Gender and Earnings Conference Calls

Abstract

Using a large sample of quarterly earnings conference call transcripts, we investigate gender issues in interactions between two high-profile professions—sell-side analysts and public firm executives. We find that women are generally less "visible" on conference calls. Specifically, female analysts have fewer conference call participation opportunities. Conditional on participation, female analysts are allowed fewer opportunities to ask follow-up questions and speak less compared with male counterparts. Female analysts speak with more positive tone, less uncertainty, less numerical content, fewer speech hesitations, and fewer back and forth conversations with firm management. Female executives have shorter discourses and receive more rounds of questions from analysts. However, female executives exhibit more certainty and hesitate less, indicating superior abilities in answering analysts' questions. Our analysis of speech interruptions finds that female analysts are interrupted less by female, but not male, executives. Female executives receive more interruptions from both male analysts and executives and are more likely to be challenged by male subordinates. The equity market also discounts female analysts' participation. Overall, our results are consistent with gender-based discrimination.

"Forget the board room. Women's voices are barely even present on conference calls."

-Bloomberg[1]

1. Introduction

Despite the fact that women account for nearly half of the total labor force in the US, there is an underrepresentation of women in the most powerful positions in the business world.[2] Catalyst.org reports that females accounted for just 4.8% of CEOs and 21.2% of board positions among S&P 500 firms in 2019.[3] Similarly, women exclusively manage only 1.9% of total mutual fund assets women, compared to 74% by men (Lutton and Davis, 2015). While factors including human capital, work commitment, career interruptions, competition orientation, and social norms have been proposed to explain the "glass ceiling", gender discrimination remains an import determinant (Bertrand and Hallock, 2001; Bertrand, Chugh, and Mullainathan, 2005; Bertrand, Goldin, and Katz, 2010; Adams and Funk, 2012; Goldin, 2014; Adams, Barber, and Odean, 2016; Bertrand, 2018).

In this paper, we examine the gender discrimination issue in prestigious professions of the business world (CEOs and financial analysts) using a unique setting—earnings conference calls. Specifically, we investigate five questions: (1) Are female analysts more or less likely to appear on conference calls? (2) Conditional on participation, are female analysts treated equally compared with their male counterparts? (3) Do female analysts and executives exhibit different communication patterns compared to male analysts and executives? (4) Are male participants more likely to discriminate against female participants and vice versa? (5) Does the market interpret female and male conference call participants' information equally?

Gender discrimination issues such as harassment, slow promotion, and unequal pay are still widely reported on Wall Street (Boorstin, 2018). However, unlike entry-level jobs, studies on jobs near the glass ceiling are difficult to conduct in lab and field experiments (Bertrand and Mullainathan, 2004; Bertrand and Duflo, 2017). To provide evidence of gender discrimination for high-earning professionals, researchers have leveraged novel approaches and data sources regarding senior management (Matsa and Miller, 2011), surgeons (Sarsons, 2019), musicians (Goldin and Rouse, 2000), entrepreneurs (Hebert, 2020), mutual fund managers (Niessen-Ruenzi and Ruenzi, 2019), and financial advisers (Egan, Matvos, and Seru, 2018).

Conference calls have emerged as a popular and influential disclosure channel for public firms since the passage of Regulation Fair Disclosure (Regulation FD) in 2000. One unique feature of conference calls is that, following management's presentation session, managers will answer questions from the public, typically sell-side analysts, in a question-and-answer (Q&A) session. Prior studies have established that earnings conference calls convey price-related information beyond press releases (Bowen, Davis, and Matsumoto, 2002; Bushee, Matsumoto, Miller, 2004; Kimbrough, 2005) and that the Q&A session is more informative than the presentation portion (Matsumoto, Pronk, and Roelofsen, 2011). Various dimensions of conference calls examined in the literature include analyst participation (Mayew, 2008), linguistic characteristics (Allee and DeAngelis, 2015; Bochkay, Chava, and Hales, 2019; Brochet, Loumioti, and Serafeim, 2015; Bushee, Gow, and Taylor, 2018; Davis, Ge, Matsumoto, and Zhang, 2015; Mayew and Venkatachalam, 2012), and information transfer (Brochet, Kolev, and Lerman, 2018).

To the best of our knowledge, our paper is the first to investigate gender discrimination issues through an earnings conference call lens. Conference calls have several features that provide us with a unique setting to study gender discrimination. First, on conference calls two parties—

analysts and executives—participate together, which makes conference calls different from other disclosure venues in which only one party is involved at a time. As such, we can directly observe the interaction between analysts and management with various gender combinations. Second, during the Q&A session, analysts and managers interact in real-time without rehearsal or scripting. Matsumoto et al. (2011) argue that the spontaneous nature of the Q&A part of a conference call leads to more information disclosure by managers because they prefer to withhold bad news in prepared statements. Therefore, we expect this more stressful part of a conference call to elicit genuine behavioral patterns and gender attitudes of analysts and management. Third, a speaker's voice makes gender more visible when investors listen to conference calls compared with when they read written communication (e.g., regulatory filings by public companies, analyst recommendations, etc.), making gender attitudes more salient.

We analyze a large sample of more than 60,000 conference call transcripts collected from Capital IQ for the period 2008 to 2016, from which, using multiple algorithms based on first names, we determine the gender of participating analysts and executives. Our analyses proceed in several stages. First, we examine whether there exist gender differences in the probability of analysts' conference call participation. We follow Mayew (2008) using the Institutional Brokers Estimate System (I/B/E/S) to identify a sell-side analyst population who are interested in participating in conference calls. We find that female analysts are 2% less likely to participate in conference calls, representing a 5% relative reduction from the unconditional mean participation probability of 41%.

Next, we conduct a conditional analysis on conference call participants' behavior. Given the lower participation probability of female analysts in a male-dominated profession, we examine whether they are treated and/or do they behave differently from their male counterparts. By

analyzing analyst participation prioritization, we find that although female analysts are equally likely to ask the first question on conference calls, they have fewer opportunities to ask follow-up questions and their statements are shorter. Prior studies find that connections with firm management are valuable capital for sell-side analysts (Mayew, 2008; Green, Jame, Markov, and Subasi, 2014; Fang and Huang, 2017). Thus, if female analysts encounter discrimination, they could behave less aggressively to maintain a favorable relationship with management. Consistent with this notion, we find that female analysts exert less pressure on firm management. Specifically, female analysts have more positive tone and less uncertain tone, discuss less numerical content, hesitate less, and have fewer back-and-forth Q&As with firm management.

We next turn our gender analysis toward executives. In Q&A sessions, analysts initiate questions, which executives answer. Therefore, analysts set the atmosphere of Q&A sessions, which is consistent with the argument that analyst tone, instead of executive tone, moves the market (Chen, Nagar, and Schoenfeld, 2018). This suggests that if analysts discriminate against female executives, they would likely be under stricter scrutiny. Consistent with this idea, we find female executives experience more back-and-forth Q&As. However, female executives exhibit superior ability when handling analysts' questions in that they hesitate less and are less uncertain in tone. Kumar (2010) argues, and provide supporting evidence, that gender discrimination raises the evaluation standard of females in male-dominated professions and only females with superior ability self-select into these professions. Our finding is in line with this self-selection hypothesis.

Given that the analysis of conference call participation, tone, speech hesitations, and back-and-forth Q&As provide indirect evidence of gender discrimination, we provide direct evidence by examining interruptions during analyst-executive interactions. Besides "taste-based" and "statistical" discriminations, which are explicit, discrimination can be implicit (Bertrand et al.,

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2005). This type of unconscious discrimination is more fundamental and difficult to conceal. As such, previous studies have used interruptions to capture discrimination in casual conversation (Zimmerman and West, 1975) and among Supreme Court justices (Jacobi and Schweers, 2017). Using interruptions as a measure of discrimination, we observe an in-group favoritism—female analysts receive fewer interruptions from female executives compared with male executives. Male executives treat male and female analysts equally. However, male analysts and executives are more likely to interrupt female executives. We also find evidence consistent with the "power jockeying" phenomenon—that male executives interrupt their female colleagues, particularly those in superior roles, more than they interrupt female analysts.

Last, we examine the market reaction to female and male analysts' conference call participation. If market participants misinterpret analysts' conference call participation due to discrimination or stereotyping, female analysts' participation may lead to a weaker market reaction. We control for both analyst and executive tone to separate the informational influence of gender differences across roles. We find that there is a negative relationship between the percentage of female analysts participating on the call and the absolute short-term market reaction. Additionally, female analyst tone is associated with a weaker directional market reaction than male analyst tone. This finding is consistent with a gender-stereotyping hypothesis and contrasts with the self-selection hypothesis that the market values female analysts' superior ability more (Kumar, 2010). It also suggests that gender stereotyping occurs more readily when gender characteristics on conference calls (e.g., voice) are more salient than in other analyst outputs such as forecasts and recommendations, for example.

Our paper contributes to the literature in several aspects. First, we add to the gender discrimination literature on high-earning professionals. Extant research predominantly focuses on

indirect evidence of gender discrimination. For example, one stream of literature argues that gender discrimination raises the evaluation standard of females in male-dominated professions, thus, females competing successfully in these professions must possess superior abilities (e.g., Kumar, 2010; Hengel, 2020). Other works reveal subtle but direct evidence of gender discrimination in unique settings including comments by economists on Internet forums (Wu, 2018), physicians' referrals to surgeons (Sarsons, 2019), and punishments for financial advisors (Egan et al., 2018). We leverage earnings conference calls, a real-time communication environment, to investigate participants' gender attitudes. Our results provide both indirect evidence—female analysts have few participation opportunities and speak less—and direct evidence of discrimination—both female analysts and executives are interrupted more frequently by their male counterparts. Moreover, our conference call setting allows us to study two parties—analysts and executives—at the same time.

Second, we extend earnings conference call literature by introducing gender effects. While prior research on earnings conference calls focuses on incremental information and compares the informational roles of various participants (Matsumoto et al., 2011; Chen et al., 2018) our paper focuses on gender differences in participation, communication, and discrimination. Given that prior studies using private data document gender differences in the upper echelons and other high-profile professions within the financial industry (Kumar, 2010; Huang and Kisgen, 2013; Jeong and Harrison, 2017), it is more surprising to see a gender effect persist in the scrutinized public forum of earnings conference calls.

The rest of the paper proceeds as follows. We review the literature and develop hypotheses in Section 2. Sections 3, describes the data. In Section 4, we present the empirical analysis. Sections 5, concludes.

2. Literature Review and Hypothesis Development

2.1. Gender discrimination in business

Early studies on gender discrimination provide only indirect evidence by controlling for gender differences in observed characteristics and considering unexplained gender differences, such as the gender pay gap, as discrimination. For example, studies examining gender wage gaps usually control for education, experience, and other variables that are reflective of productivity (Guryan and Charles, 2013). However, this approach will overestimate discrimination if men have higher unobserved productivity or underestimate discrimination if women have higher unobserved productivity (Blau and Kahn, 2017). The unexplained labor market gap can also underestimate discrimination if it in turn affects control variables (Blau and Kahn, 2017). However, even if after controlling for productivity-related characteristics there is no evidence of a gender gap, it does not rule out discrimination through gender segregation and unequal promotion (Bertrand and Hallock, 2001). For management-level positions, human capital, career motivation, and other individual unobservable characteristics are more homogeneous compared with entry-level jobs (Blau and Khan, 2017). Therefore, unexplained gender gaps observed in compensation can be interpreted as evidence of discrimination (Bertrand and Hallock, 2001). However, some vestige of omitted-variable concerns remains.

Recent studies seeking to provide evidence of discrimination have turned to other labor market outcomes using novel approaches, which have led to two streams of literature. One stream of literature examines negative outcomes. For example, Egan et al. (2018) identify a "gender punishment gap". They find that compared to their male counterparts, female financial advisers are more likely to be fired despite engaging in less costly misconduct and have lower likelihood of repeat offenses. In the same vein, Bloomfield et al. (2019) conduct an experiment and find that, in contrast to male analysts, investment professionals evaluate female analysts as less promotable

when they lack persistence in pitching a stock, consistent with gender stereotyping. The other stream contends that gender discrimination leads to a phenomenon in which highly qualified women self-select into male-dominated professions (Kumar, 2010; Blau and Khan, 2017). For instance, Kumar (2010) argues that in the male-dominated financial services industry, female analysts, along with having above average abilities (relative to their male counterparts) are not representative of average women who are risk averse. Consistent with the self-selection hypothesis, he finds that female analysts issue bolder and more accurate forecasts, and are more likely to cover large stocks with higher institutional ownership even in early stages of their careers. He further shows that the market reacts, both in the short and long term, more strongly to female analysts' forecast revisions even when they attract less media coverage. In addition, he documents that female analysts are more likely to be promoted to prestigious brokerage firms and less likely to receive a demotion to less prestigious ones.

Discrimination can be explicit or implicit (Bertrand et al., 2005). Implicit discrimination is unconscious and difficult to hide. For example, Sarsons (2019) in investigating physicians' referrals to surgeons finds physicians' evaluation of a surgeon's ability declines more after a patient death for female surgeons compared with male surgeons, controlling for surgeon specialty. Moreover, physicians give evaluation that is more positive to male surgeons after a successful surgery outcome. Wu (2018) examines anonymous discussion about female and male economists on the Economics Job Market Rumors Internet forum and finds pervasive gender discrimination. She documents that users discuss non-academic information more for female economists and academic information more for male economists. In sum, novel datasets and settings are useful tools to identify gender discrimination within high-paying professions.

2.2. Earnings conference calls

Earnings conference calls are one of the most important venues for firms to communicate with investors (Matsumoto et al., 2011). The majority of conference calls follow immediately after a quarterly earnings release. A conference call usually starts with a presentation session in which executives discuss current operations and make forward-looking statements. After management's presentation, analysts and investors can communicate with firm management in a Q&A session. Prior studies show that conference calls provide value-relevant information to capital markets (Frankel et al., 1999; Bushee et al., 2004; Kimbrough, 2005). Matsumoto et al. (2011) find that both presentation and Q&A sessions have incremental information over press releases, with the Q&A discussions being particularly informative. They further show that the informativeness of a Q&A session is associated with the number of analysts following the firm and that analysts' active role in conference calls contributes significantly to their informativeness.

From the perspective of analysts, Bowen et al. (2002) show that conference calls increase analysts' forecast accuracy and decrease forecast dispersion. However, analysts' participation is not random, and hosting firms have discretion to determine who ask questions on conference calls (Brown et al., 2019). Mayew (2008) shows that during conference calls, firms discriminate by providing analysts who issue favorable stock recommendations with more opportunities to ask questions. Further, Mayew et al., (2013) find that analysts who participate in conference calls by asking questions issue more accurate and timelier earnings forecasts than non-participating analysts, suggesting participating analysts may possess superior information.

Another stream of literature examines soft information embedded in conference calls. For example, Larcker and Zakolyukina (2012) classify CEO and CFO narratives from conference call transcripts into "deceptive" and "trustful" parts based on psychological and linguistic word lists,

and they find that the deception measure can predict subsequent financial restatements. Allee and DeAngelis (2015) document that tone dispersion, which is the degree to which tone is spread evenly in a narrative, is associated with firm performance, managers' financial reporting choices, and managers' incentive to influence the perception of the firm. Mayew and Venkatachalam (2012) show that managers' affective states in conference calls can predict future firm performance and the effect is more prominent in the Q&A session when managers are under great scrutiny by analysts. Davis et al. (2015) show that there exists a manager-specific component in the tone of earnings conference calls that current performance, future performance, or strategic incentives cannot explain. They further add that demographic characteristics including career experience and charitable organization involvement are the driving forces behind the relationship with the manager-specific factor. Additionally, the authors also note that the tone of executives on earnings conference calls is associated with their level of optimism. However, with regard to gender, they document only weak evidence that female executives use less favorable language.

2.3 Hypothesis development

Gender discrimination is ubiquitous among male-dominated industries. Equity analysts are a male-dominated occupation. Given extensive historical gender discrimination and an "old boys' network", establishing connections with firm management provides fewer rewards, perhaps even punishment, to female analysts (Fang and Huang, 2017) and may therefore decrease their incentives to build connections. Moreover, because managers have discretion over analysts' conference call participation (Mayew, 2008), connections are a key determinant of their participation. Along the same line, sell-side analysts avoid asking difficult questions on conference calls to maintain a good relationship with management and leave tough questions to private

communication instead (Brown et al., 2015). Given gender stereotyping within the analyst industry, we propose:

H1: Female analysts are less likely than male analysts to participate in earnings conference calls.

Firm management has the discretion to determine which analysts they will prioritize on conference calls. Firms are very sensitive with regard to information disclosure on conference calls given that both solid and soft information are disseminated to the public (Suslava, 2017; Zhou, 2018).[4] To avoid disclosing unfavorable information, management regularly chooses not to answer certain analysts' questions (Gow et al., 2019; Hollander et al., 2010) or disproportionately prioritizes optimistic analysts (Cohen et al., 2019; Mayew, 2008). According to firms' Investor Relations Officers (IROs), analysts who have a long coverage history with the firm usually receive priority in the question queue (Brown et al., 2019).

Previous studies consider three dimensions of analyst participation prioritization: asking the first question, asking multiple rounds of questions, and having long conversation with firm management (e.g., Call et al., 2018). Managing conference calls is the primary task of IROs and prioritizing analysts in the Q&A queue selectively is an important component (Brown et al., 2019). Asking the first question in a conference call sends a strong signal of a firm's special attention and connection with the analyst (Call et al., 2018; Cen et al., 2020). Similarly, given the time constraint, asking a second round of questions also implies a friendly relationship between analysts and the management. Note also that long conversations signify that firms are willing to provide analysts with more visibility. Because of the lower benefits of connections to management for female

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[4] For example, Elon Musk, the CEO of Tesla, Inc., said questions from analysts were asking "boring, bonehead questions" in its 2018 Q1 earnings conference call on May 2nd, 2018. Tesla stock price plunged 5.6% on the following day.

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analysts (Fang and Huang, 2017), and potential in-group bias (Jannati et al., 2020), female analysts may have less of an opportunity to build these connections. If analyst gender is a barrier to building these connections, we are likely to observe less favorable treatment of female analysts by management on earnings conference calls in term of conference call participation prioritization. Therefore, we hypothesize:

> *H2a: Females analysts are less likely to ask the first question on earnings conference calls.*
>
> *H2b: Females analysts are less likely to have follow-up interactions on earnings conference calls.*
>
> *H2c: Female analysts' interactions with management on conference calls are shorter than male analysts' interactions with management.*

The manner of communication between analysts and firm management plays a crucial role in conference calls. Although analysts are under the pressure of their buy-side to ask acute questions, it should not happen at the expense of the relationship with firm management (Brown et al., 2015). This is the case because the value of a firm's access to analysts benefits from connections with management, both from the perspective of research informativeness (Green et al., 2014) and compensation (Groysberg et al, 2011). Under Regulation FD, although firms must open conference calls to all interested members of the general public (Bushee et al., 2004), the complementing role of public information to private information (i.e., mosaic theory) on earnings conference calls remains essential for analysts (Mayew, 2008). Connections of analysts are also associated with their forecast accuracy and career advancement. Sell-side analysts have strong incentives to curry favor from their buy-side clients (Groysberg et al., 2011). A considerable amount of compensation paid by buy-side clients to sell-side firms is for corporate access (Brown et al., 2019).

To retain connections with management, analysts must not interrogate executives and/or cast them in an unfavorable light. As Soltes (2014) points out: "Assuming you want management to continue speaking with you, you have to avoid making the C-suite lose face on the call…if you have difficult questions and you want management to speak openly, you have to do that off-line." (p. 265). Women value social connections and relationships more in communication compared to their male counterparts (Leaper, 1991). Conversations between women are more fluent and affirmative compared with mixed-gender and male-only pairs (Hirschman, 1994). To the extent that female analysts are at a disadvantage in participating in conference calls, they may choose to initiate a relatively relaxed conversation with management in accordance with the "theater" nature of conference calls (Brown et al., 2019). Consequently, female analysts may discuss less numerical content that is "solid" and give firm management more freedom to provide "soft" statements (Zhou, 2018). Because asking harsh questions can be counterproductive to building a good relationship with management, mild questions may lead to less cognitive dissonance (Festinger, 1957; Chang, Solomon, and Westerfield, 2016), which in turn leads to less uncertain sentiment and less hesitation (Lay and Paivio, 1969). Along the same lines, analysts' pursuit of harmony with firm management may decrease the toughness of their questions and thus lower the possibility of tug-of-war (i.e., fewer back-and-forth comments). Therefore, we hypothesize:

H3a: The tone of female analysts' interaction with management on conference calls is less negative than the tone of male analysts' interaction with management.

H3b: Female analysts discuss less numerical information with firm management.

H3c: Female analysts exhibit less uncertainty in their narratives.

H3d: Female analysts exhibit less frequency of speech hesitation in their interactions with firm management.

H3e: Female analysts have fewer back-and-forth comments with firm management.

In conference call Q&A sessions, firm management generally responds to analysts' questions in a passive manner. Female executives self-select into the pursuit of C-suite positions, which suggests that they possess superior ability than an average C-suite executive (Kumar, 2010). This suggests that female executives are therefore, more capable at handling analyst inquiries and as such, exhibit less uncertain sentiment and fewer hesitations. Moreover, the possibility of male analysts' discriminatory bias against female executives can also lead to more difficult questions asked and thus more back-and-forth comments (Jannati et al., 2020). Therefore, we hypothesize:

H4a: Female executives exhibit less uncertainty in their narratives.

H4b: Female executives exhibit less frequency of speech hesitations.

H4c: Female executives have more back-and-forth comments with analysts.

Men and women have different views on the purpose of conversation. Women seek social connections and relationships in communication while men prefer to exhibit power (Leaper, 1991). Consequently, women are more expressive and polite in conversation while men are more aggressive (Basow and Rubenfeld, 2003). In line with this, prior studies have shown that men are much more likely to interrupt women than vice versa. Specifically, men generally desire to demonstrate power and control the topics of conversations by interrupting women (Zimmerman

and West, 1975). Jacobi and Schweers (2017) examine oral arguments at the U.S. Supreme Court and show that male justices and male advocates disproportionately interrupt female justices. Therefore, we expect women, either female analysts or female executives, to receive more interruptions. This leads to the following hypotheses:

H5a: Female analysts are more likely to be interrupted.

H5b: Female executives are more likely to be interrupted.

Investors respond to a wide range of analyst characteristics including reputation (Gleason and Lee, 2003; Stickel, 1992), connections with firm management (Fang and Huang, 2017), underwriting relationships (Lin and McNichols, 1998), brokerage affiliation (Clement and Tse, 2003), gender (Kumar, 2010), name favorability (Jung et al., 2019), and political preferences (Jiang et al., 2016), among others. Prior studies find that subjective feelings influence investment decisions and that investors seek consistency in how easily perceived characteristics, such as gender, affect their decisions (Alter and Oppenheimer, 2006). Given that men dominate sell-side analysts, gender stereotyping could lead to lower evaluation of female analysts' participation on earnings conference calls. Therefore, we hypothesize:

H6: Market reaction to female analyst participation in conference calls is weaker.

3. Data

3.1 Sample selection

We collect earnings conference call transcripts of Standard and Poor's 500 (S&P 500) constituent firms from Capital IQ over the 2008 to 2016 time-period. In addition, we collect transcripts of over 2,700 random firms that are not included in S&P 500 index but appear in the Center for Research in Security Prices (CRSP) database. Our initial sample includes 81,677 earnings conference call transcripts for 3,346 unique publicly traded companies. We remove firms

without data in I/B/E/S or CRSP. For each transcript, we record the call date, time stamp, names of firm executives, names of analysts participating in the question-and-answer (Q&A) session, and analyst affiliation.

To determine analyst gender, we extract the first name from each analyst's full name and apply multiple algorithms sequentially—R package *gender*, Python package *gender-guesser*, and *gender-api.com*.[5] We use these tools, publicly available government databases, and social network data to construct first name-gender pairs. Because a probability is given for each gender guess tool (i.e., Prob(male)+Prob(female)=1), we assign the gender with higher probability to each first name.[6] No gender is assigned to androgynous first names (i.e., Prob(male)=Prob(female)=50%). Appendix D describes the gender determination process. For executives who appear in conference calls, we match names with Execucomp records that have gender and other information. Finally, we complement missing analyst and executive gender data by manually searching a variety of sources including S&P Capital IQ, LinkedIn, Bloomberg, and Seeking Alpha. In sum, we are able to identify the gender of 98.5% (99.4%) analyst (executive) conference call participations.[7]

In order to investigate the dynamics of analyst-management interactions on conference calls, we construct a call-analyst level sample. We proceed in several steps. First, we parse all conference call transcripts into question-answer blocks. In conference call transcripts, each narrative starts with the name, title, and affiliation of the speaker in separate lines. Before an analyst asks questions, the conference call operator introduces the analyst. Thus, the appearance

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[5] More information on these tools is available via https://cran.r-project.org/web/packages/gender/gender.pdf, https://pypi.python.org/pypi/gender-guesser/, and https://gender-api.com/en/, respectively.
[6] *Gender-guesser* does not provide a probability of gender but rather gives five possible results: male, female, mostly male, mostly female, and androgynous. We assign "male" ("female") to a first name if *gender-guesser* gives "male" or "mostly male" ("female" or "mostly female").
[7] Analysts with unidentifiable gender are recorded in transcripts as "Unidentified Analysts", "Unknown Speaker" or "Unknown Analyst" or with a name abbreviation. Unidentifiable company participants are recorded as "Unidentified Company Representative", "Unknown Executive", "Attendees", "Unknown Speaker", etc.

of the operator can serve as a delimiter for conversation blocks. Specifically, each conversation block starts with the analyst name and ends with the operator's introduction of the next analyst.[8] In other words, a block is a group of continuous back-and-forth comments between the focal analyst and one or more executives. Hereafter, we designate each block an interaction.

Second, we scan each conference call transcript to identify all interactions. Because analysts may have back-and-forth statements or questions with one or more executives in each block, we separately record each analyst's narrative and narratives of different executives in each interaction block and then collapse multiple observations related to one analyst (or executive) to one observation. For analysts who ask more than one round of questions (i.e., analysts involved in two or more non-continuous interactions in one conference call), observations are aggregated to generate one observation for each analyst in each conference call. Our final conference call sample contains 442,211 call-analyst level observations representing 62,644 conference calls and 2,836 unique firms. Appendix A contains a summary of the sample selection process.

3.2 Variables

Our key variables are indicator variables *FemaleAna*, which is equal to 1 if the analyst is female and a continuous variable in the range of [0,1], *FemaleExe*, which is the percentage of female executives' narratives related to the corresponding analyst based on number of words spoken.[9] Analyst questions that are answered exclusively by male (female) executives have *FemaleExe* equal to 0 (1).

The extant literature suggests that other analyst's characteristics could vary systematically with gender. To the extent that this is the case, the relationship between analyst gender and earnings

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[8] We remove all names, titles, and affiliations to keep narratives only for our textual analysis applications.
[9] For example, suppose an analyst asks questions and two executives, one man and one woman, answer the questions. If the male executive's narrative consists of 40 words and the female executive's narrative consists of 60 words, *FemaleExe* will be equal to 0.6.

conference call or market outcomes, is likely biased. We follow Mayew (2008) and include

variables, related to analyst characteristics. *AllStar* is an indicator variable for Institutional Investor

All-American analysts in a given year. *BrokerSize* is the number of analysts employed by the

brokerage firm of an analyst in the prior calendar year of the conference call. *GenExp* is the number

of years between the conference call date and the date on which the analyst issues his or her first

forecast on I/B/E/S. *FirmExp* is the number of years between the conference call date and the date

on which the analyst issues his or her first forecast for the firm on I/B/E/S. *IndCover* is the number

of Fama-French 48 industries covered by an analyst in the prior calendar year of the conference

call. *CompCover* is the number of unique firms covered by an analyst in the prior calendar year of

the conference call. *CCuser* is the number of other conference calls on which the analyst

participates in the same calendar quarter as the focal conference call. *Rec* is the analyst's latest

stock recommendation of the firm holding the conference call on an integer range from -2 to +2

representing strong sell to strong buy. *RecHorizon* is the number of days from the issue date of the

latest stock recommendation to the conference call date. To measure analyst forecast performance,

we follow Clement (1999) and construct a forecast accuracy measure, which is equal to the

negative value of the absolute forecast error demeaned by the same quarter-firm forecast average:

$$ForeAcc_{ijt} = -\frac{\left|ForeError_{ijt}\right| - \overline{\left|ForeError_{jt}\right|}}{\left|ForeError_{ijt}\right|} \; ;$$

where, $\left|ForeError_{ijt}\right|$ is the absolute forecast error (the absolute difference between the last

earnings per share (EPS) forecast and actual EPS) for analyst *i* of firm *j* in quarter *t*, and

$\overline{\left|ForeError_{jt}\right|}$ is the mean $\left|ForeError_{ijt}\right|$ (average $\left|ForeError_{ijt}\right|$ across all analysts covering

firm *j* in quarter *t)*. A positive (negative) value of *ForeAcc* indicates that an analyst's forecast is

more (less) accurate than other analyst forecasts of the same firm in the same quarter. This measure

of forecast accuracy is relative to other analysts and eliminates heteroscedasticity across firm-quarters (Ke and Yu, 2006).

3.3 Analyst gender distribution

We first examine the gender distribution for analysts appearing on earnings conference calls in our sample. Table 1 reports the call-analyst level analyst gender distribution by year (Panel A), Global Industry Classification Standard (GICS) sector (Panel B), and brokerage affiliation (Panel C). Percentage of participation observations represented by female analysts (*%FemalePart*) and percentage of unique female analysts (*%FemaleUnique*) are shown separately. Corresponding percentage of female forecasts (*%FemaleFollowIBES*) and percentage of unique female analysts (*%FemaleUniqueIBES*) in the I/B/E/S sample are also reported.

[Insert Table 1 here]

Table 1 contains gender distributions for the sample period. Panel A shows that although there is a slight increase over time in the percentage of unique participating female analysts, there is a steady decline in female analysts participation from 12.15% to 10.20%, indicating that over time female analysts participate less frequently on earnings conference calls than their male counterparts. The percentage of female analyst following in I/B/E/S also exhibits a similar decline. Panel B shows gender distribution across 11 GICS sectors. Female analysts are more concentrated in Consumer Staples and Consumer Discretionary, followed by Health Care. This evidence is consistent with that of Kumar (2010) who shows that female analysts are more heavily represented in these sectors. In Panel C, we follow Green et al. (2009) and rank brokerage firms in the I/B/E/S database based on the number of affiliated analysts in each year separating Top 10 and other brokerages. The proportion of female analysts in large brokerage firms is higher than that in other brokerage firms in both samples. Green et al. (2009) suggest that the relatively high representation

of female analysts in large brokerages is because of emphasis on employee diversity and better working conditions, which are attractive to women. The proportion of female participation in Panel C is consistently lower than that of unique female analysts, indicating a lower participation level across both brokerage-ranking groups.

3.4 Descriptive statistics

Table 2 presents descriptive statistics for conference call variables (Panel A), and firm variables (Panel B). Regarding conference call characteristics, the mean number of words spoken in the Q&A session is 3,835 (*WordsQNA*). Panel A shows that on average, 7.6 non-continuous interactions (*FollowupCall*) are made by 7.2 analysts (*AnaCount*) with 3.4 executives (*ExeCount*). The number (percentage) of female analysts per call is 0.76 (9.8%) (*FemaleAnaCount* and *FemaleAnaPct*). The average number of participating female executives is 0.44 (*FemaleExeCount*), representing 12.8% of all executives (*FemaleExePct*). Turning to CEOs and CFOs, we see that 59.6% (58.1%) of conference calls have the firm's CEO (CFO) participating (*CEOPart* and *CFOPart*) and 52.2% have both the CEO and CFO present (*CEOCFOPart*).[10] The average for the number of CEO and CFO participating in a conference call (*CEOCFOCount*) is 1.2, while the number (percentage) of female CEOs or CFOs is just 0.075 (4.1%) (*FemaleCEOCFOCount* and *FemaleCEOCFOPct*). It is important to note that the percentage of female CEOs or CFOs is much lower than the percentage of female executives, which is consistent with the lower participation rate of women in the labor force and lower representation in corporate

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[10] Because Capital IQ gives up-to-date executive titles but not the title as of the conference call date, we match executive names with Execucomp. Specifically, we follow Jiang, Petroni, and Wang (2010) and use Execucomp variables CEOANN, CFOANN, and TITLEANN to determine CEOs and CFOs. *CEOPart* are *CFOPart* are lower than the actual participation rates because our method does not assign CEO or CFO flags to interim CEOs or CFOs.

C-suites. On the other hand, it could also be due to the relatively high proportion of women among investor relations officers (Brown et al., 2019).[11]

Panel B, which contains firm level results, shows that an average firm has market capitalization of approximately $6.9 billion (*MktCap*), a leverage ratio of 2.6 (*Leverage*), market-to-book ratio of 2.9 (*MB*), and return on assets of 0.01 (*ROA*). It also shows that, 21.7% of firms are S&P 500 constituents, with institutional ownership accounting for 66.6% of total shares (*InstOwn*), and that on average, 10.7 analysts in I/B/E/S (*AnaCover*) cover each firm,. The average standardized unexpected earnings (actual earnings minus consensus earnings scaled by quarter-end stock price) is approximately 0.035 (*SUE*). Mean consensus stock recommendation (on an integer range from -2 to +2 representing strong sell to strong buy) is 0.7 (*RecCon*). The stock run-up prior to conference call is -0.007 (*Runup*). A mean (median) of 42.7 (14) other conference calls within the same 3-digit SIC code as the focal conference call are held in the same calendar quarter (*CallCluster*). Appendix B contains extended variable definitions.

[Insert Table 2 here]

3.5 Univariate analysis

We next compare the mean of a series of analyst-call level variables between male and female analysts. Table 3 Panel A contains the results. Consistent with prior work (e.g., Bosquet et al, 2014; Kumar, 2010; Mayew, 2008), we find that female analysts are much more likely to be all-star analysts, are hired by large brokerage firms, have less general experience but similar firm-specific experience, cover fewer industries and companies, are more accurate in earnings forecasts, and issue less favorable stock recommendation with shorter horizons.

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[11] Investor relations officers (IROs) are listed as executives at the beginning of conference call transcripts.

Table 3 Panel B reports gender comparisons for analysts' participation variables in which we use various variables to capture participation characteristics. Specifically, we use first questioner indicator (*First*), the number of non-continuous interactions between analyst and managers (*InterAna*), the number of words spoken by each analyst (*WordsAna*), and the average number of back-and-forth comments in an interaction (*RallyAna*). We expect the number of back-and-forth statements to reflect the intensity of an interaction with management. We find female analysts are less likely to ask the first question, are less likely to have follow-up interactions with executives, have shorter interaction length, and have fewer rounds of back-and-forth comments in each interaction.

In addition, we introduce two new characteristics of analyst-manager interactions: interruption and hesitation. In a conference call, when a manager (analyst) interrupts an analyst or manager, it indicates that managers (analysts) strongly disagree with an analyst's (manager's) comments and/or want to cut short the conversation. Importantly, it can also reflect how disrespectful the interrupter is toward the interruptee. To proxy for interruptions, we follow the lexical symbols used by Capital IQ. Capital IQ uses an ellipsis (…) at the end of a sentence to indicate that speakers have cut off each other. We construct a variable, *InterruptAna*, which is the total number of times an executive interrupts an analyst.[12] We measure hesitation by the appearance of two consecutive hyphens (--) to represent a self-correction or broken thought. *HesitAna* is the number of hesitations exhibited by the analyst. We provide examples of both interruptions and hesitations in Appendix C using excerpts from a conference call transcript.

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[12] We do not find evidence of analysts interrupting each other in our sample.

Panel C contains Analysts' textual characteristics comparisons. We measure sentiment with three Loughran and McDonald (2011) (LM) dictionaries: positive, negative, and uncertainty. We calculate analyst tone as:

$$ToneAna = \frac{Tone\ WordsAna\ Count}{WordsAna} \times 100\%,$$

where *ToneAna* is *positiveAna*, *negativeAna*, or *uncertaintyAna*.[13] Prior research has established that the LM dictionary is an effective measure of financial context sentiment. Given that LM designed their dictionary specifically for financial statements, and conference call transcripts are derived from verbal communication, we also use the Harvard General Inquirer (Harvard GI) dictionary to measure sentiment.[14] To capture general sentiment, we construct a net tone measure, which is the difference between positive and negative tone (*net* and *netGI*). Positive net tone indicates that an interaction exhibits more positive sentiment than negative sentiment. In addition, we follow Zhou (2018) to examine the percentage of numbers or numeric phrases in interactions (*number*). We expect that numbers will contain more specific, value-relevant information than lexical content.

Panel C of Table 3 shows that female analysts are interrupted less by executives and exhibit fewer hesitations. Female analysts use more positive and negative words but do not exhibit a difference in net tone compared with male analysts. Using the Harvard GI dictionary, female analysts exhibit more positive sentiment but less negative sentiment, and therefore a more positive net sentiment. Less numeric content is included in female analysts' comments. This evidence is in line with hypothesis H3 that female analysts desire to establish more harmonious conversation

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[13] The Loughran and McDonald (2011) dictionaries can be found at http://sraf.nd.edu/
[14] The Harvard General Inquirer dictionaries can be accessed at http://www.wjh.harvard.edu/~inquirer/

with managers. In sum, the univariate analysis results are consistent with the hypothesis that female analysts' questions are less aggressive on conference calls.

In Table 3 Panel D, we report executive narrative variables for female and male executives. We construct a call-executive level sample including only executives who speak in the Q&A portion of earnings conference calls.[15] This sample contains number of words (*WordsExe*), number of interruptions received (*InteruptExe*), number of hesitations (*HesitExe*), and tone variables. We then make comparisons between female and male executives using these variables. In general, the number of words spoken by male executives is much larger than that of female executives (1037 vs. 593). Female executives receive fewer interruptions and exhibit fewer hesitations. For executive tone, female executives are less positive based on the LM dictionary but are more positive based on the Harvard GI dictionary. Moreover, we find that female executives are more affirmative compared to their male counterparts by exhibiting less uncertain sentiment. Taken together, the univariate comparisons in Table 3 are largely consistent with our hypotheses. To confirm these findings, we turn to multiple regression analyses.

[Insert Table 3 here]

4. Empirical findings

4.4 Multivariate analysis

4.4.1 Conference call participation

We first examine the determinants of female analysts' earnings conference call participation. We follow Mayew (2008) to use I/B/E/S as the universe of sell-side analysts who are potentially interested in attending conference calls and construct a corresponding I/B/E/S

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[15] Investor Relations personnel and other firm participants who do not speak in the Q&A portion of the call are not included.

sample. For the initial I/B/E/S sample, we require each firm-quarter-analyst observation to have both an existing earnings forecast and stock recommendation. An analyst is considered as actively following the firm if his/her earnings forecast is issued within one year of a given fiscal quarter end. Only the most recent forecasts prior to an earnings conference call are used.

To determine analyst gender within I/B/E/S, we need to obtain the first name of each analyst. However, I/B/E/S only provides each analyst's last name and first initial (item "ANALYST" in I/B/E/S). We exclude observations with missing brokerage ID (ESTIMID in I/B/E/S) or analyst name. In addition, we eliminate forecasts made by research teams.[16] To ensure the accuracy of analyst gender, we remove analysts for which two or more analysts (indicated by analyst code in I/B/E/S) share the same first initial and last name in the same brokerage (Bradley, Gokkaya, and Liu, 2017). Next, to determine the first name of analysts in I/B/E/S, we match analyst names within earnings call transcripts with analysts in I/B/E/S at the brokerage level. We check unmatched analysts manually with Capital IQ, LinkedIn, Bloomberg, Seeking Alpha, among others. Gender is then determined as described in Appendix D. We successfully identify the full name and gender for 5,687 analysts (99.8% of 5,722 unique sell-side analysts appearing in sample conference calls) in I/B/E/S. The final I/B/E/S sample includes over 671,550 analyst-firm-quarter observations for the 62,644 conference calls.[17]

We model conference call participation probability of analyst i following firm j in quarter t. We estimate the following pooled cross-sectional logit regression model:

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[16] Analyst names for forecast issued by teams are recorded in I/B/E/S as a combination of two or more last names or a department name (e.g., "GERRY/ADKINS", "RESEARCH DEPT").

[17] Given the sizes of the I/B/E/S and conference call samples, the average analyst participation rate is about 65.8% (=442,211/671,550) which is higher than the mean of *Participate*, 41%, described below. The difference can be attributed to two reasons. First, some participants (e.g. buy-side analysts, sell-side/independent analysts not qualifying for I/B/E/S inclusion, media, etc.) in conference calls are not in I/B/E/S. For example, only 83% of participating analysts in our sample are sell-side. Second, I/B/E/S does not include all brokerage houses (e.g., Cowen & Co.). The mean of *Participate* in our I/B/E/S sample is close to the 38.1% documented in Mayew (2008).

$$Participate_{i,j,t} = \beta_0 + \beta_1 FemaleAna_{i,j,t} + \beta_2 Rec_{i,j,t} + \beta_3 AllStar_{i,j,t} + \beta_4 ForeAcc_{i,j,t}$$
$$+ \beta_5 GenExp_{i,j,t} + \beta_6 FirmExp_{i,j,t} + \beta_7 IndCov_{i,j,t} + \beta_8 CompCov_{i,j,t}$$
$$+ \beta_9 BrokerSize_{i,j,t} + \beta_{10} RecHorizon_{i,j,t} + \beta_{11} CCUser_{i,j,t} + \beta_{12} SUE_{i,j,t}$$
$$+ \beta_{13} Afternoon_{i,j,t} + \beta_{14} AnaCover_{i,j,t} + \beta_{15} WordsQNALog_{i,j,t} + \epsilon_{i,j,t}.$$

The dependent variable, *Participate*, is an indicator variable equal to 1 if an analyst asks a question on an earnings conference call, zero otherwise. Year, industry (3-digit SIC), and brokerage fixed effects are included in all specifications. Standard errors are clustered at the firm level. In Model 1, we include *FemaleAna* and ten control variables capturing analyst characteristics. To examine how analyst gender affects the relationship between analyst reputation and conference call participation, we add an interaction term between *FemaleAna* and *AllStar* in the second specification. In the third model, we further include the firm level variable—*SUE*—and three conference call variables—*Afternoon*, *AnaCover*, and *WordsQNALog*. *Afternoon*, an indicator variable, which is equal to 1 if the conference call is initiated at or after 12 p.m.; this is controlled for because of potential diurnal influence on participation. The number of analysts following the company and the number of words spoken reflect how competitive it is for analysts to participate in a conference call. Participation opportunities should be fewer if more analysts follow the firm. *WordsQNALog* captures the time allocated to each Q&A session because analysts are likely to have more opportunities to participate in longer earnings conference calls (Mayew, 2008).

We present the results in Table 4. Focusing on our testing variable *FemaleAna*, we see that in all three columns the estimated coefficient is negative and significant at the 1% level. The marginal effect is also meaningful. The predicted probabilities of participation for female and male analysts are 37.0% and 39.0%. The 2.1% difference represents an approximate 5% disadvantage in participation probability for female analysts at the sample mean. The estimated coefficient of all-star analyst is positive and significant at the 1% level. The magnitude of the estimated

coefficient of the interaction term is comparable to that of *AllStar*, suggesting that the benefit of being an all-star analyst for female analysts is almost double that of male analysts with regard to the likelihood of participation. In other words, female all-star analysts have a higher participation likelihood than male all-star analysts, thus supporting Hypothesis H1.

Examining other variables in Table 4, we see that across all three columns that the likelihood of conference call participation increases with stock recommendation favorableness (*Rec*), prior forecast accuracy (*ForeAcc*), firm-specific experience (*FirmExp*), frequency of conference call participation (*CCUser*), and length of the Q&A session (*WordsQNALog*). Interestingly, general analyst experience (*GenExp*) has a negative effect on participation likelihood. This finding is consistent with Mayew (2008) who suggests that analysts with more general experience may have lower demand for firm-specific information. We also see that analysts covering more companies (*CompCover*) or industries (*IndCover*) and issuing less timely coverage (*RecHorizon*) have lower participation probability.[18] Consistent with our expectations, there is a positive relationship between earnings surprise and participation, and a negative relationship between high analyst coverage (*AnaCover*) and participation. Notice also that analysts are less likely to participate in conference calls initiated in the afternoon (Column 3). One explanation is that it is because analysts are subject to diurnal influence. This is consistent with the notion that depletion of personal resources and circadian rhythms lead to less participation later in the day (Chen, Demers, Lev, 2018).

[Insert Table 4 here]

Collectively, our participation analysis indicates that female analysts generally participate on earnings calls less frequently than male counterparts do, and that Institutional All-star

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[18] Replacing *CompCover* with *SameDayCall*, which is the number of conference calls held by other firms covered by the analyst on the same day, yields similar results.

recognition is more important for female analysts than male analysts with regard to conference call participation access. The finding is consistent with the notion that female analysts are in a relatively weaker position with respect to conference call participation.

4.4.2 Conference call prioritization

Next, we examine whether firm management prioritizes female analysts and provides them with more interaction opportunities on conference calls. We use three dependent variables, as our measure of prioritization - *First*, *FollowUp,* and *AbnLength*. Firm-level controls, year-quarter fixed effects, and firm fixed effects are included in all models.[19] Table 5 reports the results. Column 1 results where *First* is the dependent variable show that gender is not significant in explaining the likelihood of asking the first question on a conference call and thus hypothesis H2a is not supported. Column 2 reports Poisson model results for the number of interactions. We include initial question position (*Order*) because analysts who ask a question early in the queue are more likely to have a follow-up opportunity.[20] We find that *FemaleAna* is negatively associated with *InterAna*, thus supporting Hypothesis H2b. We further examine the interaction length between analysts and executives by counting the total number of words within each interaction. For analysts who have multiple interactions with executives, we aggregate word counts in all interactions to generate an analyst-level count. We then follow Call et al. (2018) to define abnormal interaction length as:

$$AbnLength = \frac{Words\ in\ all\ interactions\ with\ managers\ for\ the\ analyst}{(\frac{Words\ in\ Q\&A\ session}{Number\ of\ participating\ analysts})} - 1,$$

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[19] As a robustness check, we replace firm fixed effects with call fixed effects and the results remain similar.
[20] Untabulated results show no gender difference when *Order* is the dependent variable.

AbnLength controls for systematic differences in interaction length due to Q&A session length and the number of participating analysts. A positive value of *AbnLength* indicates that an analyst's interaction length is above the average among all analysts. We regress *AbnLength* on the female analyst indicator and other control variables (Model 3). On average, female analysts' interactions with executives have 492 words and are 2.589% shorter than the within-conference call average compared with 537 words and 0.744% longer than average for male analysts. We add *FemaleExe* and its interaction with *FemaleAna* as additional controls because the presence of female executives could affect female analyst priority (Model 4). In both specifications 3 and 4, we find female analyst interactions are about 4.1% shorter.[21] Analyst interactions with only female managers are 8.1% shorter compared with those with only male management. The insignificant interaction term implies that a more female-dominated environment does not help improve female analysts' priority. In sum, these findings provide strong support for hypothesis H2c.[22]

[Insert Table 5 here]

4.4.3 Analysts' narrative characteristics

We next test hypothesis H3a by examining the influence of analysts' gender on, the tone of interactions between analyst and executives, uncertainty, quantitative information, the frequency of back-and-forth comments, and hesitations. We report the results in Table 6. As shown in the second column, where we use Harvard GI dictionaries to measure sentiment, female analysts convey sentiment that is more positive in their interactions with management. However, using the LM dictionaries in the first column, there is no evidence that gender differences exist in tone with regard to male and female analysts' interactions with management. This difference in results

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[21] The average predicted mean *AbnLength* for male analysts are 0.8% and -3.2% for female analysts.
[22] Because CEO gender may affect the general gender attitude, we conduct a subsample analysis based on the CEO gender who is present in a conference all. No significant difference is found between these two samples.

between the two dictionaries could be because LM specifically designed their dictionaries for financial statements. Note that the differences in results across the two dictionaries suggest that female analysts are more positive in nonfinancial context but are similar to their male counterparts in financial topics, thus partially supporting Hypothesis H3a. Columns 3 and 4 report results for uncertainty (Loughran and McDonald, 2011) and numerical content (Zhou, 2018), respectively. Consistent with hypotheses H3b and H3c, they show that female analysts' narratives are more certain and include less numerical content.

Turning to the relationship between speech hesitation and analyst gender, Column 5 shows that *FemaleAna* negatively predicts *HesitAna*. This result is consistent with the notion that female analysts ask fewer aggressive questions that may lead to fewer hesitations, thus providing support for Hypothesis H3e.[23] Finally, in Column 6, we report Poisson regression results for *RallyAna*. Note that *netAna* is included in both Columns 5 and 6 because topics that are more negative could lead to more hesitation and more intense back-and-forth battles between analysts and executives. We also see that female analysts make 0.02 fewer comments in their interaction with management ($p<0.01$), consistent with Hypothesis H3e. In sum, the analysis of analyst narratives suggests that female analysts create a relatively more relaxed environment on conference calls and exert less pressure on executives. This is consistent with the notion that female analysts value connections with firm management more and are conservative when asking questions.

[Insert Table 6 here]

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[23] One concern is that hesitations are representative of lack of ability. We re-run the regression with all analyst-level control variables for all I/B/E/S analysts and observe similar results.

4.4.4 Executives' narrative characteristics

Hypothesis H4 predicts that female executive conference call participation is associated with less uncertain tone, more back-and-forth comments, and fewer speech hesitations. Table 7 present regression results testing this hypothesis. Similar to Table 6, we add *netAna* as a control variable because analysts lead the direction of discussion with firm management and thus, we can regard executives' narratives as a response to analysts' questions. In Column 1, we find, consistent with Hypothesis H4a, that *FemaleExe* negatively affects the percentage of uncertain sentiment.[24] Similarly, as shown in Column 2, there is a negative relationship between hesitations and female executives, supporting Hypothesis H4b. The effect is also economically important. Specifically, given a mean count of 2.1 hesitations for executives, female executives exhibit 0.24, or 12%, fewer hesitations. Consistent with Hypothesis H4C, the results in Column 3 indicate that interactions with only female executives have 0.036 more back-and-forth comments compared to interactions with only male executives. In sum, the results of Table 7 support hypotheses H4a through H4c that female executives are under greater pressure from analysts but are still more professional in answering questions compared with male executives.

[Insert Table 7 here]

4.4.5 Analyst-management interaction interruptions

We next examine hypothesis H5 regarding whether female participants are interrupted more than their male counterparts are. Table 8 contains the results. The dependent variable, *InterruptAnaExe*, is the total number of interruptions made by all executives and received by the focal analyst in a conference call.[25] Because statements that are more negative may incur more

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[24] Untabulated results show no difference in executive tone or numerical content by gender.
[25] Interruptions made by conference call operators are excluded (0.0014% of 9,965 interruptions).

interruptions, we control for the net tone of each analyst. Given that it is reasonable to believe that longer discourses are positively associated with interruptions, we also control for longer discourses with log-transformed total number of words the analyst speaks, *WordsAnaLog*.

Panel A reports Poisson regression results.[26] The estimated coefficients of *netAna* and *WordsAnaLog* are as expected. Unconditionally, we find that there is no difference in the interruptions of female analysts compared with their male counterparts. To investigate how female and male executives interrupt analysts' statements differently, we further separate interruptions made by female (*InterruptAnaFemaleExe*) and male (*InterruptAnaMaleExe*) executives and report results in Column 2 and Column 3, respectively. We add *FemaleExeCount* (*MaleExeCount*), the number of female (male) executives, to the corresponding model to eliminate its effect on the number of interruptions. The results indicate that a female analyst is interrupted 34% less when counting female executives' interruptions ($p<0.05$). However, we do not observe more interruptions made by male executives. In summary, the finding is generally unsupportive of hypothesis H5a and is consistent with an in-group favoritism explanation (Jannati et al., 2020) in which female executives treat female analysts more favorably by interrupting them less.

[Insert Table 8 here]

Table 8 Panel B examines interruptions received by executives. We aggregate all statements of a participating executive to generate one call-executive observation in the dataset. *FemaleExeDummy* is an indicator variable equal to 1 if the executive is female. The dependent variable, *InterruptExe*, is the number of interruptions the executive receives in a conference call. We include CEO and CFO dummies because interruptions are less likely to occur the higher is the

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[26] We create indicator variables, which are equal to 1 if a corresponding participant is interrupted and 0 otherwise, run logit regressions, and yield similar results in terms of gender difference.

status of the executive. We also add executive statement tone and length as additional controls as we expect that there will be more interruptions when the executive's tone is more negative. Results in Column 1 show that female executives receive 24% more interruptions compared with male analysts, supporting Hypothesis H5b.

Because both analysts and executives could interrupt a speaking executive, we separately count interruptions made by analysts (*InterruptExeAna* or *EA* in Column 2) and executives (*InterruptExeExe* or *EE* in Column 3). Among 10,178 interruptions made to executives, analysts account for 4,745 (47%) and executives account for 5,433 (53%). We add potential interrupter count (e.g. *AnaCount*, *ExeCount,* etc.) as a control in corresponding specifications because more potential interrupters may lead to more interruptions. Interestingly, interruptions made by analysts and executives exhibit similar gender bias as female executives receive 21% and 24% more interruptions made by analysts and other executives, respectively. To evaluate gender differences for interrupters, interruptions made by analysts and executives are each split based on the gender of interrupter (i.e., *InterruptExeFemaleAna* or *EFA* in Column 4, *InterruptExeMaleAna* or *EMA* in Column 5, *InterruptExeFemaleExe* or *EFE* in Column 6, and *InterruptExeMaleExe* or *EME* in Column 7). For example, *InterruptExeFemaleAna* denotes the number of interruptions made by female analysts towards the focal executive. Column 4 shows that there is no gender difference in female analyst interruptions, whereas Column 5 shows that female executives can expect to be interrupted 22% more by male analysts. In addition, when the interrupters are other female executives, female executives only receive 11.4% ($=e^{-2.17}$) of interruptions received by male executives (Column 6), again consistent with in-group favoritism. In contrast, male executives will interrupt their female colleagues 79% more often compared with interrupting their other male colleagues (Column 7). We therefore find support for Hypothesis H5b.

Collectively, our results show that men and women exhibit different patterns of interrupting other conference call participants. Women are more reluctant to interrupt other female participants while male executives are more inclined to interrupt women, especially their female colleagues. These findings echo prior evidence that women have a strong in-group favoritism (Rudman and Goodwin, 2004; Tannen, 1990) and demonstrate a potential "internecine conflict" (or male "power jockeying") and discrimination against women within C-suites.[27]

Since male executives are more likely to have high ranks in C-suite, this internecine conflict can be a result of high-ranked male executives' dominance over low-ranked female executives. To examine whether low-ranked male executives also interrupt high-ranked female executives, we first assign a rank score to each executive based on his/her title: CEO (*Rank*=3), CFO (*Rank*=2), and others (*Rank*=1). Next, we classify all interruptions made by male executives based on the relative rank between interrupters and interruptees. Specifically, interruptions made by male executives with lower rank score are called "challenging" interruptions and interruptions made by male executives with same or higher rank score are called "dominating" interruptions. *Challenge* (*Dominate*) is the number of "challenging" ("dominating") interruptions. We re-run the regressions in Table 8 Panel B by replacing *InterruptExeMaleExe* with *Challenge* and *Dominance* respectively and find that the estimated coefficient of *FemaleExeDummy* in the *Challenge* model is 1.88 times as large as that of the *Dominance* model (0.94 vs. 0.50). Economically, when considering only challenging (dominating) interruptions made by male executives, female executive receive 95% (50%) more interruptions compared with male executives. While both

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[27] One concern about the internecine rivalry in the C-suite is that female participants are more likely to be interrupted due to a hierarchy effect. Specifically, IR officers, who have relatively low status and are more likely to be women, are more likely to be interrupted by CEOs and CFOs, who have relatively high status and are more likely to be men. We believe this is not likely to be the case for two reasons. First, we check a small random sample of Q&A session transcripts and do not find IR officers speaking during interruption events. Second, the estimated coefficient of *CEO* and *CFO* are positive in Models 3, 6, and 7, indicating firm participants with a high status are more likely, rather than less likely, to be interrupted.

coefficients are positive and significant at 1% level, the results suggest that male executives have a stronger intention to interrupt their female colleagues with higher rank than with lower rank, consistent with both gender discrimination and male "power-jockeying".

4.4.6 Market reaction

In Table 9, we provide evidence on Hypothesis 6 where we examine the relationship between female analyst earnings conference call participation and the market reactions associated with the conference call. Specifically, we estimate and compare the market reaction to female and male analysts' tone. Market reaction is measured by the 4-factor adjusted CRSP value-weighted cumulative abnormal stock return over a [-1,+1] window around each conference call date (*CAR*). We use weighted average net tone (positive tone minus negative tone) of all participating female analysts in a call, *netFemaleAnaCall*, to proxy for the opinion of participating analysts. The net tone of male analysts, *netMaleAnaCall*, and the net tone of executives, *netExeCall*, are included along with firm and call controls.[28,29] In addition, we use the proportion of female analysts, *FemaleAnaPct*, to examine how the absolute value of *CAR*, |*CAR*|, is affected. If the market is less sensitive to female analysts' participation, we expect that the estimated coefficient of *netFemaleAnaCall* will be smaller than that of *netMaleAnaCall* and that *FemaleAnaPct* will be negative.

Column 1 contains *CAR* results and shows, consistent with our expectations, that *netFemaleAnaCall*, *netMaleAnaCall*, and *netExeCall*, are all positive and significant. Comparing the coefficients we see that the market reacts similarly to male analyst and executive tones (*p*=0.17 for F-test). However, the market reaction to analyst tone is significantly different by analyst gender

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[28] *netFemaleAnaCall* and *netMaleAnaCall* have a weak correlation (ρ=0.0095).
[29] Replacing each LM tone variable with its corresponding Harvard GI variable yields qualitatively similar results.

($p<0.001$ for F-test). Specifically, a 1% increase in female (male) analyst tone is associated with 0.5% (1.3%) higher market reaction. In Column 2, we find that all-female-analyst conference calls are associated with 0.58% lower market reaction magnitude, which translates to a 40 million dollar market capitalization difference at the sample mean. In sum, our market reaction analysis indicates that investors discount female analyst participation, thus providing support for Hypothesis H6.

[Insert Table 9 here]

5. Robustness tests

5.1. Gender as probability

One concern of our results is that may not be accurate because our initial assignment of gender is a binary variable and we draw inferences based on probabilities. To provide evidence on the robustness of our results, we replace the indicator variable, *FemaleAna*, with a continuous variable, *FemaleProb*, as the probability of being female given by each gender algorithm. Analysts determined manually as female (male) are assigned a probability of 1 (0).[30] Multivariate analysis results remain unchanged when we replace *FemaleAna* with *FemaleProb*.

5.2. Gender attitude and conference call participation

Our evidence of gender discrimination may result from a firm's general social responsibility characteristics. To capture firm social responsibility, we follow Lins et al. (2017) using the corporate social responsibility (CSR) score based on MSCI ESG Stats Database (formerly known as KLD).[31] To the extent that CSR score captures firm gender attitudes, more socially responsible firms may exhibit less discrimination against females.

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[30] Because *Gender-guesser* gives five possible results (male, female, mostly male, mostly female, and androgynous) instead of probability, we assign 0.25 (0.75) to "mostly male" ("mostly female"). Using other probability including 0.2/0.8 and 0.33/0.67 does not qualitatively change the results.

[31] See Krüger (2015) for a detailed discussion regarding MSCI ESG ratings.

We add an interaction term for *FemaleAna* (or *FemaleExe*) and CSR score in all regressions. Untabulated results indicate that the interaction term is not significant in almost all models. The only exception is that the disadvantage of female analysts in abnormal interaction length is weaker for high CSR firms. Specifically, a one-standard-deviation increase of CSR score is associated with a 1.17% increase in abnormal interaction length for female analysts. Apart from this latter result, the results indicate that firm-level gender characteristics and policies have little influence on direct and indirect gender discrimination on earnings conference calls. Collectively, we interpret these results as evidence that gender discrimination is deeply rooted in interpersonal communication as a micro-institution of gender-power relationships in society (Jacobi and Schweers, 2017; Zimmerman and West, 1975). However, the corporate gender equality movement is still relatively young and thus, our findings suggest that firm-level gender attitude is still drowned out in a larger gender inequality backdrop that is manifested in the earnings conference call environment.

6. Conclusion

In this paper we use a large sample of quarterly earnings conference call transcripts to investigate gender discrimination issues within the interactions between two high-profile professions—sell-side analysts and public firm executives. First, we find that women are at a disadvantage in conference call participation. Second, we investigate the linguistic characteristics of analysts and executives by parsing conference call transcripts into conversation blocks. We find conditional on analysts' participation that management of firms treats female analysts with less respect compared to their male counterparts during conference calls. Specifically, female analysts have fewer follow-up opportunities to interact with executives and speak less. Consistent with a relatively weaker status and a desire to be more agreeable in a male-dominated profession, female

analysts' narratives have more favorable tone, less numerical content, fewer speech hesitations, and fewer back-and-forth comments. We also find evidence consistent with gender stereotyping in firm management, with female executives displaying less uncertain sentiment and fewer speech hesitations when answering analysts' questions. However, they appear to be under more pressure from analysts with more back-and-forth comments.

We also examine the occurrence of interruptions during analyst-executive interactions in earnings conference calls and find that female analysts receive fewer interruptions from female executives compared with male executives—an in-group favoritism. In addition, we find that male executives treat male and female analysts equally in terms of interruptions. With regard to analysts' interruptions of executives, we find that female analysts interrupt female and male executives to a similar extent, but male analysts interrupt female executives more. Interestingly, while female executives tend to interrupt their female colleagues less, male executives are more likely to interrupt a female colleague than a male one, particularly when the female executive is in a superior role, suggesting an "internecine conflict" or gender-based "power jockeying". We also find that the stock market underreacts to female analysts' participation on conference calls and that our results are. Finally, our results are robust to using our gender variable as a probability and to a firms' general CSR attitude.

In sum, our results indicate that, although prior studies find that women possess superior ability as analysts (i.e., superior forecast accuracy, large brokerage affiliation, and all-star designation) that is valued by firm management (Fang and Huang, 2017; Green et al., 2009; Kumar, 2010), they are in general less "visible" and poorly treated during conference calls relative to male peers. Similarly, female executives are under pressure from both analysts and their male colleagues.

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Table 1 - Gender distribution

Table 1 reports the gender distribution of analysts for 442,211 call-analyst observations with respect to time (Panel A), sector (Panel B), and brokerage firm size (Panel C). Year is the calendar year of the conference call date. Sector represents GICS sectors. Brokerage type is based on the number of analysts hired by the brokerage firm: top 10 brokerages are the largest 10 brokerages in terms of the number of analysts affiliated in I/B/E/S. *%FemalePart* is the percentage of conference call or earnings estimate participation by female analysts. *%FemaleUnique* is the percentage of unique female analysts. *%FemaleFollowIBES* is the percentage of forecasts issued by female analysts in I/B/E/S sample. *%FemaleUniqueIBES* is the percentage of unique female analysts following in I/B/E/S sample.

Panel A. Conference call gender distribution by year

year	%FemalePart	%FemaleUnique	%FemaleFollowIBES	%FemaleUniqueIBES
2008	12.15%	11.89%	11.53%	13.02%
2009	11.82%	11.19%	10.72%	12.33%
2010	11.63%	11.22%	10.08%	11.71%
2011	11.10%	10.59%	9.79%	11.12%
2012	10.50%	11.22%	9.43%	10.94%
2013	10.23%	11.17%	9.43%	10.85%
2014	10.13%	11.90%	9.50%	11.07%
2015	10.36%	11.79%	9.70%	11.17%
2016	10.20%	12.48%	9.60%	11.53%

Panel B. Conference call gender distribution by sector

Sector	%FemalePart	%FemaleUnique	%FemaleForecastIBES	%FemaleUniqueIBES
Consumer Discretionary	18.47%	16.25%	17.07%	16.72%
Consumer Staples	24.17%	19.20%	23.93%	20.43%
Energy	6.90%	8.68%	7.04%	8.09%
Financials	8.50%	9.02%	7.45%	11.29%
Health Care	12.35%	14.80%	11.22%	15.98%
Industrials	7.96%	8.31%	7.22%	8.61%
Information Technology	6.72%	8.37%	6.45%	8.14%
Materials	7.20%	9.21%	5.09%	8.85%
Real Estate	9.74%	10.86%	4.39%	8.10%
Telecommunication Services	9.65%	7.29%	8.03%	5.17%
Utilities	8.05%	13.35%	11.69%	16.94%

Panel C. Conference call analyst gender distribution by brokerage firms

	%FemalePart		%FemaleUnique		%FemaleForecastIBES		%FemaleUniqueIBES	
	Top 10	Others	Top 10	Others	Top 10	Others	Top 10	Others
2008	16.17%	10.48%	17.96%	10.47%	14.13%	10.23%	16.87%	11.40%
2009	14.30%	10.26%	14.50%	10.50%	12.25%	10.02%	14.85%	11.29%
2010	13.45%	10.41%	14.47%	9.95%	11.77%	9.45%	14.38%	10.77%
2011	13.30%	9.93%	14.11%	9.74%	12.47%	8.89%	14.71%	9.86%
2012	11.29%	9.75%	14.85%	10.43%	12.39%	8.44%	13.79%	9.95%
2013	10.88%	9.35%	14.44%	10.62%	10.99%	8.83%	12.69%	10.16%
2014	10.30%	9.56%	13.19%	11.58%	9.52%	9.50%	11.82%	10.72%
2015	11.46%	9.65%	14.64%	11.51%	9.82%	9.65%	12.68%	10.45%
2016	13.01%	8.89%	16.41%	11.37%	10.88%	9.06%	14.47%	10.39%

Table 2 - Descriptive statistics

Table 2 reports descriptive statistics for conference call and firm variables of 442,211 conference calls. See Appendix B for variable definitions.

Panel A. Conference call variables

	mean	Q1	median	Q3
WordsQNA	3835.324	2534.000	3756.000	4988.000
FollowupCall	7.602	5.000	7.000	10.000
AnaCount	7.167	4.000	7.000	9.000
FemaleAnaCount	0.763	0.000	0.000	1.000
FemaleAnaPct	0.098	0.000	0.000	0.167
ExeCount	3.411	3.000	3.000	4.000
FemaleExeCount	0.439	0.000	0.000	1.000
FemaleExePct	0.128	0.000	0.000	0.250
CEOPart	0.596	0.000	1.000	1.000
CFOPart	0.581	0.000	1.000	1.000
CEOCFOPart	0.522	0.000	1.000	1.000
CEOCFOCount	1.188	0.000	2.000	2.000
FemaleCEOCFOCount	0.075	0.000	0.000	0.000
FemaleCEOCFOPct	0.041	0.000	0.000	0.000

Panel B. Firm variables

	mean	Q1	median	Q3
MktCap	6929.626	469.768	1415.135	4542.676
Leverage	2.601	1.242	1.562	2.357
MB	2.862	1.165	1.925	3.375
ROA	0.010	0.001	0.016	0.043
SP500	0.217	0.000	0.000	0.000
InstOwn	0.666	0.526	0.738	0.878
AnaCover	10.720	5.000	8.000	15.000
SUE	0.035	-0.042	0.042	0.219
RecCon	0.721	0.380	0.730	1.000
Runup	-0.007	-0.078	0.000	0.066
CallCluster	43.110	5.000	15.000	69.000

Table 3 - Analyst gender differences in conference calls

Table 3 reports the results of two sample t-tests of call-analyst level variables with respect to analyst characteristics (Panel A), analyst participation (Panel B), and analyst narratives (Panel C) based on analyst gender. Executive narrative variables are reported in Panel D. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. See Appendix B for variable definitions.

Panel A. Analyst characteristics

	N	Male	Female	Difference	t-stat
AllStar	327757	0.150	0.219	-0.069	-33.827***
BrokerSize	327757	61.729	67.746	-6.017	-23.618***
GenExp	327757	14.372	13.458	0.913	16.861***
FirmExp	327757	5.041	5.266	-0.225	-8.249***
CompCover	327757	16.216	14.653	1.562	33.958***
IndCover	327757	3.056	2.706	0.350	30.079***
ForeAcc	327757	0.101	0.110	-0.009	-2.590**
CCUser	327757	6.562	6.079	0.483	18.332***
Rec	327757	0.504	0.438	0.066	16.661***
RecHorizon	327757	517.082	530.001	-12.919	-4.326***

Panel B. Analyst participation variables

	N	Male	Female	Difference	t-stat
First	442211	0.142	0.128	0.014	8.109***
Followup	442211	1.054	1.042	0.012	11.142***
WordsAna	442211	157.400	136.722	20.678	49.269***
RallyAna	442211	3.387	3.085	0.302	28.809***

Panel C. Analyst narrative variables

	N	Male	Female	Difference	t-stat
InterruptAna	442211	0.022	0.017	0.005	5.949***
HesitAna	442211	0.923	0.706	0.217	29.484***
positiveAna	442211	1.088	1.148	-0.060	-11.503***
negativeAna	442211	1.284	1.343	-0.059	-10.732***
netAna	442211	-0.195	-0.194	-0.001	-0.112
uncertainAna	442211	1.643	1.592	0.051	7.931***
positiveGIAna	442211	3.089	3.108	-0.019	-2.199*
negativeGIAna	442211	0.930	0.915	0.014	2.922**
netGIAna	442211	2.160	2.193	-0.033	-3.366***
numberAna	442211	0.751	0.630	0.121	24.021***

Panel D. Executive narrative variables

	N	Male	Female	Difference	t-stat
WordsExe	169432	1036.805	593.494	443.311	51.610***
InterruptExe	169432	0.058	0.047	0.011	3.888***
HesitExe	169432	5.957	2.941	3.016	35.691***
positiveExe	169432	1.377	1.170	0.207	25.564***
negativeExe	169432	0.828	0.915	-0.086	-12.875***

netExe	169432	0.549	0.263	0.286	26.750***
positiveGIExe	169432	3.234	3.409	-0.175	-12.679***
negativeGIExe	169432	0.941	0.825	0.116	18.818***
netGIExe	169432	2.296	2.596	-0.300	-19.302***
uncertainExe	169432	0.909	0.798	0.111	18.151***

Table 4 - Analyst gender and conference call participation

This table reports logit regression results for analyst conference call participation by gender in the I/B/E/S sample. The dependent variable *Participate* is an indicator variable equal to 1 if the analyst asks a question on the quarterly conference call of the firm he/she covers and 0 otherwise. Standard errors are clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. See Appendix B for variable definitions.

	(1)	(2)	(3)
VARIABLES	Participate	Participate	Participate
FemaleAna	-0.071***	-0.119***	-0.124***
	(0.024)	(0.027)	(0.028)
AllStar	0.286***	0.257***	0.277***
	(0.023)	(0.024)	(0.024)
FemaleAna×AllStar		0.230***	0.253***
		(0.057)	(0.060)
Rec	0.313***	0.310***	0.318***
	(0.008)	(0.008)	(0.008)
ForeAcc	0.166***	0.162***	0.175***
	(0.006)	(0.006)	(0.006)
GenExp	-0.019***	-0.018***	-0.020***
	(0.002)	(0.002)	(0.002)
FirmExp	0.027***	0.027***	0.034***
	(0.002)	(0.002)	(0.002)
IndCover	-0.008	-0.002	-0.012**
	(0.005)	(0.005)	(0.005)
CompCover	-0.019***	-0.022***	-0.021***
	(0.001)	(0.001)	(0.001)
BrokerSize	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)
RecHorizon	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
CCUser	0.015***	0.018***	0.017***
	(0.002)	(0.002)	(0.002)
SUE			0.011**
			(0.005)
Afternoon			-0.055***
			(0.019)
AnaCover			-0.047***
			(0.001)
WordsQNALog			0.158***
			(0.004)
Constant	-2.872***	-2.924***	-3.046***
	(0.487)	(0.480)	(0.475)

Observations	668,551	668,551	668,551
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Brokerage FE	Yes	Yes	Yes
Pseudo R^2	0.077	0.072	0.093

Table 5 - Participation prioritization of conference calls

Table 5 reports the call-analyst level logit (Model 1), Poisson (Model 2), and OLS (Model 3 and 4) regression results for conference call prioritization. *First* is an indicator variable which equals 1 if an analyst is the first one to ask question. *FollowUp* is the number of non-continuous interactions for the analyst. *AbnLength* is the abnormal interactions length. Standard errors are clustered at firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. See Appendix B for variable definitions.

	(1)	(2)	(3)	(4)
VARIABLES	First	FollowUp	AbnLength	AbnLength
FemaleAna	-0.005	-0.005***	-4.140***	-4.114***
	(0.031)	(0.002)	(0.458)	(0.480)
FemaleExe				-8.060***
				(0.981)
FemaleAna×FemaleExe				-0.297
				(1.756)
Rec	0.242***	0.006***	1.414***	1.413***
	(0.011)	(0.001)	(0.153)	(0.153)
AnaCountLog	-1.307***	-0.044***	9.275***	9.321***
	(0.009)	(0.003)	(0.262)	(0.262)
WordsQNALog	-0.045***	0.064***	-2.383***	-2.501***
	(0.007)	(0.003)	(0.145)	(0.149)
Order		-0.008***	-2.547***	-2.543***
		(0.000)	(0.061)	(0.061)
Constant	1.059***	-0.334***	12.937***	14.253***
	(0.048)	(0.019)	(1.066)	(1.104)
Observations	442,211	442,211	442,211	442,211
Firm controls	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Pseudo-R^2	0.068	0.002		
Adjusted R^2			0.028	0.029

Table 6 - Analyst gender and textual characteristics

Table 6 reports OLS regression (Column 1 to Column 4) and Poisson regression (Column 5 and Column 6) results of analyst narrative textual characteristics. *netAna* is the percentage of net tone of the analyst based on Loughran and McDonald (2011) dictionary. *netGIAna* is the percentage of net tone of the analyst based on Harvard GI dictionary. *uncertainAna* is the percentage of uncertain words based on Loughran and McDonald (2011) dictionary. *numberAna* is the percentage of numerical content in analysts' statements. *HesitAna* is the number of speech hesitations of the analyst. *RallyAna* is the average number of back-and-forth comments for the analyst in a conference call. Standard errors are clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. See Appendix B for variable definitions.

VARIABLES	(1) netAna	(2) netGIAna	(3) uncertainAna	(4) numberAna	(5) HesitAna	(6) RallyAna
FemaleAna	-0.014	0.036***	-0.052***	-0.082***	-0.177***	-0.020***
	(0.013)	(0.013)	(0.011)	(0.007)	(0.017)	(0.006)
Rec	0.033***	0.025***	0.028***	-0.007***	0.017***	0.009***
	(0.004)	(0.005)	(0.004)	(0.002)	(0.005)	(0.002)
AnaCountLog	-0.158***	-0.016	-0.040***	-0.016	-0.842***	-0.475***
	(0.016)	(0.020)	(0.013)	(0.010)	(0.019)	(0.008)
WordsQNALog	0.028**	-0.039**	-0.002	0.064***	0.829***	0.466***
	(0.014)	(0.018)	(0.011)	(0.009)	(0.016)	(0.007)
netAna					-0.011***	0.007***
					(0.002)	(0.001)
Constant	-0.071	2.650***	1.668***	0.171***	-4.895***	-1.500***
	(0.100)	(0.132)	(0.077)	(0.062)	(0.114)	(0.046)
Observations	442,211	442,211	442,211	442,211	442,211	442,211
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.033	0.028	0.017	0.043		
Pseudo R^2					0.138	0.108

Table 7 – Executive gender and narrative variables

Table 7 reports OLS (Column 1), Poisson (Colum 2 and Column 3) regression results of executive narrative textual characteristics. *uncertainExe* is the percentage of uncertainty words spoken by executives based on the Loughran and McDonald (2011) dictionary. *HesitExe* is the number of speech hesitations of the executives. *RallyAna* is the average number of back-and-forth comments for the analyst in a conference call. Standard errors are clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. See Appendix B for variable definitions.

VARIABLES	(1) uncertainExe	(2) HesitExe	(3) RallyAna
FemaleExe	-0.040***	-0.242***	0.036***
	(0.015)	(0.032)	(0.011)
netAna	-0.013***	0.004***	0.007***
	(0.001)	(0.001)	(0.001)
Rec	-0.002	0.026***	0.009***
	(0.001)	(0.003)	(0.002)
AnaCountLog	0.011	-1.093***	-0.475***
	(0.008)	(0.015)	(0.008)
WordsQNALog	-0.007	1.142***	0.467***
	(0.007)	(0.014)	(0.007)
Constant	0.968***	-6.188***	-1.508***
	(0.052)	(0.100)	(0.046)
Observations	442,211	442,211	442,211
Firm controls	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Adjusted R^2	0.085		
Pseudo R^2		0.270	0.108

Table 8 - Interruptions

Table 8 reports Poisson regression results of interruptions towards analysts (Panel A), executives (Panel B), and challenging vs. dominating interruptions by male executives (Panel C). *InterruptAnaExe* is the number of times the analyst is interrupted by executives on a conference call. *InterruptAnaFemaleExe* is the number of times the analyst is interrupted by female executives on a conference call. *InterruptAnaMaleExe* is the number of times the analyst is interrupted by male executives on a conference call. *InterruptExe (E)* is the number of times the executive is interrupted by the analyst or other executives on a conference call. *InterruptExeAna (EA)* is the number of times the executive is interrupted by the analyst on a conference call. *InterruptExeAna (EE)* is the number of times the executive is interrupted by other executives on a conference call. *InterruptExeFemaleAna (EFA)* is the number of times the executive is interrupted by a female analyst on a conference call. *InterruptExeMaleAna (EMA)* is the number of times the executive is interrupted by a male analyst on a conference call. *InterruptExeFemaleExe (EFE)* is the number of times the executive is interrupted by female executives on a conference call. *InterruptExeMaleExe (EME)* is the number of times the executive is interrupted by male executives on a conference call. *Chanllenge* is the number of times the executive is interrupted by male executives with a lower rank on a conference call. *Dominate* is the number of times the executive is interrupted by male executives with a higher or same rank on a conference call. *ExeCount* is the number of executives. *FemaleExeCount* (*MaleExeCount*) is the number of female (male) executives. *FemaleExeDummy* is an indicator equal to 1 if the executive is female and 0 otherwise. *WordsExeLog* is the natural log of the number of words spoken by the executive. CEO (CFO) is an indicator variable equal to 1 the executive is the CEO (CFO) of the firm. *netExe* is the net tone of the executive. *AnaCount* is the number of analysts on the conference call. *FemaleAnaCount* is the number of female analysts. *MaleAnaCount* is the number of male analysts. Standard errors are clustered at firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. See Appendix B for variable definitions.

Panel A. Analyst interruptions

VARIABLES	(1) InterruptAnaExe	(2) InterruptAnaFemaleExe	(3) InterruptAnaMaleExe
FemaleAna	-0.062	-0.338**	-0.043
	(0.047)	(0.167)	(0.049)
netAna	-0.041***	-0.044	-0.041***
	(0.008)	(0.039)	(0.008)
WordsAnaLog	1.245***	1.411***	1.235***
	(0.029)	(0.113)	(0.030)
Rec	-0.034**	-0.019	-0.036**
	(0.017)	(0.070)	(0.017)
FemaleExeCount		1.069***	
		(0.188)	
MaleExeCount			0.014
			(0.025)
Constant	-8.733***	-11.416***	-8.775***
	(0.272)	(0.987)	(0.287)
Observations	442,211	442,211	442,211
Firm controls	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Pseudo R^2	0.191	0.191	0.193

Panel B. Executive interruptions

VARIABLES	(1) E	(2) EA	(3) EE	(4) EFA	(5) EMA	(6) EFE	(7) EME
FemaleExeDummy	0.236***	0.207*	0.237***	0.103	0.222**	-2.170***	0.790***
	(0.077)	(0.108)	(0.092)	(0.221)	(0.113)	(0.358)	(0.109)
CEO	0.328***	0.132**	0.500***	0.149	0.129*	0.329	0.536***
	(0.053)	(0.063)	(0.070)	(0.159)	(0.067)	(0.257)	(0.073)
CFO	0.440***	0.474***	0.440***	0.221	0.504***	0.541**	0.472***
	(0.047)	(0.060)	(0.060)	(0.163)	(0.064)	(0.235)	(0.062)
netExe	-0.126***	-0.188***	-0.081***	-0.214***	-0.184***	-0.016	-0.081***
	(0.016)	(0.023)	(0.021)	(0.066)	(0.024)	(0.101)	(0.021)
WordsExeLog	0.657***	0.876***	0.506***	0.907***	0.871***	0.822***	0.504***
	(0.020)	(0.028)	(0.024)	(0.087)	(0.029)	(0.106)	(0.025)
AnaCount		0.066*					
		(0.037)					
ExeCount			0.054*				
			(0.028)				
FemaleAnaCount				0.435***			
				(0.076)			
MaleAnaCount					0.115***		
					(0.025)		
FemaleExeCount						0.888***	
						(0.266)	
MaleExeCount							0.109***
							(0.030)
Constant	-6.315***	-8.419***	-5.973***	-9.921***	-8.464***	-9.192***	-6.270***
	(0.213)	(0.279)	(0.281)	(0.676)	(0.298)	(1.091)	(0.280)
Observations	169,432	169,432	169,432	169,432	169,432	169,432	169,432
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.250	0.206	0.244	0.201	0.204	0.279	0.241

Panel C. Challenging vs. dominating interruptions by male executives

VARIABLES	(1) Challenge	(2) Dominate
FemaleExeDummy	0.945***	0.503***
	(0.195)	(0.142)
CEO	4.153***	
	(0.243)	
CFO	2.597***	0.933***
	(0.254)	(0.076)
netExe	-0.132***	-0.072***
	(0.043)	(0.024)
WordsExeLog	0.726***	0.266***
	(0.061)	(0.024)
MaleExeCount	0.240***	0.025
	(0.045)	(0.038)
Constant	-11.958***	-4.655***
	(0.631)	(0.338)
Observations	169,432	169,432
Firm controls	Yes	Yes
Year-quarter FE	Yes	Yes
Firm FE	Yes	Yes
Pseudo R^2	0.391	0.201

Table 9 - Market reaction

Table 9 reports OLS regression results of equity market reactions at the conference call level. The dependent variable, *CAR*, is the Fama-French 4-factor adjusted cumulative return over the [-1, +1] window relative to the conference call date. Column 1 and Column 2 report the subsample results based on whether *CAR* is positive or negative. *FemaleAnaPct* is percentage of female analysts participating. *FemaleAnaCount* is the number of female analysts participating. *netFemaleAnaCall* is the weighted average net tone for female analysts in a conference call. *netMaleAnaCall* is the weighted average net tone for male analysts in a conference call. *netExeCall* is the net tone of all executives in the call. Standard errors are clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. See Appendix B for variable definitions.

	(1)	(2)
VARIABLES	CAR	|CAR|
netFemaleAnaCall	0.499***	
	(0.068)	
netMaleAnaCall	1.271***	
	(0.054)	
FemaleAnaPct		-0.578**
		(0.234)
netExeCall	1.147***	
	(0.066)	
AnaCountLog	1.030***	0.108
	(0.153)	(0.104)
WordsQNALog	-0.941***	0.520***
	(0.129)	(0.085)
Constant	6.435***	0.478
	(0.918)	(0.603)
Observations	62,644	62,644
Firm controls	Yes	Yes
Year-quarter FE	Yes	Yes
Firm FE	Yes	Yes
Adjusted R^2	0.096	0.224

Appendix A – Sample construction

	Conference calls
Initial sample	81,677
Merge with I/B/E/S to obtain quarterly forecasts / recommendations related to earnings conference calls	70,224
Remove observations without at least one corresponding quarterly earnings forecast issued within 365 days prior to the earnings conference call. Remove estimates without analyst name, brokerage ID (ESTIMID). Remove estimates made by team (i.e., analyst name is "RESEARCH DEPARTMENT" or two last names separated by "/")	70,023
Drop observations for which two or more analysts have the same first initial and last name at the same brokerage	69,995
Remove observations for which the firm is covered by only one analyst for a fiscal quarter end	66,813
Remove observations with no Compustat/CRSP data	65,888
Keep the last quarterly forecast prior to conference call date	63,720
Remove observation with missing values	**62,644**

Appendix B – Variable definitions

Variables	Definition
Conference call level variables	
MktCap	Market value of equity, in million dollars
Leverage	Book value of debt and equity divided by the market value of equity.
MB	Ratio of market value of equity to book value of equity.
ROA	Net income in the most recent quarter divided by total assets
SP500	Indicator variable equal to 1 if a firm is a component of Standard and Poor's 500 index and 0 otherwise.
InstOwn	Percentage of aggregate institutional ownership in shares outstanding of firm in the Thomson Reuters 13-F filing immediately prior to conference call date.
AnaCover	Number of analysts issuing one-quarter-ahead or two two-quarter-ahead forecast and having an outstanding stock recommendation for the current fiscal quarter
SUE	Actual quarterly EPS minus consensus EPS forecast, scaled by the stock price at the quarter end
RecCon	Mean stock recommendation scaled into [-2,+2] discrete interval as of the conference call date. -2 indicates strong sell and +2 indicates strong buy.
Runup	Fama-French 4-factor adjusted cumulative return during the [-42,-2] window relative to the conference call date
CallCluster	Number of other conference calls with the same 3-digit SIC code as the focal conference call held in the same calendar quarter
WordsQNA	Log-transformed number of words spoken in question-and-answer portion of conference call, in thousands
FollowupCall	Number of non-continuous interactions between analysts and executives in a call
AnaCount	Number of analysts in the conference call
IBESCount	Number of IBES analysts in the conference call
IBESPart	Indicator variable equal to 1 if at least one IBES analyst participates
ExeCount	Number of executives in the conference call
CEOPart	Indicator equal to 1 if CEO attends the conference call
CFOPart	Indicator equal to 1 if CFO attends the conference call
CEOCFOPart	Indicator equal to 1 if both CEO and CFO attend the conference call
FemaleAnaPct	Proportion of female analysts, in decimal
CAR	Fama-French 4-factor adjusted cumulative return during the [-1,+1] event window relative to the conference call date
netAnaCall	Weighted average net tone (positive tone minus negative tone) of all participating analysts in a call
netExeCall	Weighted average net tone (positive tone minus negative tone) of all participating executives in a call
CsrDiv	Net CSR score based on *Diversity* category in MSCI ESG Stats Database
Csr5	Net CSR score based on *Community, Diversity, Employee Relations, Environment, Human Rights* categories in MSCI ESG Stats Database
Csr7	Net CSR score based on seven major categories in MSCI ESG Stats Database
CsrAll	Net CSR score based on seven major categories and six Controversial Business Issues categories in MSCI ESG Stats Database

Analyst-call level variables

FemaleAna	Dummy variables equal to 1 if the analyst is female
FemaleExe	Proportion of executive narratives accounted by female executives
Participate	Indicator variable equal to 1 if an analyst asks a question in firm's quarterly earnings conference call and 0 otherwise.
First	Indicator equal to 1 if this is the analyst is the first questioner in the call
Order	Order of analyst interaction with management in the call
Words	Number of words spoken by the analyst (with suffix *Ana*) or executives (with suffix *Exe*)
AbnLength	Abnormal interaction length for each participant, measured as the standardized difference between the participant's actual length of interactions and the average interaction length for the call
RallyAna	Number of back-and-forth comments between the analyst and executive for the analyst
Interrupt	Number of times analyst (with suffix *Ana*) or executives (with suffix *Exe*) is interrupted by another conference call participant for the analyst. See Table 9 for detailed definitions
Hesit	Number of times analyst (with suffix *Ana*) or executives (with suffix *Exe*) self-corrects or has a broken thought in this conversation
Words	Number of words spoken by analyst (with suffix *Ana*) or executives (with suffix *Exe*)
numberAna	Percentage of numbers the analyst speaks in this conversation/interaction
numberExe	Percentage of numbers the executive speaks in this conversation/interaction
Tone	Percentage of sentiment words in the analyst's (with suffix *Ana*) or executives' (with suffix *Exe*) narrative based on Loughran and McDonald (2011) dictionary. *Tone* can be positive, negative, or net sentiment
ToneGI	Percentage of sentiment words in the analyst's (with suffix *Ana*) or executives' (with suffix *Exe*) narrative based on Harvard GI dictionary. *Tone* can be positive, negative, or net sentiment
net	Net sentiment of combined analyst's and executives' narratives
Rec	I/B/E/S stock recommendation score prior to the conference call in [-2, +2] interval. 2 indicates strong buy, 1 indicates buy, 0 indicates hold, -1 indicates sell, and -2 indicates strong sell.
AllStar	Indicator variable equal to 1 if an analyst is voted as Institutional Investor All-American research team in the prior calendar year of the conference call.
ForeAcc	Negative value of the absolute forecast error demeaned by same quarter-firm average forecast for previous quarter
BrokerSize	Number of analysts hired by affiliated brokerage firm of an analyst in the prior calendar year of the conference call.
GenExp	Number of years between the analyst's first forecast date for the firm and the conference call date.
FirmExp	Number of years between the first forecast date of an analysts and the conference call date.
CompCover	Number of firms covered by an analyst in the prior calendar year of the conference call.
IndCover	Number of Fama-French 48 industries covered by an analyst in the prior calendar year of the conference call.
RecHorizon	Number of days between most recent recommendation announcement date and conference call date
CCUser	Number of other conference calls on which the analyst participates in the same calendar quarter as the focal conference call

Executive-call level variables

CEO	Indicator equal to 1 if the executive is the CEO in most recent fiscal year
CFO	Indicator equal to 1 if the executive is the CFO in most recent fiscal year
FemaleExeDummy	Indicator equal to 1 if the executive is female

Appendix C – Interruption and back-and-forth comments in conference calls

Appendix C show an excerpt for the interaction between BMO Capital Markets analyst, Richard C. Anderson, and two company participants, Timothy M. Schoen and James F. Flaherty, on the quarterly earnings conference call for HPC, Inc. on May 1st, 2012. Richard and James are interrupted by each other twice (identified by "…" and coded as *InterruptAnaExe*=2 and *InterruptExeAna=2*). Richard exhibits two hesitations (identified by "--"and coded as *HesitAna=2*) and exhibits James exhibits six hesitations (*HesitExe*=6). Seth makes seven statements resulting in a value of 7 for *RallyAna*.

Timothy M. Schoen
Chief Financial Officer and Executive Vice President
The insurance recovery and the Google payment was in our guidance.

Richard C. Anderson
BMO Capital Markets U.S.
Okay. That's what I thought. And, Jay, just maybe to refine the acquisition question a little bit for you, what -- of the 5x5 matrix that you talk about, what property type within that, do you think fits best in an environment that you're describing, with a lot of uncertainty, that you would say, this is **the -- maybe** the least risky or the best fit in the environment that you're in right now?

James F. Flaherty
Former Director
Well, if you want to call the ballgame based on lowest risk, that would probably **be...**

Richard C. Anderson
BMO Capital Markets U.S.
I think risk is part of the conversation, **but...**

James F. Flaherty
Former Director
I'm just thinking your question. You defined the question in terms of risk. If you want to know what the lowest risk piece of our economic business model is, it's probably on-campus medical office buildings where the hospital is the #1 or #2 market share hospital system in a growing area. But that's just, that **was -- from** our standpoint, we wouldn't stop there. (continued)

Richard C. Anderson
BMO Capital Markets U.S.
Okay. But what would be some of those other elements where you'll pull the trigger in this environment?

James F. Flaherty
Former Director
Valuation, condition, i.e. fiscal obsolescence, CapEx obsolescence of the portfolio that we're acquiring, quality of the counter party, both from the standpoint **of -- you've** heard me talk forever

about, we want to have counter parties that have 3 criteria: quality outcomes, efficient operations and critical mass. So those are the **whole -- it's** kind of **a -- it's** a large algorithm that comes into play.

Richard C. Anderson
BMO Capital Markets U.S.
Do you think life sciences is well placed right now in this environment?

James F. Flaherty
Former Director
I think life science located in one of the 4 or 5 concentrations that are the recipients of the NIH grants is how I'd start that discussion. However, then you have to get and look at the characterization of the tenants. Are they more VC-backed private companies that are working 1 or 2 drugs through a Phase I, Phase II, Phase III ultimately FDA approval process? That would have a lot of risk associated with it. Or are they very substantial companies like Amgen, like Genentech, like Takeda, like Pfizer, like Google, like LinkedIn, sorry. That would have a different element to it. And then I think you really need to think **about -- this** isn't going to impact anything in terms of 2012, 2013. (continued)

Richard C. Anderson
BMO Capital Markets U.S.
And then lastly, just, I think more of a comment. (continued)

James F. Flaherty
Former Director
Well, we'll certainly take it under advisement. They're just not -- as you know, there's not a lot moving around. But we like to give guidance on our company's results. We think it's a little inappropriate for us to be giving guidance on another company's results, particularly when they have their own strategic plan that **they're...**

Richard C. Anderson
BMO Capital Markets U.S.
You can take their results out of it, and just say what happens to your results in terms of coverage. **Anyway...**

James F. Flaherty
Former Director
We're certainly willing to take a peek at that.

Appendix D – Gender determination procedure

```
                              First name
                                  │
                                  ▼
                            ┌──────────────┐
                            │  Check with  │
                            │  gender (R)  │
                            └──────────────┘
                                  │
                                  ▼
        Yes                    ╱Got╲
  ┌───────┐  ◄───────────────◄  gender?  ╲
  │  End  │                    ╲         ╱
  └───────┘                       ▼ No
                            ┌──────────────┐
                            │  Check with  │
                            │ gender-guesser│
                            │   (Python)   │
                            └──────────────┘
                                  │
                                  ▼
        Yes                    ╱Got╲
  ┌───────┐  ◄───────────────◄  gender?  ╲
  │  End  │                    ╲         ╱
  └───────┘                       ▼ No
                            ┌──────────────┐
                            │  Check with  │
                            │  gender-api  │
                            │(gender-api.com)│
                            └──────────────┘
                                  │
                                  ▼
        Yes                    ╱Got╲
  ┌───────┐  ◄───────────────◄  gender?  ╲
  │  End  │                    ╲         ╱
  └───────┘                       ▼ No
                            ┌──────────────┐
  ┌───────┐                 │              │
  │  End  │  ◄──────────────│ Manual check │
  └───────┘                 └──────────────┘
```