitude of the effect is smaller than in the MD. The vagueness of the QA of a call held by a female executive is on average only 3 per cent less than for a call held by a male executive. Managers are more vague in the QA and the difference between male and female executives narrows. Experienced and overconfident managers are more vague while "recession" managers appear to be less vague.

[Insert Table 4 here]

In Tables 5 and 6, we estimate the same models as in Table 4, using $Female_{(CEO)}$ and $Female_{(CFO)}$ as the variables of interest, respectively. These tables highlight some very interesting differences in the gender effect between CEOs and CFOs. It is evident that the results in Table 4 are mostly driven by the difference between male and female CEOs. Indeed, the estimates reported in Table 5 show that female CEOs are significantly more positive and less vague than male CEOs in both sessions of the call. In term of magnitude of the effect, the estimates suggest that the tone of the MD of a conference call held by a female CEO is on average 12.6 per cent more positive than when it is held by a male CEO, while the vagueness is 16.5 per cent smaller. Results are similar for the QA. By contrast, the results of Table 6 indicate that there is barely any difference in the sentiment of male and female CFOs. Coefficient estimates are generally of the expected sign but much smaller than for CEOs and statistically significant only for the vagueness of the MD. This suggests a greater similarity

between the communication styles of male and female CFOs. One possible explanation for these results is that CFOs attend conference calls less frequently than CEOs, and, even when they do, they speak much less during the MD. Indeed, the average length of CEOs' interventions is 1,568 words while, for CFOs, it drops to 917 words. This could in turn be due to the specificity of their roles which consist in overseeing the firm's finance and accounting processes. Consequently, CFOs tend to mostly focus on communicating the company's performance metrics (Firk et al., 2019). The impact of the other controls is qualitatively similar to that in Table 5.

[Insert Tables 5 and 6 here]

The results so far suggest that female and male managers differ in the way they communicate with the former being significantly more optimistic and less ambiguous than the latter in both sessions of conference calls.[10] This difference manifests itself more strongly in the MD and for CEOs. Oakley (2000) observes that communication styles are important determinants of the ability to affirm one's authority in executive positions. In this respect, female executives tend be at a disadvantage compared to their male colleagues who are generally much more self-promoting. She further suggests that, as a result, female executives might need to adapt their linguistic style in order to overcome such a barrier. In line with her argument, we therefore conjecture that the distinctive linguistic style of female executives in conference calls we find might be a consequence of the pressure on female executives to convincingly assert their managerial authority in a male dominated environment. In the next section, we will perform further tests to explore possible alternative drivers of our findings.

4. Information Value or Different Styles?

The question that arises is whether the more positive and less vague tone of female executives in earnings calls reflects incremental information content or is instead due to a distinctive linguistic style that differentiates female and male executives. Our analysis so far already controls for several company and market-related factors which could impact the sentiment of the call; hence we would argue that the previous OLS results point towards the second explanation. In this section, we conduct additional tests to validate our interpretation.

4.1 Abnormal sentiment and gender

[10] Our results are robust if we remove the years 2008 through 2010. Therefore, our findings are not driven by the financial crisis. Results are omitted for the sake of brevity but are available from the author upon request.

The first test consists in verifying whether the *abnormal sentiment* of the call is affected by the manager's gender. *Abnormal sentiment* is defined as the sentiment conveyed by corporate disclosures that is not explained by economic news or other company fundamentals. This is a two-step approach commonly used in the literature to disentangle tone from firm's performance (Huang et al., 2014; Chen et al., 2018; Bochkay et al., 2019). The first step is to obtain abnormal tone, *AbTone*, and abnormal vagueness, *AbVagueness,* as the residuals from the estimation of the following equation:

$$K\ Tone/Vagueness = \alpha + \theta\ Controls + \varepsilon, \quad (1a)$$

where K = {MD; QA}.

For each sentiment variable and session of the call, we run two alternative specifications of regression 1a. In the first one, *Controls* include all the company controls used in Equation 1 while, in the second specification, we also add *Manager Controls* from Equation 1 to control for manager-specific characteristics. The results of these estimations are presented in Panel A of Table 7 and are consistent with our previous findings.

In the second step, *AbTone* and *AbVagueness*, obtained as residuals of these regression estimates, are used as dependent variables in the regression below:

$$AbTone/Vagueness_{(MD,QA)} = \alpha + \beta\ Female_{(Man)} + Year,\ quarter\ and\ industry\ fixed\ effects + \varepsilon, \quad (2)$$

The results of the regression estimates of Equation 2 are reported in Panel B of Table 7 and show that the gender of the executive contributes significantly to explaining the abnormal tone and abnormal vagueness of conference calls. The sign of the relationship is the same as found in our baseline regressions.

[Insert Table 7 here]

4.2 Gender, sentiment, and the firm's future performance

In this section, we investigate directly the link between gender, conference call sentiment and future firm performance and whether the more positive and less vague tone of female executives could potentially be due to the fact that female led firms do on average better than male led ones. The extensive research on the impact of female leadership on firm performance has so far reached mixed results (Adams and Ferreira, 2009; Lam et al., 2013; Flabbi et al., 2019).

We measure firm performance by using the next quarter return on assets (ROA_{+1}), and then estimate the following regression:[11]

$$ROA_{+1} = \alpha + \beta\, Female_{(Man)} + \delta\, Sentiment_{(MD,\ QA)} + \eta\, Manager\ Controls + \lambda\, Other\ Controls + Year,\ quarter\ and\ industry\ fixed\ effects + \varepsilon, \quad (3)$$

and also an augmented version of Equation 3 that includes the interaction of $Female_{(Man)}$ with $Sentiment_{(MD,\ QA)}$. The variables of interest are our female dummy, the relevant measures of sentiment, tone and vagueness of the MD and QA, and their interaction. The remaining control variables are the same as in Equation 1. [12]

The results, which are reported in Table 8 show that the tone of both the MD and QA is, as we would expect, positively associated with future performance, i.e. a more positive tone of the call anticipates better future performance. In contrast, the results are weaker for vagueness which, while it generally carries the expected negative coefficient, appears to be statistically significant only in the MD (Column 2). Turning to the effect of the female dummy, this is not statistically significant in the model specifications in Columns 1 to 4. In the model specifications in Columns 5 to 8, the interaction term is statistically significant for all measures of sentiment but positive for tone ($Inter_{(MD\ Tone,\ QA\ Tone)}$) and negative for vagueness ($Inter_{(MD\ Vag,\ QA\ Vag)}$), which suggests a moderating effect of the female dummy. The female dummy carries however the opposite sign of the interaction term and is not always statistically significant. Also, vagueness is never significant in any model specification that includes the interaction term. In order to shed more light on the direct impact of female executives on future performance we also calculate the significance of the marginal effects of the female dummy for the model specifications in Columns 5 to 8 at the sample mean of the sentiment measures. Untabulated results show that the marginal effect of the female dummy on future ROA is always negative but not statistically significant which is consistent with the results in Columns 1 to 4.

[Insert Table 8 here]

All the results together indicate that the tone of both sessions of conference calls is positively associated with future performance, while vagueness has a much weaker impact. Also, our findings suggest that female executives are not on average associated with better future performance than male

[11] Results are qualitatively similar if firm performance is measured using next quarter SUE.

[12] The contemporaneous performance variable *ROA* is dropped in Equation 3 because of the correlation with the sentiment variables.

executives. Consequently, the difference in sentiment between male and female executives cannot be attributed to female led firms performing on better than male led firms. This, in turn, provides further support to our conjecture that the observed differences reflect distinctive communication styles which could result from the need female executives feel to prove their leadership ability.

5. Market Reaction to Gender and the Sentiment of Earnings Calls

We capture market reaction to executive gender and linguistic differences by analysing the sentiment of financial analysts in the QA session and measuring cumulative abnormal returns on the day of the conference call and the one immediately after.

5.1 Financial analysts' sentiment

Recent studies have found that financial analysts' tone is informative about their underlying sentiment regarding the firm, and that investors respond to the linguistic signals conveyed through financial analysts' questions during earnings calls (Twedt and Rees, 2012; Brockman et al., 2015). In addition, Cohen et al. (2019) find that the tone of financial analysts can be indicative of some favourableness of the analyst towards the firm or its managers. In order to test whether financial analysts' sentiment is affected by female managers' participation in earnings calls and, more generally, by the sentiment of the call, we estimate the following regression:

$$FA\ Tone/Vagueness = \alpha + \beta\ Female_{(Man)} + \delta Sentiment_{(MD,\ QA)} + \gamma\ Manager\ Controls + \lambda\ Other\ Controls + Year, quarter\ and\ industry\ fixed\ effects + \varepsilon, \quad (4)$$

where our variables of interest are the dummy $Female_{(Man)}$ and $Sentiment_{(MD,\ QA),}$ that is, tone and vagueness. If financial analysts adjust their tone to account for the differences in language between male and female executives, we would expect the coefficient estimate of our female dummy to be negative for both tone and vagueness or, in other words, analysts should be less positive and less vague when a female executive holds the call. The *Controls* employed in regression 4 are the same as in Equation 1.[13]

The estimation results of Equation 4 are presented in Table 9.

[Insert Table 9 here]

[13] We only remove *MeanRec* because of a multicollinearity problem with our female dummy. In untabulated results, we find evidence that analysts' recommendations are generally significantly worse for female executives.

Our findings show that financial analysts respond to the sentiment of the MD. Specifically, Column 1 (Column 3) shows that a more positive (vague) MD presentation makes analysts significantly more positive (vague), although the results are only weakly significant in the case of vagueness. This indicates that financial analysts do believe that the sentiment of the disclosure is informative to some extent. What is more interesting is the analysts' reaction to the gender of the executive. Column 1 shows that the coefficient estimate of the female dummy is negative, as expected, and statistically significant at the 1 per cent level. The magnitude of the effect indicates that, in the presence of a female manager, analysts are on average 33 per cent less positive than when facing a male executive. This suggests an "over-reaction" to the differences in style between male and female executives which are in fact much smaller as documented in Section 3. Financial analysts, therefore, seem to exhibit a *gender bias* as they have a less friendly attitude towards female executives. As regards vagueness, the female dummy is not statistically significant in the last two columns of Table 9 which is consistent with vagueness generally having a weaker effect than tone.

In Columns 2 and 4 of Table 9, we explicitly account for the possible friendliness of participating analysts by constructing a measure of friendliness similar to those proposed by Cohen et al. (2019), based on the frequency of their participation as well as the length of their intervention in conference calls. We are able to do this only for a subsample of approximately 23,500 conference calls for which we can identify the analysts who speak in the QA. Our friendliness measure, *FriendlyFA*, indicates the number of friendly analysts taking part in a call. An analyst is considered *friendly* if he has participated in more than two of the four previous conference calls and his talk is in the upper quartile of the distribution of the average FA talk in our whole sample.[14] The inclusion of this new control does not alter the regression results. Columns 2 and 4 show that results are consistent with those of Columns 1 and 3, with a larger magnitude of the effect of the female dummy in the case of tone while the coefficient estimate of vagueness remains insignificant. Friendly analysts appear to be less positive and more vague. This is in contrast with what Cohen et al. (2019) document, but in line with evidence presented by Brown et al. (2015) who show that analysts prefer private communication with the CEO and/or CFO and refrain from asking questions during public earnings conference calls. Finally, as we would expect, analysts are more positive and less vague the better the firm performance.

5.2 Cumulative abnormal returns

[14] The results remain unchanged if friendliness is defined only in terms of the analyst's participation.

Existing research also shows that the stock market perceives earnings conference calls as informative disclosure events and that the sentiment that managers convey through their interventions significantly impacts market reaction to the call (among the others, Price et al., 2012). However, studies looking at whether the stock market is gender-biased against women have not reached a unanimous conclusion (Lee and James, 2007; Martin et al., 2009; Gregory et al., 2013; Huang and Kisgen, 2013; Niessen-Ruenzi and Ruenzi, 2019). To assess whether and to what extent investors react to the tone of a conference call and, most importantly, whether their reaction is also affected by the executive's gender, we estimate the following (pooled) OLS model:

$$CAR(0,1) = \alpha + \beta\, Female_{(Man)} + \delta\, Sentiment_{(MD,\,QA)} + \gamma\, Manager\ Controls + \lambda\, Other\ controls + Year,\ quarter\ and\ industry\ fixed\ effects + \varepsilon, \quad (5)$$

where our variables of interest are the dummy $Female_{(Man)}$ and $Sentiment_{(MD,\,QA),}$ that is, the tone and vagueness of the MD and QA session, respectively. *CAR(0,1)* is the cumulative abnormal returns calculated from the day of the event (day 0) to the day immediately after the earnings conference call (day +1). In addition to the same controls as in previous regressions, we now also include the tone and vagueness of financial analysts and also run a specification that controls for the institutional ownership of the firm. It could be argued that, because they are more sophisticated, institutional investors are better able to read and process the information conveyed during earnings conference calls. Our measure of institutional ownership, *InstOwn,* is defined as the number of shares owned by institutional investors, which we obtain from Thomson Reuters Institutional Holdings (13F), scaled by the total number of shares outstanding.

The estimation results of Equation 5 are presented in Table 10.

[Insert Table 10 here]

Our evidence shows that the market reaction is affected by the sentiment of the call. CAR increases with the tone and decreases with the vagueness of both sessions of the call, and the effect is statistically significant at the 1 per cent level. As expected, the magnitude of this effect is larger for tone than for vagueness. Specifically, a one standard deviation increase of the tone in the MD (QA) increases the standard deviation of CAR by 7.8 per cent (6.1 per cent) whereas the economic significance of vagueness ranges from -2.5 per cent (MD) to -1.5 per cent (QA). In line with Brockman et al. (2015), we find that the tone of financial analysts has a larger positive impact on the CAR than managerial tone in both the MD and QA.

Turning to the female dummy, results show that the CAR appears to be unaffected by the gender of the executive holding the call as our female dummy is never statistically significant. We believe this result provides further indirect evidence that female leadership is not associated to better firm performance, else we would expect the female dummy to have a positive and significant relationship with the CAR. The results are unchanged when we control for institutional ownership which is generally positively associated with the CAR.

We conclude that the stock market, unlike financial analysts, does not seem to discount the different communication styles of male and female executives or to exhibit a bias against female executives.

6. Controlling for Endogeneity

One concern in our analysis is that female executives are not randomly assigned to firms and, as shown in Panel B of Table 1, their representation is not uniform across sectors either. Female executives could for instance self-select in certain firms whose corporate culture and communication approach is aligned to their own. If this is the case, we would be facing an omitted variable problem due to some unobserved firm characteristics being related to both the firm's decision to hire female executives as well as the linguistic style of their conference calls. In this section we address the endogeneity problem in two ways. We first implement an instrumental variable approach employing two alternative instruments. Next, we perform a propensity score matching where conference calls held by female executives are matched with conference calls held by male executives but with otherwise no significant difference with respect to other firm and executive characteristics.

6.1 Instrumental variable approach

We design an instrumental variable (IV) approach using, in line with the existing literature, a *gender equality* (GE) index for US states as our instrumental variable which we label *GE Index*. We employ an updated version of the commonly used GE index first proposed and calibrated by Sugarman and Straus (1988), which covers data between 1977 and 1983. This updated version, calculated by Di Noia (2002), applies the original methodology but extends to the end of the 1990s, making it more appropriate for our sample period. The GE index measures gender equality based on several economic indicators (e.g. income equality between men and women), political indicators (e.g. women's representation in the state Senate) and legal indicators (e.g. discrimination laws).

It assigns a score out of 100 points to each of the 50 US states. The 1988 GE index ranked Oregon in top place, with a score of 59.9, and Mississippi at the bottom, with a score of 19.2, and the

median score was 42.3. The 2002 GE index, on the other hand, ranges from 33.6 (Alabama) to 73.10 (Washington) and has a median score of 62.8.[15] The conjecture is that the higher this index in a given state the more likely it is that a firm based there will appoint a female executive (Huang and Kisgen, 2013). While it seems plausible that the index is correlated with the appointment of a female executive, we argue it is unlikely that it directly affects any our dependent variables. We are, therefore, reasonably confident that it satisfies the exclusion restriction, although this cannot be formally proved.

Our IV approach, therefore, consists in estimating the following 2SLS model where, in the first stage, our female dummy is instrumented as follows:

$$Female_{(Man)} = \alpha + \beta_1\, GE\ Index + \delta\, Manager\ Controls + \gamma\, Other\ Controls + Year,\ quarter\ and\ industry\ fixed\ effects + \varepsilon, \quad (6)$$

The predicted value of the female dummy obtained from the above regression is then used in the second stage, which otherwise replicates the OLS regressions 1 and 3 to 5 estimated previously. Table 11 shows the estimation results when the dependent variables of the second stage are the sentiment of the MD and QA, respectively. Column 1 of Table 11 presents the outcome of the first stage estimation. The coefficient of the chosen instrument is statistically significant at the 1 per cent level, and the F is largely above the critical value of 10 normally required by the Stock-Yogo weak instrument test. Therefore, we are reassured that our instrument of choice satisfies the relevance condition.

The results of the second stage, reported in the remaining columns, are largely in line with those of the OLS regressions, thereby confirming that female executives are more positive and less vague than their male colleagues.

[Insert Table 11]

Table 12 presents the results of the IV estimation when the dependent variable is the future firm performance, that is, the next quarter ROA. We replicate here Equation 3 including a model specification with an interaction term between our sentiment variables ($Sentiment_{(MD,\ QA)}$) and the instrumented female dummy ($Female_{(Man)}$). The effect of sentiment variables is generally comparable to the OLS, in that tone remains positively associated to future performance and the coefficient

[15] As Di Noia (2002) discusses, the 2002 GE index shows a general improvement in gender equality across US states, leading to a much more homogenous picture as compared to the 1988 GE index. This is confirmed by the lower standard deviation, which drops from 8.2 in 1988 to 5.3 in 2002.

estimates strongly statistically significant across all model specifications. In contrast, the impact of vagueness is negative and statistically significant in Columns 2 and 4, but appears to be positive and significant only for the QA in the model specification of Column 8 with the interaction term which, however, is negative and statistically significant, indicating that the vagueness of female executives has a negative impact on future performance. In line with the OLS results, we do not find any evidence that female executives are associated on average to better future firm performance. In fact, the instrumented female dummy is negative and statistically significant across all model specifications. The interaction term is positive and significant only in Column 7 ($Inter_{(QA\ Tone)}$). In the model specifications with the interaction term, the test for the significance of the marginal effects of the (predicted) female dummy at the sample mean of the sentiment variables further confirms that the direct effect of female executives on future ROA is negative and statistically significant.[16] Our findings thus show that female executives do not on average lead to better future performance, hence, this cannot be an explanation for their linguistic style.

[Insert Table 12]

Finally, the results of the IV estimation for the FA sentiment, and the CAR are reported in Tables 13 and 14, respectively, and show no change with respect to the OLS.[17] The only notable difference is found when the dependent variable is *FA Vagueness* as the predicted female dummy becomes positive and statistically significant at 1 per cent level. The statistical significance disappears when controlling for friendly analysts but this could also be due to the reduced number of observations in this model specification. In conclusion, the IV results confirm the OLS results that financial analysts appear to be significantly less friendly towards female executives while, in contrast, gender does not seem to have any impact on stock market reaction.

[Insert Tables 13 and 14]

A possible concern with our IV approach could be that the instrument is not appropriate to capture state gender equality throughout our whole sample period due to the date when it is compiled.

[16] Results are not reported but are available from the authors upon request.

[17] In Table 12 through 14 for brevity we omit the first-stage estimation. However, untabulated results show that coefficient estimates and the F-statistic from the first-stage regression for these specifications of our regression model are qualitative similar to those presented in Table 11.

As a robustness test, in untabulated results, we therefore employ an alternative measure of state level gender equality as our instrument based on the number of times a given state has elected one or more female delegates to the House and/or Senate. We obtain the list of female delegates elected to each Congress by each state from the Office of the Historian, U.S. House of Representatives. Our conjecture, similar to Carter et al. (2016) is that the number of times female delegates are elected to the Congress in a given state is associated with the local supply of females qualified for executive roles. As such, firms headquartered in those states should be more likely to hire female executives. At the same time, we are confident the instrument is not directly related to our dependent variables.

A state is then defined gender friendly if it has elected at least one female delegate to the Congress for at least a four-year period (equivalent to two mandates) during our sample period, and zero otherwise. Results are qualitatively similar to the previous ones which reassures about the quality of the IV approach. [18]

6.2 Propensity score matching approach

To alleviate concerns due to the potential limitations of our IV approach, we also perform a propensity score matching procedure (Rosenbaum and Rubin, 1983) which corrects possible selection bias by pairing treated and untreated observations based on a set of observable characteristics.

Our matching procedure begins with a logit regression to estimate the probability, i.e. propensity score, of being in the treated group of conference calls held by a female manager as a function of observable characteristics. We next use a nearest neighbour approach to match female observations to male observations with the closest estimated propensity score. To ensure matched observations are as similar as possible we pair them based on all observable covariates.

Panel A in Table 15 reports the propensity score matching estimates from the logit regression which uses all the control variables and fixed effects that we also used in our baseline OLS regressions.[19] To validate our matching procedure and to verify that there is no significant difference in the observable characteristics of the matched pairs other than the treatment itself, in this Column 6

[18] In fact, as additional robustness, we also conduct our IV approach using a third gender equality index of US states compiled by Cowell-Meyers and Lengbein (2013) as an alternative instrument. These authors rank US states according to the number of women-friendly policies adopted between 1999 and 2004, which they cluster based on the date of their enactment. Ultimately, the score of each state is out of 11, with one point for each policy adopted. We use the log of this score as our alternative instrumental variable and find that the results, available from the authors upon request, are qualitatively unchanged.

[19] In order to estimate the ATE that having a female manager hold the call has on the future firm performance (ROA_{+1}) and on the market reaction to the call (*FA Tone*; *FA Vagueness*; *CAR(0,1)*), we run our matching algorithm several times to include each sentiment variable (*MD Tone*; *QA Tone*; *MD Vagueness*; and *QA Vagueness*) separately along with all the other control variables used in our baseline specification in Equations 1, and 3 to 5. For the sake of brevity, Panel A of Table 15 does not report the propensity score matching estimates from our matching procedure that also includes sentiment variables. However, the quality of our matching procedure is not affected by the inclusion of any sentiment variable.

of Panel A, we report the t-tests of the difference for all observable covariates between the treated and the matched untreated group. None of the differences are significant. As an additional test, we also perform again the logit regression on the matched sample. Results are reported in Column 2 of Panel A and show that none of the control variables is statistically significant.

We then calculate the average treatment effect (ATE) estimates for our outcome variables which we report in Panel B of Table 15. Results are consistent with the OLS and IV regression results. Specifically, the propensity score matching supports the hypothesis that female managers are on average more positive and less vague than male managers in earnings conference calls, and that such linguistic difference is not explained by the better future performance of female led firms.

The results also confirm financial analysts' gender bias against female executives whereas, as in the OLS and the IV estimations, the stock market does not respond to the executive's gender which, in turn, implies that it does not discount the different linguistic styles of male and female executives.

[Insert Table 15 here]

7. Conclusions

A growing literature has investigated whether gender differences affect corporate and financial decisions. Little is known however about whether gender differences influence the communication styles of voluntary corporate disclosures. This paper aims to fill this gap in the literature by using a unique sample of nearly 78,000 quarterly earning conference calls. We focus on firms' senior executives, that is, CEOs and CFOs, and examine whether female and male executives use different language when communicating corporate results during conference calls. Using tone and vagueness as measures of sentiment, we provide strong evidence that, *ceteris paribus*, female executives employ a more positive tone while being more direct and less ambiguous than male executives during both the management discussion and the question and answer sessions of conference calls. This result is robust to many alternative specifications of our baseline model, and remains qualitatively similar after controlling for the potential endogeneity of our variable of interest. We also show that the different communication styles between male and female executives are not due to female executives being associated with better future firm performance. Linguistic styles have been shown to matter in managerial roles to be able to exercise authority and achieve business goals. Female executives are generally considered to be at a disadvantage *vis à vis* their male colleagues in this respect (Oakley, 2000). It is therefore likely that the distinctive communication style we document in this paper reflects the need of female executives to adapt their language to be "viewed positively as effective leaders" (Baxter, 2010) in a male dominated workplace.

We next investigate if and how market participants respond to such linguistic differences. We look at the sentiment of financial analysts in the QA and at the CAR from the day of the conference call to the day immediately after the event. Ours is the first paper to study the interaction between financial analysts and managers in the QA portion of the call. Our findings show that financial analysts respond to the sentiment of the call and are more positive (vague) if the tone of the MD is more positive (vague). Similarly, the CAR is positively (negatively) correlated with tone (vagueness). This indicates that market participants view the sentiment of the call as carrying some information value.

More interestingly, we document that financial analysts exhibit a gender bias against female executives because their tone is significantly less positive and more vague when facing a female executive in the call. However, the gender of the executive does not affect the stock market reaction. This suggests that not only do stock market participants not have a gender bias, but also that they do not adjust their reaction to correct for the specific linguistic style of female executives.

Our paper is the first one to shed light on the interplay between financial analysts and executives during conference calls. Our limited data on the financial analysts' identity do not allow us however to analyse how the gender of all participants to the call, financial analysts and managers, contributes to shaping their interaction during the QA session, possibly influencing also the analysts' future recommendations. More generally, this paper represents a first step in exploiting the richness of conference calls to study gender differences among executives. Conference calls narratives can be further used to investigate the link between differences in sentiment and differences in information content between male and female executives. This could ultimately contribute to explain some of the documented differences in corporate decisions between male and female executives, such as for instance the level of greenness (Liu, 2018; Atif et al. 2020). We believe these issues represent promising avenues for future research

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Table 1. Sample description

This table reports the percentage of conference calls in our sample held by female and male CEOs/CFOs (Panel A), and their distribution by industry (Panel B) and year (Panel C). Column 1 reports the frequency of conference calls where neither the CEO nor the CFO is female. Column 2 reports the frequency of conference calls with at least one female executive (CEO and/or CFO). Column 4 (5) reports the frequency of conference calls held by a male (female) CEO. Column 7 (8) reports the frequency of conference calls held by a male (female) CFO. Figures in Column 3 indicate the total number of conference calls held by the CEO and/or the CFO. Figures in Column 6 and Column 9 indicate the total number of conference calls held by the CEO and the CFO, respectively.

	Calls with CEO or/and CFO			Calls with CEO			Calls with CFO		
	Male	Female	Tot.	Male	Female	Tot.	Male	Female	Tot.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: executive gender									
Per cent	89.95	10.05		96.49	3.51		91.26	8.74	
N	69,793	7,794	77,587	69,064	2,514	71,578	57,648	5,522	63,170
Panel B: distribution by industry									
Standard Industry Classification									
Agriculture, Forestry and Fishing	100(%)	0(%)	140	100(%)	0(%)	130	100(%)	0(%)	127
Mining	96.31	3.69	3,710	99.62	0.38	3,449	95.47	4.53	2,738
Construction	95.25	4.75	1,052	100.00	0.00	996	94.53	5.47	914
Manufacturing	90.14	9.86	30,334	96.74	3.26	28,001	91.42	8.58	24,777
Transportation, Communications, Electric, Gas and Sanitary service	88.93	11.07	7,380	95.15	4.85	6,615	91.72	8.28	6,293
Wholesale Trade	88.08	11.92	2,400	97.39	2.61	2,262	88.57	11.43	1,994
Retail Trade	82.01	17.99	5,130	91.75	8.25	4,654	85.31	14.69	4,267
Finance, Insurance and Real Estate	91.54	9.86	14,591	96.61	3.39	13,456	92.76	7.24	11,364
Services	89.39	10.61	12,662	96.88	3.12	11,829	90.39	9.61	10,535
Others	93.62	6.38	188	100.00	0.00	186	92.55	7.45	161
Panel C: distribution by year									
Fiscal Year									
2004	91.8(%)	8.2(%)	5,331	97.8(%)	2.2(%)	4,723	92.2(%)	7.8(%)	4,438
2005	91.58	8.42	6,963	97.36	2.64	6,210	92.26	7.74	5,751
2006	91.58	8.42	7,349	97.41	2.59	6,667	92.31	7.69	6,083
2007	91.18	8.82	7,179	97.09	2.91	6,565	92.39	7.61	5,995
2008	91.19	8.81	6,637	96.86	3.14	6,171	92.80	7.20	5,641
2009	90.72	9.28	6,358	96.50	3.50	5,936	92.65	7.35	5,466
2010	90.20	9.80	7,207	96.34	3.66	6,755	92.09	7.91	6,147
2011	91.58	8.42	2,600	96.91	3.09	2,269	92.93	7.07	2,220
2012	89.72	10.28	1,867	96.47	3.53	1,758	91.98	8.02	1,696
2013	88.68	11.32	2,358	96.50	3.50	2,231	90.51	9.49	2,107
2014	88.22	11.78	2,359	95.62	4.38	2,215	88.96	11.04	1,775
2015	88.50	11.50	5,668	95.91	4.09	5,325	88.99	11.01	4,124
2016	87.37	12.63	6,316	95.21	4.79	5,955	88.41	11.59	4,600
2017	87.16	12.84	5,848	95.13	4.87	5,486	88.44	11.56	4,335
2018	86.50	13.50	3,547	95.26	4.74	3,312	87.93	12.07	2,792

Table 2. Descriptive statistics

This table presents summary statistics for our sample of quarterly earnings conference calls held by US listed firms from 2004 to 2018. ^ marks variables subject to a log transformation when included in regressions. All variables are defined in Appendix I. Each continuous variable is winsorized at 1 and 99% to mitigate the impact of outliers.

	N	Mean	Median	Min	25%	75%	Max	Std. dev.
Tone measures								
MD Tone		0.0171	0.0170	-0.0242	0.0065	0.0276	0.0581	0.0161
MD Vagueness		0.0139	0.0127	0.0014	0.0088	0.0174	0.0500	0.0078
QA Tone		0.0109	0.0106	-0.0181	0.0031	0.0184	0.0418	0.0118
QA Vagueness		0.0170	0.0163	0.0038	0.0122	0.0210	0.0366	0.0066
FA Tone		0.0018	0.0017	-0.0312	-0.0067	0.0102	0.0360	0.0130
FA Vagueness		0.0255	0.0250	0.0050	0.0195	0.0309	0.0511	0.0089
	77,587							
CEO Tone		0.0238	0.0240	-0.0313	0.0104	0.0374	0.0722	0.0202
CEO Vagueness		0.0121	0.0111	0.0000	0.0070	0.0161	0.0375	0.0074
	71,578							
CFO Tone		0.0073	0.0068	-0.0316	-0.0019	0.0165	0.0461	0.0148
CFO Vagueness		0.0156	0.0134	0.0000	0.0085	0.0198	0.0649	0.0110
	63,170							
Manager controls								
$Experience_{(Man)}$^	77,587	14.671	12	2	6	20	94	11.020
$Experience_{(CEO)}$^	71,578	7.649	6	1	3	11	43	6.544
$Experience_{(CFO)}$^	63,170	7.002	5	1	2	10	51	6.141
Holder67	51,059	0.304	NA	0	NA	NA	1	NA
$Holder67_{(CEO)}$	44,727	0.268	NA	0	NA	NA	1	NA
$Holder67_{(CFO)}$	39,598	0.177	NA	0	NA	NA	1	NA
Recession	63,441	0.306	NA	0	NA	NA	1	NA
$Recession_{(CEO)}$	56,991	0.206	NA	0	NA	NA	1	NA
$Recession_{(CFO)}$	46,155	0.185	NA	0	NA	NA	1	NA
Other variables								
WoB		0.054	NA	0	NA	NA	1	NA
CCtime^		13.804	14	8	10	16	22	3.956
SUE		0.229	0.106	-10.390	-0.315	0.604	12.221	2.379
EPS g.		-0.095	-0.056	-11.125	-0.548	0.269	11.778	2.345
ROA		0.014	0.017	-0.180	0.006	0.031	0.092	0.037
TobinQ		1.018	0.929	0.573	0.767	1.175	2.165	0.330
Returns		0.026	0.022	-0.474	-0.085	0.129	0.651	0.195
RetVol		-1.701	-1.727	-3.011	-2.106	-1.370	0.744	0.611
FirmAge^		21	18	3	10	29	55	13.861
MktCap		7.299	7.212	3.447	6.123	8.380	11.454	1.673
Dividends		0.506	NA	0	NA	NA	1	NA
CAR(0,1)		-0.001	-0.001	-0.214	-0.041	0.039	0.195	0.074
	77,587							
Sales g.	77,305	0.033	0.022	-0.456	-0.039	0.088	0.811	0.175
InstOwn	59,636	0.074	0.041	0	0.012	0.101	0.470	0.091
MeanRec	51,491	2.284	2.31	1	1.973	2.637	5	0.541
FriendlyFA	23,469	0.831	1	0	0	1	3	0.898

Table 3. Female and male manager differences

This table reports tests on the difference in means for some of our variables. Panel A reports differences in mean *CEO* (*CFO*) *Tone* and *CEO* (*CFO*) *Vagueness* between calls held by male CEOs (CFOs) (i.e., when the indicator variable $Female_{(CEO)/(CFO)}$ is set equal to zero) and calls held by female CEOs (CFOs) (i.e., when the indicator variable $Female_{(CEO)/(CFO)}$ is set equal to one). Panel B reports differences in mean *QA Tone* and *QA Vagueness*, and *FA Tone* and *FA Vagueness* between calls held by male executives and calls held by female executives. Panel C reports differences in mean CEO (CFO) experience and in the proportion of overconfident CEOs (CFOs) between conference calls held by male CEOs (CFOs) and conference calls held by female CEOs (CFOs). T-statistics are in parenthesis and z-statistics in brackets. ***, **, and * indicate 1%, 5%, and 10% significance respectively.

Variables	Female = 0	Female = 1	Difference
Panel A: MD sentiment			
CEO Tone	0.024	0.029	-0.005***
			(-12.22)
CEO Vagueness	0.012	0.010	0.002***
			(13.56)
N	69,064	2,514	
CFO Tone	0.007	0.008	-0.001**
			(-2.68)
CFO Vagueness	0.016	0.015	0.001***
			(6.70)
N	57,648	5,522	
Panel B: QA sentiment			
QA Tone	0.011	0.013	-0.002***
			(-13.70)
QA Vagueness	0.017	0.016	0.001***
			(13.83)
FA Tone	0.002	0.002	-0.000
			(-1.06)
FA Vagueness	0.026	0.026	0.000
			(0.03)
N	69,793	7,794	
Panel C: Manager characteristics			
$Experience_{(CEO)}$	7.675	6.946	0.729***
			(5.49)
N	69,064	2,514	
$Experience_{(CFO)}$	7.040	6.606	0.434***
			(5.02)
N			
$Holder67_{(CEO)}$	0.268	0.277	-0.009
			[-0.78]
N	43,178	1,549	
$Holder67_{(CFO)}$	0.179	0.158	0.021***
			[3.20]
N	36,017	3,581	

Table 4. Manager gendenr and the sentiment of earnings conference calls

The table reports the coefficients estimates from the OLS regression of manager sentiment in MD and QA sessions of earnings conference calls on the indicator *Female(Man)* and other control variables over the period between 2004 and 2018 described in Equation 1. The dependent variable is *MD Tone* in Columns 1 and 2, *MD Vagueness* in Columns 3 and 4, *QA Tone* in Columns 5 and 6, and *QA Vagueness* in Columns 7 and 8. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent Variable	Dependent variable							
	MD Tone		MD vagueness		QA Tone		QA vagueness	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female(Man)	0.0007***	0.0009***	-0.0009***	-0.0011***	0.0008***	0.0009***	-0.0005***	-0.0005***
	(3.73)	(3.33)	(-10.84)	(-8.26)	(6.26)	(4.45)	(-6.17)	(-4.08)
WoB	0.0015***	0.0016***	-0.0006***	-0.0003	0.0015***	0.0009***	-0.0004***	-0.0001
	(6.18)	(3.95)	(-5.14)	(-1.56)	(8.61)	(3.33)	(3.78)	(-0.49)
Experience(Man)	-0.0001	-0.0003**	0.0003***	0.0006***	0.0000	-0.0001	0.0001**	0.0003***
	(-1.26)	(-2.48)	(9.55)	(9.38)	(0.32)	(-0.74)	(2.30)	(5.71)
CCtime	-0.0007***	-0.0006*	0.0001	-0.0002	-0.0033***	-0.0032***	0.0008***	0.0008***
	(-2.86)	(-1.74)	(0.88)	(-1.08)	(-18.08)	(-12.54)	(7.98)	(5.56)
SUE	0.0006***	0.0006***	-0.0000***	-0.0001***	0.0002***	0.0002***	-0.0000	-0.0000
	(23.03)	(15.32)	(-2.96)	(-3.51)	(10.91)	(7.56)	(-0.03)	(-0.67)
EPS g.	0.0001***	0.0002***	-0.0000	0.0000	0.0000**	0.0001*	-0.0000	0.0000
	(6.23)	(4.25)	(-0.89)	(1.10)	(2.55)	(1.94)	(-0.01)	(1.29)
ROA	0.0189***	0.0225***	-0.0011	-0.0011	0.0106***	0.0095***	0.0012	0.0072***
	(11.02)	(5.28)	(-1.30)	(-0.52)	(8.41)	(3.18)	(1.59)	(3.72)
TobinQ	0.0025***	-0.0010***	0.0001	0.0013***	0.0011***	0.0006**	-0.0005***	-0.0002
	(12.65)	(-2.77)	(1.35)	(6.74)	(8.01)	(2.35)	(-5.88)	(-1.38)
Returns	0.0061***	0.0073***	-0.0011***	-0.0013***	0.0032***	0.0038***	-0.0001	0.0001
	(20.73)	(15.96)	(-7.46)	(-5.57)	(14.93)	(12.00)	(-1.09)	(0.78)
RetVol	-0.0002**	0.0005***	0.0005***	0.0001	-0.0003***	-0.0001	0.0001**	-0.0001*
	(-2.13)	(2.63)	(8.99)	(1.14)	(-3.39)	(-1.09)	(2.26)	(-1.65)
FirmAge	-0.0001	-0.0002	-0.0007***	-0.0005***	0.0001	-0.0000	-0.0002***	-0.0000
	(-1.05)	(-1.46)	(-17.58)	(-6.58)	(1.52)	(-0.16)	(-4.41)	(-0.26)
Holder67		-0.0003		0.0004***		-0.0007***		0.0005***
		(-1.61)		(3.59)		(-5.34)		(6.39)
Recession		0.0006***		-0.0001		0.0001		-0.0003***
		(3.68)		(-0.87)		(0.47)		(-3.56)
MeanRec		-0.0018***		-0.0002		-0.0008***		-0.0001*
		(-9.53)		(-1.59)		(-5.67)		(-1.79)
Sales g.		0.0045***		-0.0001		0.0023***		-0.0004*
		(8.37)		(-0.38)		(5.94)		(-1.92)
MktCap		0.0021***		-0.0007***		0.0004***		-0.0006***
		(28.13)		(-18.45)		(6.72)		(-20.35)
Dividend		-0.0018***		-0.0002*		-0.0002		0.0001
		(-8.33)		(-1.72)		(-1.62)		(0.61)
Intercept	0.0215***	0.0139***	0.0189***	0.0221***	0.0172***	0.0169***	0.0190***	0.0232***
	(14.36)	(5.49)	(29.09)	(23.31)	(17.15)	(11.29)	(30.92)	(26.39)
R-squared	0.12	0.16	0.07	0.09	0.14	0.14	0.10	0.11
N	77,587	34,316	77,587	34,316	77,587	34,316	77,587	34,316

Table 5. CEO gender and the sentiment of earnings conference calls

The table reports the coefficients estimates from the OLS regression of CEO sentiment in MD and QA sessions of earnings conference calls on the indicator *Female(CEO)* and other control variables over the period between 2004 and 2018 as described in Equation 1. The dependent variable is *CEO Tone* in columns 1 and 2, *CEO Vagueness* in Columns 3 and 4, *QA Tone* in columns 5 and 6, and *QA Vagueness* in columns 7 and 8. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent variable	Dependent variable							
	CEO Tone		CEO vagueness		QA Tone		QA vagueness	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female(CEO)	0.0030***	0.0031***	-0.0016***	-0.0020***	0.0016***	0.0018***	-0.0012***	-0.0017***
	(8.00)	(4.77)	(-11.84)	(-9.69)	(6.97)	(4.78)	(-9.46)	(-8.08)
WoB	0.0023***	0.0021***	-0.0007***	-0.0005***	0.0014***	0.0010***	-0.0003***	0.0002
	(7.15)	(3.74)	(-6.79)	(-2.67)	(7.81)	(3.22)	(-2.80)	(1.33)
Experience(CEO)	-0.0005***	-0.0011***	0.0002***	0.0004***	-0.0001	-0.0002**	0.0001***	0.0003***
	(-4.69)	(-6.84)	(5.83)	(6.39)	(-1.26)	(-2.08)	(4.21)	(6.56)
CCtime	0.0004	0.0001	0.0002	-0.0001	-0.0035***	-0.0034***	0.0008***	0.0007***
	(1.19)	(0.21)	(1.43)	(-0.52)	(-18.45)	(-12.86)	(7.47)	(4.37)
SUE	0.0005***	0.0006***	-0.0000***	-0.0000**	0.0002***	0.0002***	0.0000	-0.0000
	(16.02)	(11.60)	(-3.48)	(-2.46)	(10.32)	(7.51)	(0.28)	(-0.22)
EPS g.	0.0002***	0.0002***	-0.0000**	-0.0000	0.0000**	0.0000	-0.0000	0.0000
	(5.70)	(3.35)	(-2.37)	(-0.92)	(2.56)	(1.44)	(-0.34)	(0.71)
ROA	0.0238***	0.0120**	-0.0048***	0.0010	0.0108***	0.0108***	0.0005	0.0048**
	(11.37)	(2.07)	(-5.72)	(0.48)	(8.33)	(3.38)	(0.69)	(2.31)
TobinQ	0.0010***	-0.0023***	-0.0003***	0.0007***	0.0012***	0.0007**	-0.0005***	-0.0001
	(3.97)	(-4.59)	(-3.18)	(4.05)	(7.95)	(2.36)	(-5.49)	(-0.49)
Returns	0.0076***	0.0089***	-0.0009***	-0.0009***	0.0033***	0.0038***	-0.0001	0.0001
	(19.94)	(14.39)	(-6.35)	(-3.87)	(14.96)	(11.40)	(-1.15)	(0.35)
RetVol	-0.0000	0.0009***	0.0004***	-0.0000	-0.0003***	-0.0002	0.0001**	-0.0001
	(-0.01)	(3.45)	(8.02)	(-0.18)	(-4.09)	(-1.12)	(2.41)	(-0.92)
Firm Age	0.0003***	-0.0002	-0.0006***	-0.0003***	0.0001**	0.0000	-0.0002***	-0.0000
	(3.24)	(-1.15)	(-16.24)	(-3.54)	(2.27)	(0.29)	(-4.80)	(-0.61)
Holder67(CEO)		-0.0016***		0.0006***		-0.0006***		0.0004***
		(-6.03)		(6.32)		(-4.18)		(5.24)
Recession(CEO)		0.0009***		-0.0006***		0.0003**		-0.0004***
		(3.32)		(-6.10)		(2.30)		(-4.11)
MeanRec		-0.0013***		-0.0003***		-0.0006***		-0.0001
		(-5.05)		(-3.18)		(-4.36)		(-1.62)
Sales g.		0.0048***		-0.0002		0.0023***		-0.0003
		(6.70)		(-0.83)		(5.63)		(-1.40)
MktCap		0.0026***		-0.0007***		0.0004***		-0.0006***
		(24.94)		(-18.91)		(6.74)		(-17.92)
Dividend		-0.0031***		0.0003**		-0.0004**		-0.0001
		(-10.44)		(2.38)		(-2.24)		(-0.79)
Intercept	0.0252***	0.0179***	0.0180***	0.0207***	0.0175***	0.0169***	0.0190***	0.0233***
	(12.94)	(5.13)	(23.48)	(18.51)	(17.17)	(10.99)	(30.65)	(25.86)
R-squared	0.12	0.15	0.07	0.08	0.14	0.15	0.11	0.11
N	71,578	30,352	71,578	30,352	71,578	30,352	71,578	30,352

Table 6. CFO gender and the sentiment of earnings conference calls

The table reports coefficients estimates from the OLS regression of CFO sentiment in MD and QA sessions of earnings conference calls on the indicator *Female(CFO)* and other control variables over the period between 2004 and 2018 as described in Equation 1.The dependent variable is *CFO Tone* in Columns 1 and 2, *CFO Vagueness* in Columns 3 and 4, *QA Tone* in columns 5 and 6, and *QA Vagueness* in Columns 7 and 8. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent Variable	Dependent variable							
	CFO Tone		CFO Vagueness		QA Tone		QA Vagueness	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female(CFO)	-0.0000	0.0002	-0.0008***	-0.0004	0.0003	0.0002	-0.0001	-0.0000
	(-0.10)	(0.55)	(-5.55)	(-1.59)	(1.62)	(0.95)	(-0.81)	(-0.34)
WoB	0.0011***	0.0009**	0.0002	0.0005*	0.0015***	0.0004	-0.0003***	-0.0001
	(4.42)	(2.01)	(0.94)	(1.76)	(7.76)	(1.37)	(-3.41)	(-0.72)
Experience(CFO)	-0.0001	-0.0003***	0.0003***	0.0006***	-0.0000	-0.0000	0.0001***	0.0002***
	(-0.84)	(-2.60)	(5.39)	(6.53)	(-0.63)	(-0.33)	(3.18)	(3.58)
CCtime	-0.0023***	-0.0007*	0.0012***	0.0002	-0.0034***	-0.0031***	0.0010***	0.0011***
	(-9.16)	(-1.82)	(6.09)	(0.55)	(-17.33)	(-10.80)	(8.54)	(6.45)
SUE	0.0007***	0.0007***	-0.0000	-0.0001*	0.0002***	0.0002***	-0.0000	-0.0000
	(25.54)	(17.04)	(-1.14)	(-1.89)	(10.97)	(6.87)	(-0.40)	(-0.82)
EPS g.	0.0002***	0.0002***	-0.0000	0.0000	0.0000**	0.0000	0.0000	0.0000
	(6.26)	(4.32)	(-0.10)	(0.96)	(1.98)	(1.05)	(0.61)	(1.43)
ROA	0.0588***	0.0557***	-0.0027*	-0.0023	0.0099***	0.0099***	0.0018**	0.0081***
	(30.95)	(12.04)	(-1.78)	(-0.64)	(6.75)	(2.97)	(2.03)	(3.67)
TobinsQ	0.0038***	0.0002	0.0007***	0.0021***	0.0013***	0.0008***	-0.0005***	-0.0005***
	(18.98)	(0.63)	(4.37)	(6.58)	(8.35)	(2.72)	(-5.90)	(-2.65)
Return	0.0044***	0.0050***	-0.0012***	-0.0015***	0.0030***	0.0035***	-0.0001	0.0002
	(14.41)	(10.53)	(-4.74)	(-3.89)	(12.76)	(9.47)	(-0.81)	(0.92)
RetVol	-0.0013***	-0.0001	0.0005***	-0.0001	-0.0004***	-0.0002	0.0001*	-0.0002*
	(-11.97)	(-0.69)	(6.64)	(-0.96)	(-4.19)	(-1.21)	(1.91)	(-1.88)
FirmAge	0.0012***	0.0009***	-0.0009***	-0.0006***	0.0001	-0.0000	-0.0002***	-0.0001
	(14.26)	(5.39)	(-14.48)	(-5.16)	(1.41)	(-0.24)	(-5.38)	(-1.20)
Holder67(CFO)		-0.0004*		-0.0003		-0.0008***		0.0006***
		(-1.82)		(-1.40)		(-4.53)		(5.62)
Recession(CFO)		0.0000		0.0008***		-0.0005***		0.0001
		(0.05)		(4.51)		(-2.75)		(0.89)
MeanRec		-0.0019***		0.0004**		-0.0008***		-0.0001
		(-9.67)		(2.53)		(-5.52)		(-1.63)
Sales g.		0.0028***		0.0001		0.0023***		-0.0005*
		(4.85)		(0.23)		(5.20)		(-1.79)
MktCap		0.0021***		-0.0010***		0.0003***		-0.0006***
		(26.33)		(-15.56)		(5.48)		(-16.36)
Dividend		-0.0011***		-0.0011***		-0.0002		0.0000
		(-4.79)		(-6.20)		(-1.43)		(0.31)
Intercept	0.0090***	-0.0020	0.0165***	0.0242***	0.0183***	0.0181***	0.0183***	0.0224***
	(6.53)	(-0.99)	(17.90)	(17.78)	(17.77)	(11.65)	(28.90)	(23.64)
R-squared	0.11	0.15	0.05	0.07	0.14	0.14	0.11	0.11
N	63,170	25,756	63,170	25,756	63,170	25,756	63,170	25,756

Table 7. Manager gender and abnormal sentiment of earnings conference calls

The table reports in Panel A the coefficients estimates from the OLS regressions described in Equation 1a. The dependent variable is *MD Tone* in Columns 1 and 2, *MD Vagueness* in Columns 3 and 4, *QA Tone* in Columns 5 and 6, and *QA Vagueness* in Columns 7 and 8. Panel B reports the coefficient estimates from the OLS regression described in Equation 2. The dependent variable is $AbTone_{(MD)}$ in Columns 1 and 2, $AbVagueness_{(MD)}$ in Columns 3 and 4, $AbTone_{(QA)}$ in Columns 5 and 6, and $AbVagueness_{(QA)}$ in Columns 7 and 8. *Abnormal sentiment* variables are obtained as the residuals from the estimation of Equation 1a reported in Panel A. All independent variables are defined in Appendix I. All specifications in Panel B include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Panel A:	Regressions of manager tone and vagueness in the MD and QA on firm and manager controls							
Independent variable	Dependent variable							
	MD tone		MD vagueness		QA tone		QA vagueness	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
WoB	0.0017***	0.0021***	-0.0007***	-0.0007***	0.0019***	0.0020***	-0.0007***	-0.0007***
	(7.11)	(7.57)	(-6.74)	(-5.93)	(10.03)	(9.32)	(-7.10)	(-6.11)
CCtime	0.0050***	0.0025***	-0.0023***	-0.0017***	0.0037***	0.0032***	-0.0026***	-0.0018***
	(24.62)	(10.20)	(-22.30)	(-13.66)	(24.83)	(17.23)	(-30.29)	(-17.75)
SUE	0.0005***	0.0005***	-0.0000	-0.0000	0.0002***	0.0002***	0.0000***	0.0000*
	(20.62)	(16.58)	(-1.16)	(-0.92)	(8.47)	(7.04)	(2.88)	(1.88)
ROA	0.0107***	0.0328***	0.0050***	-0.0047***	0.0114***	0.0146***	0.0013*	-0.0011
	(6.14)	(9.93)	(5.85)	(-2.99)	(8.75)	(5.82)	(1.68)	(-0.71)
Return	0.0049***	0.0062***	-0.0007***	-0.0010***	0.0030***	0.0037***	-0.0000	0.0001
	(16.25)	(15.88)	(-4.98)	(-5.31)	(13.47)	(12.96)	(-0.27)	(0.74)
RetVol	0.0002	0.0002	0.0002***	0.0003***	-0.0004***	-0.0005***	-0.0002***	-0.0002***
	(1.45)	(1.26)	(3.03)	(4.18)	(-4.45)	(-5.11)	(-4.12)	(-2.88)
Sales g.	0.0041***	0.0043***	-0.0004**	-0.0003	0.0017***	0.0019***	0.0001	0.0001
	(12.56)	(9.90)	(-2.32)	(-1.26)	(6.84)	(5.74)	(0.60)	(0.51)
MktCap	0.0012***	0.0015***	-0.0005***	-0.0006***	0.0003***	0.0004***	-0.0004***	-0.0005***
	(27.72)	(26.52)	(-24.78)	(-23.64)	(9.05)	(8.67)	(-21.22)	(-22.38)
TobinQ	0.0038***	0.0034***	0.0003***	0.0009***	0.0026***	0.0032***	-0.0007***	-0.0010***
	(20.27)	(12.99)	(3.82)	(7.07)	(18.60)	(16.00)	(-8.64)	(-8.82)
Dividend	-0.0026***	-0.0028***	-0.0002***	-0.0003***	-0.0008***	-0.0007***	0.0004***	0.0004***
	(-19.18)	(-17.18)	(-3.30)	(-3.34)	(-7.61)	(-5.98)	(7.38)	(5.78)
EPS g.	0.0001***	0.0001***	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(4.49)	(4.69)	(-0.67)	(1.02)	(1.23)	(1.58)	(0.90)	(1.54)
FirmAge	0.0002**	0.0006***	-0.0006***	-0.0006***	0.0007***	0.0010***	-0.0003***	-0.0003***
	(2.01)	(5.17)	(-13.95)	(-11.28)	(11.80)	(12.10)	(-7.77)	(-5.91)
Holder67		-0.0011***		0.0005***		-0.0008***		0.0007***
		(-6.95)		(6.21)		(-6.72)		(11.04)
Recession		0.0004***		-0.0001		-0.0002*		-0.0001**
		(2.72)		(-1.04)		(-1.87)		(-2.23)
$Experience_{(Man)}$		-0.0002***		0.0004***		-0.0004***		-0.0001***
		(-2.74)		(12.25)		(-6.91)		(-2.68)
Intercept	-0.0078***	-0.0044***	0.0251***	0.0234***	-0.0062***	-0.0062***	0.0273***	0.0268***
	(-12.99)	(-5.61)	(83.66)	(62.64)	(-13.84)	(-10.67)	(108.55)	(84.13)
R-squared	0.06	0.07	0.03	0.04	0.03	0.04	0.03	0.03
N	77,305	51,000	77,305	51,000	77,305	51,000	77,305	51,000

Panel B:	Regressions of MD and QA abnormal sentiment on the female manager dummy							
Independent variable	Dependent variable							
	$AbTone_{(MD)}$		$AbVagueness_{(MD)}$		$AbTone_{(QA)}$		$AbVagueness_{(QA)}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Female_{(Man)}$	0.0005***	0.0008***	-0.0008***	-0.0010***	0.0008***	0.0007***	-0.0004***	-0.0004***
	(3.06)	(3.88)	(-10.10)	(-10.54)	(5.86)	(4.66)	(-5.43)	(-4.11)
Intercept	0.0058***	0.0052***	0.0030***	0.0022***	0.0008	0.0007	0.0031***	0.0024***
	(4.44)	(3.13)	(5.81)	(3.79)	(0.90)	(0.71)	(5.65)	(4.13)
R-squared	0.07	0.07	0.05	0.05	0.09	0.11	0.07	0.08
N	77,305	51,000	77,305	51,000	77,305	51,000	77,305	51,000

Table 8. Manager gender, sentiment of earnings conference calls, and future firm performance

The table reports the coefficients estimates from the OLS regression of future firm performance on four measures of conference call sentiment (*MD Tone*, *MD Vagueness*, *QA Tone*, *QA Vagueness*), the indicator $Female_{(Man)}$ and other control variables over the period between 2004 and 2018 as described in Equation 3. The dependent variable is ROA_{+1}, the (log of 1 + the) return on assets for the fiscal quarter following the conference call. In Columns 5 to 8 the variables $Inter_{(MD\ Tone)}$, $Inter_{(MD\ Vag)}$, $Inter_{(QA\ Tone)}$ and $Inter_{(QA\ Vag)}$ indicate the interaction of each sentiment variable with the female dummy. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent Variable	Dependent variable							
	ROA_{+1}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MD Tone	0.0855***				0.0790***			
	(11.05)				(9.86)			
MD Vagueness		-0.0416***				-0.0220		
		(-2.66)				(-1.38)		
QA Tone			0.1076***				0.1004***	
			(9.84)				(8.87)	
QA Vagueness				0.0168				0.0313
				(0.84)				(1.49)
$Female_{(Man)}$	-0.0001	-0.0001	-0.0002	-0.0001	-0.0014**	0.0032***	-0.0010	0.0023**
	(-0.32)	(-0.27)	(-0.40)	(-0.16)	(-2.08)	(3.80)	(-1.58)	(2.13)
$Inter_{(MD\ Tone)}$					0.0685***			
					(2.71)			
$Inter_{(MD\ Vag)}$						-0.2546***		
						(-4.17)		
$Inter_{(QA\ Tone)}$							0.0698**	
							(2.00)	
$Inter_{(QA\ Vag)}$								-0.1445**
								(-2.29)
WoB	0.0014***	0.0015***	0.0014***	0.0015***	0.0014***	0.0015***	0.0014***	0.0015***
	(3.04)	(3.26)	(2.96)	(3.33)	(3.04)	(3.28)	(2.94)	(3.32)
$Experience_{(Man)}$	0.0029***	0.0029***	0.0029***	0.0029***	0.0029***	0.0029***	0.0029***	0.0029***
	(17.93)	(17.95)	(17.88)	(17.89)	(17.90)	(17.92)	(17.87)	(17.88)
CCtime	-0.0111***	-0.0112***	-0.0108***	-0.0112***	-0.0111***	-0.0112***	-0.0108***	-0.0112***
	(-19.55)	(-19.67)	(-18.98)	(-19.68)	(-19.55)	(-19.68)	(-18.98)	(-19.67)
SUE	0.0019***	0.0020***	0.0020***	0.0020***	0.0019***	0.0020***	0.0020***	0.0020***
	(35.13)	(36.10)	(35.67)	(36.11)	(35.12)	(36.12)	(35.68)	(36.11)
EPS g.	-0.0001**	-0.0001*	-0.0001*	-0.0001*	-0.0001**	-0.0001*	-0.0001*	-0.0001*
	(-2.04)	(-1.79)	(-1.88)	(-1.78)	(-2.04)	(-1.81)	(-1.87)	(-1.76)
TobinQ	0.0177***	0.0180***	0.0178***	0.0180***	0.0177***	0.0180	0.0178***	0.0180***
	(26.66)	(27.13)	(26.86)	(27.11)	(26.58)	(27.13)***	(26.85)	(27.10)
Returns	0.0104***	0.0109***	0.0106***	0.0110***	0.0104***	0.0109	0.0106***	0.0110***
	(12.15)	(12.73)	(12.39)	(12.80)	(12.15)	(12.72)***	(12.39)	(12.80)
RetVol	-0.0143***	-0.0143***	-0.0143***	-0.0143***	-0.0143***	-0.0143***	-0.0143***	-0.0143***
	(-45.81)	(-45.77)	(-45.79)	(-45.84)	(-45.81)	(-45.78)	(-45.78)	(-45.83)
FirmAge	0.0067***	0.0066***	0.0066***	0.0067***	0.0067***	0.0066***	0.0066***	0.0067***
	(32.99)	(32.75)	(32.92)	(32.98)	(32.97)	(32.75)	(32.91)	(32.97)
Intercept	-0.0100***	-0.0074**	-0.0100***	-0.0085**	-0.0098***	-0.0076**	-0.0099***	-0.0087**
	(-2.75)	(-2.03)	(-2.76)	(-2.33)	(-2.69)	(-2.10)	(-2.73)	(-2.39)
R-squared	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
N	77,587	77,587	77,587	77,587	77,587	77,587	77,587	77,587

Table 9. FA sentiment during earnings conference calls

The table reports the coefficients estimates from the OLS regression of the sentiment of financial analysts, the indicator *Female(Man)* and other control variables over the period between 2004 and 2018 as described in Equation 4. The dependent variable is *FA Tone* in Columns 1 and 2, and *FA vagueness* in Columns 3 and 4. Independent variables include *MD Tone* in Columns 1 and 2, *MD Vagueness* in Columns 3 and 4, and a measure of financial analyst friendliness (*FriendlyFA*) in Columns 3 and 5. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent variable	Dependent variable			
	FA Tone		FA Vagueness	
	(1)	(2)	(3)	(4)
Female(Man)	-0.0006***	-0.0013***	0.0001	-0.0002
	(-3.90)	(-5.11)	(0.72)	(-1.36)
MD Tone	0.1249***	0.1259***		
	(43.39)	(21.71)		
MD Vagueness			0.0080*	0.0174*
			(1.92)	(1.85)
FriendlyFA		-0.0014***		0.0006***
		(-14.84)		(9.45)
WoB	-0.0004***	-0.0009***	0.0001	0.0004*
	(-2.07)	(-3.24)	(0.80)	(1.95)
Experience(Man)	-0.0001	0.0004***	0.0002***	0.0001*
	(-1.32)	(2.99)	(4.77)	(1.68)
CCtime	-0.0045***	-0.0067***	-0.0003*	-0.0008**
	(-22.90)	(-14.01)	(-1.76)	(-2.50)
SUE	0.0002***	0.0001***	-0.0000	-0.0000**
	(9.72)	(3.81)	(-1.32)	(-2.01)
EPS g.	0.0001***	0.0000	-0.0000	-0.0000*
	(2.64)	(0.37)	(-0.29)	(-1.95)
ROA	0.0131***	0.0086***	0.0030***	0.0050**
	(8.62)	(3.22)	(2.67)	(2.56)
TobinQ	-0.0007***	-0.0002	0.0015***	0.0013***
	(-4.43)	(-0.77)	(12.68)	(6.45)
Returns	0.0042***	0.0037***	-0.0008***	-0.0003
	(17.69)	(7.16)	(-4.67)	(-0.78)
RetVol	0.0002*	-0.0005***	-0.0005***	-0.0004***
	(1.89)	(-3.01)	(-7.14)	(-3.49)
FirmAge	-0.0001	0.0006***	0.0001***	-0.0001
	(-1.22)	(4.98)	(2.58)	(-0.79)
Intercept	0.0052***	0.0142***	0.0253***	0.0250***
	(3.94)	(5.75)	(29.05)	(16.24)
R-squared	0.16	0.12	0.04	0.03
N	77,587	23,469	77,587	23,469

Table 10. Market reaction to earnings conference calls

The table reports the coefficients estimates from the OLS regression of cumulative abnormal returns (*CAR(0,1)*) on the day immediately after the conference call on four measures of conference call sentiment (*MD Tone*, *MD Vagueness*, *QA Tone*, *QA Vagueness*), the indicator *Female(Man)* and other control variables over the period between 2004 and 2018 as described in Equation 5. The dependent variable is *CAR(0,1)* in Columns 1 to 8. *FA Tone* and *FA Vagueness* are included as control in Columns 1 to and 5 to 8, respectively. Specifications in even columns include the variable *InstOwn* as a control. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent variable	Dependent variable							
	CAR(0,1)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female(Man)	0.0002	0.0005	0.0001	0.0004	-0.0002	-0.0004	-0.0000	-0.0002
	(0.25)	(0.51)	(0.14)	(0.40)	(-0.19)	(-0.39)	(-0.05)	(-0.21)
MD Tone	0.3580***	0.3722***						
	(20.61)	(18.83)						
QA Tone			0.3851***	0.3891***				
			(15.43)	(13.82)				
MD Vagueness					-0.2384***	-0.2591***		
					(-6.90)	(-6.64)		
QA Vagueness							-0.1749***	-0.1674***
							(-4.17)	(-3.54)
FA Tone	0.8703***	0.8673***	0.8417***	0.8421***				
	(39.66)	(34.98)	(37.31)	(33.07)				
FA Vagueness					-0.0166	-0.0180	-0.0102	-0.0127
					(-0.55)	(-0.54)	(-0.34)	(-0.38)
InstOwn		0.0083**		0.0050		0.0084**		0.0074**
		(2.29)		(1.37)		(2.28)		(2.02)
WoB	-0.0008	-0.0010	-0.0008	-0.0011	-0.0005	-0.0007	-0.0005	-0.0006
	(-0.70)	(-0.94)	(-0.76)	(-1.01)	(-0.50)	(-0.59)	(-0.43)	(-0.51)
Experience(Man)	0.0012***	0.0011***	0.0011***	0.0010***	0.0011***	0.0011***	0.0011***	0.0010***
	(3.55)	(2.91)	(3.42)	(2.70)	(3.44)	(2.85)	(3.22)	(2.58)
CCtime	0.0071***	0.0071***	0.0080***	0.0081***	0.0029**	0.0028**	0.0030**	0.0029**
	(5.82)	(5.07)	(6.51)	(5.72)	(2.32)	(1.98)	(2.42)	(2.05)
SUE	0.0019***	0.0020***	0.0020***	0.0021***	0.0023***	0.0024***	0.0023***	0.0024***
	(14.75)	(13.55)	(15.82)	(14.51)	(17.77)	(16.28)	(17.83)	(16.35)
EPS g.	0.0003**	0.0002*	0.0003**	0.0003**	0.0004***	0.0004**	0.0004***	0.0004***
	(2.15)	(1.80)	(2.45)	(2.20)	(3.00)	(2.57)	(3.02)	(2.59)
ROA	0.1377***	0.1228***	0.1409***	0.1266***	0.1578***	0.1424***	0.1582***	0.1433***
	(14.52)	(11.04)	(14.84)	(11.38)	(16.51)	(12.67)	(16.56)	(12.75)
TobinQ	-0.0029***	-0.0027**	-0.0025**	-0.0023*	-0.0023**	-0.0024**	-0.0024**	-0.0026**
	(-2.83)	(-2.21)	(-2.40)	(-1.90)	(-2.22)	(-1.96)	(-2.34)	(-2.15)
Returns	-0.0076***	-0.0086***	-0.0064***	-0.0075***	-0.0013	-0.0020	-0.0010	-0.0017
	(-4.54)	(-4.44)	(-3.87)	(-3.87)	(-0.76)	(-1.01)	(-0.61)	(-0.86)
RetVol	0.0014***	0.0022***	0.0014***	0.0022***	0.0016***	0.0023***	0.0015***	0.0022***
	(2.66)	(3.63)	(2.70)	(3.61)	(2.89)	(3.79)	(2.72)	(3.63)
FirmAge	0.0003	0.0008*	0.0002	0.0006	-0.0000	0.0005	0.0001	0.0006
	(0.68)	(1.70)	(0.50)	(1.35)	(-0.02)	(1.04)	(0.33)	(1.34)
Intercept	-0.0184***	-0.0397***	-0.0171**	-0.0348***	0.0012	-0.0176	-0.0002	-0.0189
	(-2.62)	(-3.30)	(-2.44)	(-2.84)	(0.16)	(-1.41)	(-0.03)	(-1.51)
R-squared	0.06	0.06	0.05	0.06	0.03	0.03	0.03	0.03
N	77,587	59,636	77,587	59,636	77,587	59,636	77,587	59,636

Table 11. Manager gender and the sentiment of earnings conference calls: an instrumental variable approach

This table presents the two-stage least squares regression results described in Equation 6. Column 1 reports the results from the first-stage of an instrumental variables regression (IV) with a state-level gender equality index (*GE Index*) as an instrument for the indicator variable *Female*$_{(Man)}$. F-statistic from the first-stage regression is reported at the bottom of the table. Columns 2 to 5 report the results of the IV estimation. The dependent variable is *MD Tone* in Column 2, *MD Vagueness* in Column 3, *QA Tone* in Column 4, and *QA Vagueness* in Column 5. In Columns 2 to 5, *InstrFemale* is the fitted value of female indicator from the first-stage regression. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent variable	Dependent variable				
	Female	MD Tone	MD Vagueness	QA Tone	QA Vagueness
	(1)	(2)	(3)	(4)	(5)
GE Index	0.0025***				
	(11.96)				
InstrFemale		0.0331***	-0.0116***	0.0223***	-0.0126***
		(6.59)	(-5.00)	(6.41)	(-6.39)
WoB	0.1088***	-0.0021***	0.0006**	-0.0009*	0.0010***
	(22.73)	(-3.27)	(2.19)	(-1.91)	(3.96)
Experience$_{(Man)}$	0.0037***	-0.0002**	0.0004***	-0.0001	0.0001***
	(2.71)	(-2.51)	(9.63)	(-1.11)	(3.31)
CCtime	-0.0095*	-0.0007**	0.0001	-0.0032***	0.0008***
	(-1.93)	(-2.29)	(0.73)	(-15.58)	(6.86)
SUE	-0.0008*	0.0006***	-0.0000***	0.0002***	-0.0000
	(-1.82)	(20.37)	(-3.39)	(10.22)	(-0.88)
EPS g.	0.0000	0.0001***	-0.0000	0.0000**	-0.0000
	(0.02)	(5.24)	(-0.81)	(2.24)	(-0.01)
ROA	0.0370	0.0183***	-0.0009	0.0102***	0.0014*
	(1.10)	(8.70)	(-0.97)	(6.90)	(1.65)
TobinQ	0.0032	0.0023***	0.0002*	0.0010***	-0.0004***
	(0.84)	(9.98)	(1.70)	(6.23)	(-4.46)
Return	-0.0056	0.0063***	-0.0012***	0.0033***	-0.0002
	(-0.99)	(18.11)	(-7.27)	(13.46)	(-1.45)
RetVol	0.0013	-0.0003**	0.0005***	-0.0003***	0.0001**
	(0.61)	(-2.07)	(8.56)	(-3.20)	(2.25)
FirmAge	-0.0050***	0.0001	-0.0008***	0.0002***	-0.0002***
	(-3.06)	(0.82)	(-16.75)	(2.82)	(-5.23)
Intercept	-0.1366***	0.0289***	0.0160***	0.0246***	0.0145***
	(-4.07)	(17.53)	(22.82)	(21.93)	(21.62)
F-stat	28.49				
[p-value]	[0.000]				
N	77,587	77,587	77,587	77,587	77,587

Table 12. Manager gender, sentiment of earnings conference calls, and future firm performance: an instrumental variable approach

This table presents the two-stage least squares regression results described in Equation 6. Columns 1 to 8 report the results of the instrumental variable (IV) estimation. The dependent variable is ROA_{+1}, the (log of 1 + the) return on assets for the fiscal quarter following the conference call. In Columns 1 to 8, *InstrFemale* is the fitted value of female indicator from the first-stage regression with a state-level gender equality index (*GE Index*) as an instrument for the indicator variable $Female_{(Man)}$. In Columns 5 to 8 the variables $Inter_{(MD\ Tone)}$, $Inter_{(MD\ Vag)}$, $Inter_{(QA\ Tone)}$ and $Inter_{(QA\ Vag)}$ indicate the interaction of each sentiment variable with the instrumented female dummy. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent variable	Dependent variable							
	ROA_{+1}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MD Tone	0.1154***				0.0941***			
	(10.03)				(6.94)			
MD Vagueness		-0.1984***				0.0008		
		(-7.38)				(0.03)		
QA Tone			0.1794***				0.1068***	
			(10.28)				(5.68)	
QA Vagueness				-0.1027***				0.0715**
				(-3.36)				(2.04)
InstrFemale	-0.1165***	-0.1152***	-0.1167***	-0.1142***	-0.0625***	-0.0459***	-0.0707***	-0.0446***
	(-9.50)	(-9.38)	(-9.46)	(-9.36)	(-8.32)	(-6.66)	(-8.89)	(-5.95)
$Inter_{(MD\ Tone)}$					0.0568			
					(0.51)			
$Inter_{(MD\ Vag.)}$						-1.6787***		
						(-6.21)		
$Inter_{(QA\ Tone)}$							0.3890**	
							(2.53)	
$Inter_{(QA\ Vag.)}$								-1.2663***
								(-4.00)
WoB	0.0143***	0.0142***	0.0142***	0.0142***	0.0082***	0.0088***	0.0085***	0.0086***
	(8.87)	(8.86)	(8.81)	(8.87)	(8.52)	(9.20)	(8.82)	(8.88)
$Experience_{(Man)}$	0.0034***	0.0034***	0.0034***	0.0034***	0.0031***	0.0032***	0.0032***	0.0032***
	(14.52)	(14.75)	(14.46)	(14.61)	(19.05)	(19.33)	(19.09)	(19.12)
CCtime	-0.0112***	-0.0113***	-0.0107***	-0.0113***	-0.0112***	-0.0112***	-0.0108***	-0.0112***
	(-13.99)	(-14.16)	(-13.34)	(-14.13)	(-19.69)	(-19.69)	(-18.93)	(-19.74)
SUE	0.0018***	0.0019***	0.0019***	0.0019***	0.0019***	0.0019***	0.0019***	0.0019***
	(23.94)	(25.04)	(24.38)	(25.26)	(33.89)	(34.95)	(34.40)	(35.07)
EPS g.	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001**	-0.0001*	-0.0001*	-0.0001*
	(-1.47)	(-1.27)	(-1.34)	(-1.24)	(-2.14)	(-1.91)	(-1.96)	(-1.81)
TobinQ	0.0182***	0.0186***	0.0183***	0.0185***	0.0180***	0.0183***	0.0181***	0.0182***
	(22.38)	(22.88)	(22.47)	(22.85)	(26.97)	(27.57)	(27.18)	(27.43)
Return	0.0096***	0.0101***	0.0097***	0.0103***	0.0100***	0.0104***	0.0102***	0.0106***
	(8.88)	(9.41)	(9.02)	(9.65)	(11.63)	(12.13)	(11.80)	(12.35)
RetVol	-0.0142***	-0.0141***	-0.0141***	-0.0142***	-0.0142***	-0.0142***	-0.0142***	-0.0142***
	(-36.89)	(-36.86)	(-36.83)	(-37.23)	(-45.54)	(-45.31)	(-45.45)	(-45.54)
FirmAge	0.0060***	0.0059***	0.0060***	0.0060***	0.0064***	0.0062***	0.0063***	0.0063***
	(21.22)	(20.65)	(21.11)	(21.40)	(31.08)	(30.17)	(30.85)	(30.97)
Intercept	-0.0264***	-0.0200***	-0.0275***	-0.0216***	-0.0071*	-0.0044	-0.0069*	-0.0062*
	(-6.16)	(-4.64)	(-6.42)	(-5.03)	(-1.94)	(-1.20)	(-1.90)	(-1.67)
N	77,587	77,587	77,587	77,587	77,587	77,587	77,587	77,587

Table 13. FA sentiment during earnings conference calls: an instrumental variable approach

This table presents the two-stage least squares regression results described in Equation 6. Columns 1 to 4 report the results of the instrumental variable (IV) estimation. The dependent variable is *FA Tone* in Columns 1 and 2 and *FA Vagueness* in Columns 3 and 4. Both specifications in Columns 2 and 4 include the variable *FriendlyFA* as a control. In Columns 1 to 4, *InstrFemale* is the fitted value of female indicator from the first-stage regression with a state-level gender equality index (*GE Index*) as an instrument for the indicator variable $Female_{(Man)}$. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent variable	Dependent variable			
	FA Tone (1)	FA Tone (2)	FA Vagueness (3)	FA Vagueness (4)
InstrFemale	-0.0102***	-0.0339***	0.0089***	0.0071
	(-2.98)	(-3.52)	(3.44)	(1.21)
MD Tone	0.1274***	0.1279***		
	(41.40)	(17.16)		
MD Vagueness			0.0200***	0.0318**
			(3.57)	(2.11)
FriendlyFA		-0.0014***		0.0006***
		(-11.51)		(9.17)
WoB	0.0007	0.0022**	-0.0009***	-0.0003
	(1.54)	(2.19)	(-2.64)	(-0.50)
$Experience_{(Man)}$	-0.0000	0.0005***	0.0002***	0.0001
	(-0.62)	(3.06)	(3.58)	(1.24)
CCtime	-0.0045***	-0.0058***	-0.0002	-0.0011***
	(-22.30)	(-8.69)	(-1.63)	(-2.73)
SUE	0.0002***	0.0001*	-0.0000	-0.0000
	(8.95)	(1.73)	(-0.75)	(-1.39)
EPS g.	0.0001**	0.0000	-0.0000	-0.0000**
	(2.56)	(0.62)	(-0.27)	(-2.01)
ROA	0.0133***	0.0099***	0.0028**	0.0047**
	(8.54)	(3.06)	(2.45)	(2.35)
TobinQ	-0.0007***	-0.0004	0.0014***	0.0014***
	(-4.06)	(-0.93)	(11.73)	(6.35)
Return	0.0042***	0.0033***	-0.0007***	-0.0002
	(16.85)	(5.04)	(-4.11)	(-0.50)
RetVol	0.0002**	-0.0003	-0.0005***	-0.0005***
	(1.97)	(-1.24)	(-7.09)	(-3.65)
FirmAge	-0.0001*	0.0007***	0.0002***	-0.0001
	(-1.86)	(4.18)	(3.38)	(-0.84)
Intercept	0.0145***	0.0156***	0.0217***	0.0247***
	(10.49)	(5.57)	(23.49)	(16.05)
N	77,587	23,469	77,587	23,469

Table 14. Market reaction to earnings conference calls: an instrumental variable approach

This table presents the two-stage least squares regression results described in Equation 6. Columns 1 to 4 report the results of the IV estimation. The dependent variable is *CAR(0,1)* in Columns 1 to 4. Specifications in Columns 1 and 3 include the variable *FA Tone* as a control. Specifications in Columns 2 and 4 include the variable *FA Vagueness* as a control. Variables *MD Tone*, *MD Vagueness*, *QA Tone* and *QA Vagueness* are included as controls in specifications in columns 1, 2, 3, and 4, respectively. In Columns 1 to 4, *InstrFemale* is the fitted value of female indicator from the first-stage regression with a state-level gender equality index (*GE Index*) as an instrument for the indicator variable $Female_{(Man)}$. All independent variables are defined in Appendix I. All specifications include year, quarter and industry dummies. The t-statistics in parenthesis are computed using Huber-White standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Independent variable	Dependent variable: CAR(0,1)			
	(1)	(2)	(3)	(4)
InstrFemale	0.0136	0.0177	0.0169	0.0182
	(0.67)	(0.87)	(0.83)	(0.89)
MD Tone	0.3540***			
	(19.21)			
MD Vagueness		-0.2140***		
		(-4.81)		
QA Tone			0.3722***	
			(12.57)	
QA Vagueness				-0.1556***
				(-3.29)
FA Tone	0.8750***		0.8499***	
	(37.80)		(34.25)	
FA Vagueness		-0.0182		-0.0125
		(-0.61)		(-0.41)
WoB	-0.0022	-0.0025	-0.0026	-0.0025
	(-0.90)	(-1.00)	(-1.07)	(-0.99)
$Experience_{(Man)}$	0.0011***	0.0011***	0.0011***	0.0010***
	(3.30)	(3.09)	(3.14)	(2.92)
CCtime	0.0072***	0.0029**	0.0080***	0.0030**
	(5.84)	(2.33)	(6.51)	(2.42)
SUE	0.0019***	0.0023***	0.0020***	0.0023***
	(14.67)	(17.67)	(15.75)	(17.74)
EPS g.	0.0003**	0.0004***	0.0003**	0.0004***
	(2.15)	(2.99)	(2.44)	(3.01)
ROA	0.1375***	0.1575***	0.1406***	0.1579***
	(14.48)	(16.45)	(14.79)	(16.49)
TobinQ	-0.0030***	-0.0024**	-0.0025**	-0.0025**
	(-2.86)	(-2.28)	(-2.45)	(-2.39)
Return	-0.0075***	-0.0011	-0.0063***	-0.0009
	(-4.48)	(-0.68)	(-3.80)	(-0.55)
RetVol	0.0014***	0.0015***	0.0014***	0.0014***
	(2.63)	(2.82)	(2.66)	(2.67)
FirmAge	0.0003	0.0001	0.0003	0.0002
	(0.83)	(0.25)	(0.70)	(0.55)
Intercept	-0.0379***	-0.0079	-0.0363***	-0.0091
	(-5.12)	(-1.04)	(-4.93)	(-1.22)
N	77,587	77,587	77,587	77,587

Table 15. Propensity score matching estimates

This table presents the results of a propensity score matching procedure. In Panel A, we report the propensity score matching estimates (Column 1), the parameter estimates from the logit model on the matched sample (Column 2), the sample means of the treated and control samples before and after the match (Columns 3 to 5), and the t-statistics of the difference in means after the matching (Column 6). In Panel B, we report the average treatment effects (ATE) on conference call sentiment variables (*MD Tone*, *MD Vagueness*, *QA Tone*, *QA Vagueness*), future performance (ROA_{+1}), and market reaction (*FA Tone*, *FA Vagueness*, *CAR(0,1)*) where the treatment is defined as conference calls held by a female CEO and/or CFO (i.e., when the indicator variable $Female_{(Man)}$ is set equal to one). We report the z-statistics of the treatment effects in parentheses. *, **, *** denote significance at 10, 5, and 1% level, respectively.

Panel A:	Propensity score matching estimates					
	Dependent variable $Female_{(Man)}$		Treated sample mean	Control sample mean	Control sample mean	t-stat for difference
	Unmatched	Matched		Unmatched	Matched	Matched
	(1)	(2)	(3)	(4)	(5)	(6)
WoB	0.886***	0.008	0.118	0.048	0.117	0.22
	(21.88)	(0.16)				
$Experience_{(Man)}$	0.015	-0.006	2.099	2.064	2.111	-0.76
	(1.20)	(-0.35)				
CCtime	0.059	0.011	2.613	2.581	2.611	0.43
	(1.15)	(0.17)				
SUE	-0.013**	0.003	0.180	0.234	0.150	0.79
	(-2.59)	(0.44)				
EPS g.	-0.000	0.004	-0.097	-0.094	-0.113	0.42
	(-0.04)	(0.57)				
ROA	1.110***	0.348	0.015	0.014	0.015	0.66
	(3.06)	(0.73)				
TobinQ	0.152***	0.062	1.035	1.017	1.026	1.72
	(4.07)	(1.24)				
Returns	-0.126*	-0.006	0.024	0.026	0.021	0.67
	(-1.97)	(-0.07)				
RetVol	0.021	0.004	-1.730	-1.698	-1.732	0.23
	(0.98)	(0.16)				
FirmAge	-0.006	0.020	2.820	2.794	2.816	0.36
	(-0.34)	(0.86)				
Intercept	-69.375***	6.949				
	(-10.61)	(0.79)				
Pseudo R^2	0.04	0.00				
N	77,587	14,928				

Panel B:	Average treatment effects of having a female manager hold the conference call		
Outcome variables	Treatment	Control	ATE (z-stat)
MD Tone			0.0015***
			(6.51)
MD Vagueness			-0.0011***
			(-9.85)
QA Tone			0.0013***
			(7.49)
QA Vagueness			-0.0008***
			(-8.53)
ROA_{+1}			-0.0003
			(-0.69)
FA Tone			-0.0005**
			(-2.34)
FA Vagueness			0.0002*
			(1.75)
CAR(0,1)			-0.0005
			(-0.46)
N	7,794	7,134	

Appendix I

Variable definitions

Tone measures	
CEO Tone	Tone of the CEO during the MD defined as the difference of CEO positive words minus CEO negative words scaled by the CEO talk in the MD.
CFO Tone	Tone of the CFO during the MD measured as the difference of CFO positive words minus CFO negative words scaled by the CFO talk in the MD.
MD Tone	Tone of firm CEO and CFO during the MD defined as the difference of CEO and CFO positive words minus CEO and CFO negative words scaled by the CEO and CFO talks in the MD.
CEO Vagueness	Vagueness of the CEO during the MD defined as number of CEO vague words scaled by the CEO talk in the MD.
CFO Vagueness	Vagueness of the CFO during the MD defined as number of CFO vague words scaled by the CFO talk in the MD.
MD Vagueness	Vagueness of firm CEO and CFO during the MD defined as the sum of CEO and CFO vague words scaled by the CEO and CFO talks in the MD.
QA Tone	Tone of managers' answers during the QA session defined as the difference of manager positive words minus manager negative words scaled by manager talk in the QA.
QA Vagueness	Vagueness of managers' answers during the QA session defined as number of manager vague words scaled by manager talk in the QA.
FA Tone	Tone of financial analysts' questions during the QA defined as the difference of financial analyst positive words minus financial analyst negative words scaled by financial analyst talk in the QA.
FA Vagueness	Vagueness of financial analysts' questions during the QA defined as number of financial analyst vague words scaled by financial analyst talk in the QA.
Manger characteristics	
Female $_{(CEO)}$	Indicator variable which takes a value of one if the CEO holding the call is a female, and zero otherwise.
Female $_{(CFO)}$	Indicator variable which takes a value of one if the CFO holding the call is a female, and zero otherwise.
Female$_{(Man)}$	Indicator variable which takes a value of one if at least one of the executives holding the call (CEO, CFO) is female, and zero otherwise.
Experience$_{(CEO, CFO)}$	The log of (1+ the) number of conference calls in the sample held by the same CEO(CFO) at the date of any conference call.
Experience$_{(Man)}$	The log of (1+ the) sum of *Experience$_{(CEO)}$* and *Experience$_{(CFO)}$*.
Holder67	An indicator variable equal to one if the CEO and/or CFO holds stock options that are more than 67 per cent in the money at least twice in the sample period, and zero otherwise.
Recession	Dummy variable equal to one if the company's CEO and/or CFO started her/his career in a recession year, and zero otherwise.
Other variables	
CAR(0,1)	Cumulative abnormal returns from the day of the event (day 0) to the day immediately after the earnings conference call (day +1). Abnormal returns are defined in excess of CRSP value-weighted market return.
CCtime	Log of the time of day at which each conference call took place.
Dividends	Indicator variable equal to one if the firm pays dividends in the relevant financial year.
EPS g.	Growth of quarterly earnings per share relative to the previous quarter.
FirmAge	The log of the firm's age counted from the first year it appears in Compustat.
FriendlyFA	The number of friendly analysts taking part in a call. An analyst is considered to be friendly if he has participated in more than two of the four previous conference calls and his talk is in the upper quartile of the distribution of the average financial analysts talk in the whole sample.

InstOwn	The number of shares owned by institutional investors scaled by the number of common shares outstanding.
MeanRec.	The average recommendation of all the analysts following the firm in the three months prior to the call.
MktCap	The logarithm of firm's quarterly market capitalization.
Returns	Quarterly stock returns relative to the previous quarter.
RetVol	The log of the volatility of stock returns over the previous four quarters.
ROA	The log of (1 + the) quarterly return on assets defined as the ratio of earnings before interests and taxes (EBIT) to total assets.
Sales g.	Quarterly sales growth relative to the previous quarter.
SUE	Quarterly earnings surprise measured as change of quarterly net income relative to same quarter one-year-ahead net income scaled by the absolute value of same quarter one-year-ahead net income.
TobinQ	The log of (1 + the) ratio of the firm's market value to its book value. The market value is the book value of assets minus the book value of equity plus the market value of equity.
WoB	Indicator variable equal to one if at least 25 per cent of corporate board positions are held by female directors, and zero otherwise.