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Comments

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Abstract

Conventional wisdom suggests that the public release of financial analyst output is informative to traders about firm value. However, empirical tests of this mechanism have encountered difficulties in isolating the release of analyst output from concurrent intervening events such as analysts' private-client communications. Earnings conference calls provide a unique opportunity to overcome this obstacle: both analyst remarks and stock price movements can be measured publicly in real time. Accordingly, we find that the linguistic tone of analyst comments during the call is significantly associated with intraday returns after appropriately controlling for management disclosures, explaining about one-third of the stock price movement during the discussion period. In reacting to analyst tone, traders anticipate future analyst predictions and recommendations on the company, which can help to explain why prior studies have found mixed evidence on the price reaction to the release of those products. Overall our findings suggest that traders use the public release of analyst output to determine firm value.

1 Introduction

Informativeness of analyst output continues to remain an open question. While several studies document significant price reactions to analyst outputs (e.g., Brav and Lehavy, 2003; Huang et al., 2014; Li et al., 2015), other studies reach the opposite conclusion, showing that analyst outputs such as recommendations have little returns impact both in the short and the long run (e.g., Altinkilic and Hansen, 2009; Altinkilic et al., 2016; Li and You, 2015). One potential explanation is that analysts may have privately communicated with investors in some cases, and prices could have already moved by the time the analyst output is observable to the researcher.¹ For example, if such private conversations are more recent phenomena, they could explain why Altinkilic et al. (2016) find that analyst recommendations are not informative in the present era, but were in the past. One way to bypass the possibility that analyst private communication drives the non-results in this literature is to analyze a setting in which analysts publicly reveal their beliefs at the onset of belief formation. This study conducts such an analysis.

Specifically, this study examines the intraday stock price reaction to financial analyst comments and questions in earnings conference calls. These calls, which typically occur right after quarterly earnings announcements, are demonstrably important public disclosure events where management releases new information (Frankel et al., 1999; Matsumoto et al., 2011; Mayew and Venkatachalam, 2012).² On the call, management first summarizes the company's performance, and then immediately takes questions and comments from financial analysts. If this analyst assessment is additionally informative to traders, it should quickly impact prices. For example, when an analyst remarks "that is great news," the analyst assessment is likely positive. Therefore, if price reacts positively to a positive analyst remark

¹See Soltes (2014) and Brown et al. (2015) for evidence on private phone calls (e.g., "call backs") between analysts and key parties like management and large investors. Also see Massachusetts Consent Order 2013-0014 in the matter of Citigroup Global Markets Inc. for similar evidence on private communications between analysts and key investors.

²This is especially true in the post Regulation Fair Disclosure (Reg FD) era where management faces the risk of legal sanctions if it leaks material information to select analysts (e.g., Gintschel and Markov, 2004).

(and negatively to a negative remark), it suggests that traders view analysts' comments as being informative over and above the disclosures themselves (e.g., analysts are revealing private information or adding credibility or skepticism to management's disclosures). If other explanations for this result can be convincingly accounted for, one can conclude that analysts are informative.³

We identify analyst comments and questions from the transcripts of about 46,000 conference calls that occurred during trading periods from 2002 to 2013 (post Reg FD era). To measure analyst tone, we use the Loughran and McDonald (2011) linguistic tone dictionary and identify the number of positive (i.e., optimistic) versus negative (i.e., pessimistic) words in each analyst question and comment. For example, if an analyst says "that is great news," we conjecture that the analyst has developed a more positive belief about firm value, and vice versa for a negative comment (see Appendix A for an example). By contrast, if no such statement is made, we conjecture that there was no change to analysts' beliefs. We measure analyst tone as the difference of positive to negative words scaled by the sum of positive and negative words. We validate our tone measure at the analyst level by showing that an individual analyst's tone predicts her future calls on the company—this implies that tone reflects an analyst's assessment of the firm. With this property of tone established, we next use it in our intraday returns tests.⁴

We first find that prices react to management presentation and earnings news, suggesting that these disclosures are informative. We then find that prices react strongly to analyst tone during the Q&A portion of the call (which is when analysts are speaking) and also in the 30 minutes following the call. For a one standard deviation increase in analyst tone, abnormal

³Brockman et al. (2015) also study analyst tone in conference calls, but as we describe in detail at the end of this section, there are substantial differences between our goals and research design and theirs.

⁴We motivate the use of this dictionary in Section 2.2.1. The idea that linguistic analysis of communication is informative is by no means new (e.g., Tetlock et al., 2008; Li, 2010). However, what is important to note is that, depending on its purpose, linguistic analysis of speech can take different forms: some analyses measure the occurrence of financial words (Matsumoto et al., 2011), while others look for self-attribution and other psychological traits of the speaker (Larcker and Zakolyukina, 2012). Our innovation is to use linguistic analysis not to measure the information content of management's disclosures, but to measure in real time the beliefs of capital market participants during the call.

returns increase by 0.031 percent during the Q&A portion of the call (1% level) and 0.036 percent (1% level) from the end of the Q&A to 30 minutes after that. These returns amount to a third of the total unsigned return for the discussion period and build on prior work that interprets returns during the call as being driven primarily by management disclosures. More important, most firms in our sample have four calls per year, which implies that on an annual basis our results are actually quite substantial in terms of the effect on firm value (e.g., 0.124% of firm value for the Q&A, on average). Our analysis incorporates a rich set of regressors including measures of information just released by management, which we show are related to analyst tone. All our tests are also within-firm, within-year-quarter analyses; this largely eliminates the possibility that our findings are driven by persistent firm-specific factors such as the extent of manager-analyst agency problems in conference calls, or time-effects such as market-wide innovations in trading technologies. To add more depth to our findings, we also take advantage of our extensive data and discuss some dynamics of analyst (and management) tone in Section 3.2 and in Figures 2 to 6.

To conclude from the previous results that analyst comments contain information not present in management disclosures themselves, we must establish that traders are reacting to analysts' comments, and that both parties are not reacting to correlated past events or future expected events. To do so, we must eliminate several alternative explanations. For example, the immediate price reaction to analyst tone could be the result of smart investors guessing what analysts are likely to say to their institutional clients, and then front-running these clients' trades. We control for such front-running by including future abnormal institutional trading as a regressor. It could also be that investors are sentiment-driven and not rationally news-driven. We show otherwise in our return reversal tests. Analysts likewise could be responding in real time not to managers' disclosures, but to stock price movements, sounding more optimistic as they see prices rise. We control for this possibility as well by including in our analysis a return window shortly after the call, a period when analysts are silent (and thus cannot be responding to price itself), but when traders are plausibly still

acting on analyst comments.

To further ensure that other correlated intervening events are not driving our results, we re-affirm our main result after removing calls that overlap in time with analysts' revisions of their other outputs, such as earnings forecasts and recommendations (see Section 3.3). Indeed as Figure 1 shows, revisions of these other analyst outputs often occur on the same day as the earnings call. More important, we find that future analyst revisions are correlated with analyst tone, raising the possibility that astute traders could be trading on analyst comments not because they reflect new information per se, but because they signal informed future analyst output. In other words, analyst tone could reflect not the analyst's current information advantage but future information advantage.⁵ In that case, even the shortest return window could not eliminate this effect. We therefore include future revisions to analyst earnings forecasts, price targets, and stock recommendations up to 20 days after the call as proxies for current trader expectations of analysts' future information advantage. Our main results obtain in these analyses, but at economic magnitudes that are slightly less than in our initial tests (see Section 3.2). This procedure gives us confidence that the analyst tone coefficient in our returns regressions can be construed as arising from the fundamental content of analysts' comments, not speculation about their future private information acquisition activities.

We note two important observations about our findings. First, all we document is that financial analysts' comments on conference calls contain information about firm value incremental to that of management's disclosures. This finding could be due to analysts' access to private information from management (Brown et al., 2015; Soltes, 2014), to analysts' unique expertise in processing and interpreting public disclosures (Kim and Verrecchia, 1994), or to

⁵Note that future analyst output can be informative even when the current analyst comment is not. For example, management could cater to positive analysts by offering them "call backs" after the conference call (Soltes, 2014). Highlighting the salience of this concern, Brown et al. (2015) find that about 70% of analysts report that private phone calls with managers affect their future earnings forecasts. Although Reg FD (to the extent its enforcement has deterrence power) prohibits the private release of material information in such private calls, management can release psychological and confidence cues that may not be new information in the legal sense, but are highly relevant to shaping analysts' beliefs about the firm's future prospects (Bushee et al., 2011; Kirk and Markov, 2016).

some combination of both factors. Whether one of these mechanisms dominates the other does not affect our conclusion that financial analysts provide to the market important information about firm value. We also do not mean to imply that there is no substitution effect of public disclosures (i.e., that public disclosure might level the informational playing field for all traders), nor do we make a statement about other classes of informed market participants.

Our second observation is that the stock price reaction to analyst tone does not imply that analysts' information advantage has fully entered prices. If analysts' perceptible reaction on the call paints an incomplete picture of their beliefs (e.g., the call is too compressed an event compared to a detailed analyst report), or if the market is comprised of risk-averse traders for whom processing analyst reactions is costly, price will not be fully informative, and analysts will still continue to have an information advantage over price. Analysts may thus find it worthwhile to partially reveal their hand to the market in order to gain valuable insight about the firm. Accordingly, we show in Section 3 that the returns response to analyst tone is smaller than the response documented for other analyst outputs such as recommendations and in studies such as Brockman et al. (2015). We discuss these studies next.

Our study extends Price et al. (2012), who find a three-day price reaction to the tone of the entire Q&A conference call session but do not distinguish between analysts and management, and Brockman et al. (2015), who report a two-day price reaction to both manager and analyst comments measured separately but do not control for other analyst output released during that time period. Also, the long window return employed by Brockman et al. (2015) has a key shortcoming relative to our research design: It is not possible to identify when in their window the price movement actually occurs and which (correlated) information event in the window is driving their results. For example, it could be possible that an analyst privately reveals his upcoming tone to his clients during or prior to the management preamble, and the price moves even before the tone becomes public. In that case, a long return window spanning the day of the call will show significance, but our intraday returns immediately

after the call will not. Brockman et al. (2015) thus does not obviate the need to conduct this study. Moreover, we find that analyst tone explains one-third of the total unsigned return during the call, which suggests that Brockman et al. (2015) are significantly overstating the true effect of analyst tone when they report that a standard deviation increase in analyst tone increases $[0, +1 \text{ day}]$ returns by 1.16% per call. We show that this could be due to correlated analyst revisions around the call date, which we appropriately control for by using intraday returns.⁶

Our study also contributes to answering the important question of whether analyst output impacts firm value, a topic that is the focus of an influential and ongoing literature. Several studies document significant price reactions to analyst outputs (e.g., Lui et al., 2012; Huang et al., 2014; Li et al., 2015), while other studies reach the opposite conclusion, showing that analyst outputs such as recommendations have little price impact (Altinkilic and Hansen, 2009; Altinkilic et al., 2016; Li and You, 2015). Our findings indicate that an analyst’s tone foreshadows their future revisions, providing a partial rationale for the conclusion that analyst revisions are “information free” events: the market has already partly anticipated these future revisions through analyst comments on conference calls. More importantly, by showing that analyst tone moves price in a tight setting largely free of significant concurrent information events (relative to stock recommendations, etc.), our evidence speaks directly to the question of whether analyst output affects firm value.⁷

The remainder of the study proceeds as follows. Section 2 describes the data, Section 3 describes the results, and Section 4 concludes.

⁶Additionally, unlike this study, Brockman et al. (2015) do not use firm-fixed effects, making it harder to eliminate the possibility that some across-firm effects are driving their results. Brockman et al. (2015) also do not conduct our individual analyst-level analysis that helps to explain the variation in the tone measure.

⁷One could remark that this is an obvious result, for analysts’ value-add likely could not come entirely from their “middleman” role in helping clients gain access to management. However, the market for analysts is competitive, and it is possible that the only survivors are those with access to management. Survey evidence also indicates that access to management is a prized analyst attribute (Brown et al., 2015, Table 1). In such settings, our evidence is not ex-ante obvious.

2 Sample, Variable Definitions, and Descriptive Statistics

2.1 Sample

We obtain a sample of U.S. public company quarterly earnings conference call transcripts produced by Thomson Reuters from 2002 to 2013 (post Reg FD era) for which accompanying Compustat, CRSP, TAQ, and I/B/E/S data is also available. Table 1, Panel A provides the sample sizes for our empirical tests based on data availability.

Thomson Reuters quarterly earnings conference call transcripts have XML-friendly headers containing the date and starting time of the call, firm identifiers, and whether the call was related to an earnings announcement. XML tags also identify different segments of the call (e.g., presentation and discussion) and individuals like analysts and managers. We parse the text using a Perl script and require at least one manager and one analyst to be present in each call. We also match each individual analyst on the call to his or her earnings forecasts, price targets, and stock recommendations on I/B/E/S for the years 2002-2013.⁸ Finally, for the returns tests, we follow Matsumoto et al. (2011) and exclude calls that begin during after-market and pre-market hours, because we have no immediate returns data for these calls. Our final sample is about 46,000 calls.

2.2 Measures

The variables used in this study, along with their sources, are tabulated in Appendix B. Table 1, Panels B and C provide a full set of descriptive statistics, univariate statistics, winsorizing details (our results are not sensitive to winsorizing at the 1% and 99% levels),

⁸In 2008 I/B/E/S stopped providing a matching table for analysts' names, banks, and I/B/E/S identifiers in the earnings forecast file. We therefore limit our individual analyst earnings forecast tests to the years 2002-2007. Also, because our matching process relies on analyst and broker names from the conference call transcripts, and because these names do not always perfectly align with the I/B/E/S matching database (due to abbreviations, misspellings, etc.), we cannot match every analyst to I/B/E/S.

and the correlation matrix.

2.2.1 Analyst Tone Measure

We measure analysts’ belief revisions using the analyst tone in the Q&A portion of the conference call. We use the Loughran and McDonald (2011) positive and negative word dictionaries to calculate tone.⁹ There are many dictionaries that can be used to measure textual tone (e.g., Harvard IV-4 TagNeg H4N). Our motive for using the Loughran and McDonald (2011) dictionaries is that it is designed specifically to measure the optimism/pessimism tone of financial communications, which is exactly our setting. Other studies such as Matsumoto et al. (2011) have developed different dictionaries for financial communications, but for different goals such as identifying the information content of financially-oriented and forward-looking words. We show later that these information-based measures are substantially different than our tone-based belief measure.

On average, analysts speak a total of 1,181 words during the discussion portion in the sample of calls. In order to alleviate concerns about conference call length and scaling issues, we create one scaled measure for tone, using a measure similar to those employed in other studies (e.g., Tetlock et al., 2008; Li, 2010). We call this aggregate measure *ANALYST TONE*:

$$ANALYST\ TONE_{it} = \frac{(ANALYST\ POSITIVE_{it} - ANALYST\ NEGATIVE_{it})}{(ANALYST\ POSITIVE_{it} + ANALYST\ NEGATIVE_{it})} \quad (1)$$

For each firm i ’s conference call at time t , *ANALYST POSITIVE* E_{it} equals the number of positive words spoken by all the analysts on the call and *ANALYST NEGATIVE* E_{it} equals the number of negative words (according to our dictionary) spoken by all analysts on the call. We also count different tenses of the positive and negative words (e.g., “concerned” would count negative for “concern”). There is no call with no positive or no negative words.

⁹See http://www.nd.edu/~mcdonald/word_lists.html.

Appendix A provides examples of our tone measure.¹⁰

We compute analyst tone at both the individual analyst level for each call and at the aggregate level over all analysts on the call. We use the aggregate measure for our returns tests, the reason for which is three-fold. First, analysts on the call are likely to be superior and thus comprise a homogeneous subset of all the analysts following the firm (Mayew et al., 2012). The market therefore is likely to react to all these analysts.¹¹ Second, we explicitly show that individual analyst tone measures predict subsequent changes in individual analyst outputs such as recommendations, suggesting that tone measures can be aggregated in the same way that the literature aggregates other analyst outputs such as earnings forecasts. Third, as we show next, we estimate various call lengths based on a multiple of the words spoken in the call. This method becomes more accurate as the number of words increase, so it works much better at the longer call-level time-period than the shorter individual-analyst-on-the-call level time-period.¹²

In addition, we acknowledge that our approach of aggregating the tone of all the analysts on the call misses some of the subtle inter-group and individual dynamics on the call. For example, we are unable to capture the second-by-second price reaction to analyst words. We are also unable to conduct comparative statics on whether traders react more to some analysts than others. However, we have no hypotheses on whether the market prices specific group dynamics more than others, nor do we have a hypothesis on whether the market prices the identity of a famous individual analyst (irrespective of her comments) more than

¹⁰We find similar results using as our main analyst tone measure the log of $ANALYST\ POSITIVE_{it} + ANALYST\ NEGATIVE_{it}$ and when scaling Eq. (1) by total analyst words from the call (and using these alternative equations for management as well).

¹¹Mayew (2008, p. 632) argues that although management would like to favor pliant analysts on the call, capital market pressures can force management to give airtime to good analysts. In addition, Groyberg et al. (2011) document that analysts have strong incentives to be competent and accurate. These considerations further justify our decision to aggregate all analysts on the call.

¹²One potential concern with our analyst tone measure is that it depends only on the number of positive and negative words, not on the total number of words spoken by the analyst. Careful use of firm- and analyst-fixed effects partially control for such heterogeneity; however, there could still be within-firm variation in total words spoken by the analyst over time. Therefore, in unreported tests, we construct an alternative measure of analyst tone that is identical to Eq. (1) except uses as the denominator total words spoken by the analyst. The intraday return results with this measure are similar in terms of sign, magnitude, and p-values. We also control for call length throughout our empirical analysis.

an insightful comment by a less famous analyst. We therefore believe that our empirical design, which aggregates all these factors, serves our main purpose well. Finally, traders will react not to raw analyst tone, but to unexpected analyst tone. We explain in Section 3.2 how our regression design yields a measure of unexpected analyst tone.

2.2.2 Intraday Abnormal Returns

Our first set of return windows includes the following intraday times: the presentation portion of the call, the Q&A portion of the call, the 30 minutes after the call, and an additional 30 minutes after that. Our motivation for using 30-minute intervals comes from Tetlock et al. (2008, p. 1452), who conjecture that traders need up to 30 minutes to fully digest and trade on media-driven news.

We obtain the conference call start time from the conference call transcript and estimate the duration of various components of the call (e.g., presentation end time and Q&A end time) using the words-per-minute approach from Matsumoto et al. (2011). Specifically, based on their sample (which is similar to ours), Matsumoto et al. (2011, p. 1392) compute duration assuming that 160 words are spoken per minute during the presentation, and 157 words are spoken per minute during the discussion. They also assume that (1) the start of the presentation occurs 116 seconds after the scheduled start time of the conference call, and (2) the beginning of the discussion starts 28 seconds after the end of the presentation. For return windows constructed in such a manner, we calculate intraday returns using the last traded price just before the beginning of the intraday return window and the last traded price just before the end of the intraday return window. All intraday returns are net of the value-weighted market return for the same window (our results are not affected by removing this benchmark and using raw intraday returns).

2.2.3 Other Analyst Outputs

We substantiate our individual analyst tone measure by showing that it translates to future revisions in individual analyst outputs such as earnings forecasts, price targets, and stock recommendations. We assume that 20 days from the conference call date (day 0) provides enough time for analysts to make such revisions, and accordingly use day +20 as our date to measure future analyst outputs (e.g., Lys and Sohn, 1990; Kasznik and McNichols, 2002). We obtain EPS forecasts, stock recommendations, and price targets from I/B/E/S. We arrange the data at the analyst-level by matching analysts on the call to I/B/E/S using their name and brokerage house from the conference call transcript.¹³ The three future outputs we measure are as follows:

Individual Analyst EPS Forecasts: We calculate the change in the analyst EPS forecast by comparing the analyst EPS forecast for the next quarter at the end of day +20 to the analyst EPS forecast for the current quarter at the end of day 0 (conference call day). Where there is no change, we code it as zero. This procedure thus yields a conservative analyst revision measure, because a significant portion of analysts make revisions on the call date (see Figure 1). Also note that the presence of analyst-firm fixed effects in our analyses implies that we are comparing within analyst-firm variation, not across analyst-firm variation; so the scaling parameter is not a crucial issue.

Individual Analyst Price Targets: We calculate the percentage change in the analyst price target by comparing the analyst price target for a firm's stock at the end of day +20 to the end of day 0. Where there is no change, we code it as zero. As with the analyst EPS forecast measure, this procedure also yields a conservative analyst revision measure.

Individual Analyst Recommendation Level: We identify analyst upgrades and downgrades by comparing the analyst recommendation level for a firm's stock at the end of day +20 to the end of day 0. We code an upgrade as +1, a downgrade as -1, and no change as zero.

¹³As noted before, this sample only includes calls through 2007 for earnings forecasts. I/B/E/S stopped providing the analyst name to I/B/E/S ID matching file for earnings forecasts after this time.

We do not distinguish between different types of upgrades and downgrades. As with the previous two revision measures, this measure is also conservative.

2.2.4 Control Variables

We employ several control variables, all of which are described in Appendix B. We have taken care to ensure that our descriptive statistics in Table 1, Panel B agree with those of prior studies. Our first set of control variables pertains to information released by the management:

Concurrent Management Tone Measures: We use management presentation and discussion tone to proxy for management’s views, which may also be highly informative to investors. We calculate presentation tone using only words from the scripted presentation portion of the call, and similarly for the discussion part. On average, and similar to Matsumoto et al. (2011), managers speak 2,408 words in the discussion portion of the call and 2,334 words in the presentation portion. Noting that our firm-fixed effect analyses only examine the within-firm variation, not across-firm variation in the data, we construct our management measure for firm i in quarter t as:

$$MGMT\ TONE_{it} = \frac{(CEO\ POS_{it} + CFO\ POS_{it}) - (CEO\ NEG_{it} + CFO\ NEG_{it})}{(CEO\ POS_{it} + CFO\ POS_{it}) + (CEO\ NEG_{it} + CFO\ NEG_{it})}, \quad (2)$$

where POS and NEG represent positive words and negative words from the Loughran and McDonald (2011) dictionaries, respectively.¹⁴

Call Characteristics: Matsumoto et al. (2011) find that call length and management communication patterns are associated with firm value. We therefore control for the length of the presentation and the discussion.

Prior Firm Performance: We control for financial disclosures by including indicators for

¹⁴Including COOs and vice presidents (as well as including all company representatives on the call regardless of their title) does not affect the mean or standard deviation of the management tone metric, nor does it affect our intraday returns results.

whether the firm met the zero, prior quarter, and analyst consensus EPS benchmark. We also include the magnitude of any earnings surprise scaled by price and indicator variables for earnings surprises in the sample's top and bottom two scaled earning surprise deciles.¹⁵

Institutional Investor Shareholdings: We obtain institutional investor shareholdings data from the Thomson Reuters 13F filing database. The SEC requires investment managers with portfolios worth \$100 million or more to file a quarterly summary of their equity positions in a 13F filing. Our measure for institutional investor shareholdings is the percentage of a firm's shares held by institutional investors; the average institutional ownership for a firm in our sample is 60%.

Past Returns Measures: We include past returns to control for factors such as momentum.¹⁶ We include prior abnormal returns from $[-2, -1 \text{ day}]$, as well as prior abnormal intraday returns to control for this momentum effect. In our individual analyst tests we also control for $[-90, -1 \text{ day}]$ abnormal returns.

Abnormal Institutional Investor Trading: Astute traders may react to analyst tone in real time not because tone is fundamentally informative, but because it could predict analyst recommendations to institutional clients. To control for such front-running possibilities, we include abnormal institutional investor trading over days $[0, +1]$ as a control. We obtain daily institutional trading data from Ancerno, and construct a daily measure of abnormal institutional investor net buying in a manner similar to Irvine et al. (2006, Table 4), which is also similar to the measure used in Griffin et al. (2003).¹⁷ We calculate abnormal institutional investor net buying for each firm i , AIB_{it} , at the conference call-firm level as follows. First,

¹⁵The focus on earnings as the metric of financial information is standard in the empirical disclosure literature for two reasons: first, more disaggregated financial items (such as provisions) may vary in importance across firms; earnings by contrast represent a common and important aggregate performance measure for all firms. Second, there exist well-studied measures of analysts' expected earnings, thus allowing one to compute earnings news.

¹⁶For example, Altinkilic and Hansen (2009) argue that such momentum effects could arise from pre-event-day news releases.

¹⁷This data set is the focus of several studies, including Irvine et al. (2006), who provide a detailed description of the data.

we take the net trading imbalance scaled by shares outstanding for the given day t :

$$R_{it} = \frac{\text{Total Institutional Buys}_{it} - \text{Total Institutional Sells}_{it}}{\text{Shares Outstanding (in 1,000s)}_{it}} \quad (3)$$

We then subtract the average daily net trading imbalance for that firm over a control period of $[-60, -20 \text{ days}]$ and $[+20, +60 \text{ days}]$. As an example, the calculation for day zero AIB for a given firm i is as follows:

$$AIB_{i,0} = R_{i,0} - \frac{1}{\# \text{ of trading days in } [-20, -60] \text{ \& } [+20, +60]} \left[\sum_{t=-60}^{-20} R_{it} + \sum_{t=20}^{60} R_{it} \right] \quad (4)$$

Information Measures: Since the ostensible goal of the analyst Q&A is to elicit information from the management, we control for several information measures from the call using the Matsumoto et al. (2011) dictionaries for financial words and forward looking statements, which they find are associated with absolute excess returns. Our controls include the log of management and analyst financial words and forward looking words from the discussion and Q&A portions of the call. We also include controls for presentation and Q&A length.

Fixed Effects: In the returns regressions, we use firm-fixed effects and year-quarter of the call date fixed effects to control for firm effects such as the extent of firm-specific manager-analyst agency problems in conference calls, and time-effects such as market-wide innovations in trading technologies, etc. All our analyses are therefore within-firm and within-year-quarter. In the individual analyst regressions, we control for analyst-firm fixed effects to control for analyst-firm relationships, and also use time fixed effects. All standard errors are appropriately clustered by calendar year-quarter.

3 Empirical Results

3.1 Individual Analyst Tone Findings

Given the high visibility of conference calls and the value relevance of the information exchanged in these calls (e.g., Mayew and Venkatachalam, 2012), we conjecture that the tone of analysts’ questions, comments, and responses to management replies reveals their beliefs. However, since information in our setting does not literally take its analytical representation “firm value + noise” with known mean and variance, no theoretical model can validate that our analyst tone measure reflects beliefs. We must validate our measure empirically, which we do next.

We first link our analyst tone measure at the analyst-level to that analyst’s future forecasts, price targets, and stock recommendation revisions. As described in Section 2.2.3, our future analyst revision measures are conservative, because a significant portion of analysts make revisions on the conference call date (see Figure 1), and we measure future revisions from the end of the call date forward. Our measurement strategy should bias against finding significance.

Table 2 documents how an individual analyst’s tone predicts his or her respective revisions to the EPS forecast, price target, and stock recommendation level, all from the end of the conference call day to the end of day +20. We estimate our regressions with a rich set of controls, including analyst-firm fixed effects. These fixed effects should account for any analyst-firm pair heterogeneity or bias arising from factors such as analyst-management relationships that determine which analyst gets to be on the call (e.g., Mayew, 2008). We expect and find that the coefficient on analyst tone is positive and significant for EPS forecasts (5% level) and price targets (1% level; 0.004 and 0.669, respectively). A one standard deviation increase in analyst tone increases the EPS forecast for the next quarter by 0.22 cents and

the price target by 0.37% (compared to respective on average increases of 1 cent and 1%).¹⁸ For analyst recommendations, we find that a one standard deviation increase in analyst tone increases the recommendation dependent variable by 0.008, i.e., the probability of an recommendation uptick significantly increases by 0.8 percent (1% level). This magnitude may appear small until we recall that recommendation changes are not that common (only 8.6% of our observations have a recommendation change).¹⁹ The previous results give us confidence that our analyst tone measure captures analyst belief revisions about firm value, especially in light of our use of these measures as proxies for investor expectations of future analyst output.

More important, given the strong value-relevance of analyst outputs such as targets and recommendations (Brav and Lehavy, 2003; Bradley et al., 2014), the previous result alleviates concerns that analyst tone on the call is a conversational sideshow not reflective of the analyst’s true assessment of the firm. In fact, the variation in the analyst tone is an economically meaningful one. More interestingly, the explanatory power of the regressions is about 0.3, suggesting that the analyst tone, at least as we measure it, conveys a noisy picture of future analyst actions. Existence of such noise is essential; otherwise the analyst will not ask any questions for fear of losing his entire information advantage to the market. We next show how the market reacts to analyst tone.

¹⁸To allow us to better interpret the economic significance of our results, we use level changes in EPS forecasts; however, our results are similar in sign and statistical significance when we scale EPS by stock price at the quarter’s fiscal end date. Also note that firm-fixed effects control for across-firm variation in EPS.

¹⁹Another feature of our recommendation analysis is that we use OLS, which assumes that the difference between 1 and 0 (upgrade vs. no change) is of the same economic magnitude as the difference between 0 and -1 (no change vs. downgrade). While this appears to be a reasonable assumption, we nonetheless replicate the recommendation analysis with ordered and multinomial logit regressions, and find significance for the analyst tone measure. However, econometric and computational limitations prevent us from including analyst-firm fixed effects in these logit regressions (Greene, 2004). We therefore do not tabulate these results. We also replicate the analysis and find similar results in sign and statistical significance for the full five-point recommendation scale in I/B/E/S, which ranges from sell to strong buy.

3.2 The Association of Analyst Tone with Stock Returns and Alternative Explanations

We conduct our stock return analysis at the call-level by aggregating all analysts on a given call. This aggregation approach, justified in Section 2, elides over much of the interpersonal group dynamics and individual analyst variation in the call; but as we noted in Section 2, we have no particular hypotheses on how the market prices these phenomena, and our measurement approach cannot analyze returns accurately over very small time intervals. However, our use of firm and year-quarter fixed effects should control for across-firm and across-time heterogeneity (e.g., firm-specific agency problems in conference calls, market-wide innovations in trading, etc.) in these factors.

We first provide some descriptive statistics. The mean analyst discussion tone in Table 1, Panel B is -0.04 , suggesting that analysts voice about 1 positive word for each negative word in a conference. This approximate 1:1 mean ratio implies that the average analyst's belief revision on the call is neutral. By comparison, the mean manager discussion tone is 0.11 , and the mean manager presentation tone is 0.21 . The higher mean relative to the analyst tone suggests, as expected, that management is systematically more bullish or positive about their firm's prospects.

We also document across-time, within-call, and across-call characteristics of analyst tone for our sample. Figure 2 plots averages of our management and analyst tone measures by year over our sample period: these measures are relatively stable through time, although management tone declines during the financial crisis. More interesting variation in tone occurs within the call. Figure 3 plots average analyst tone computed over 100-word increments (based on words spoken by analysts). The downward trend present in analyst tone suggests that managers could be strategically selecting bullish analysts first to prime early listeners, or perhaps choosing to disclose unfavorable information late in the call. One way to distinguish between these two hypotheses is to construct the same chart for management Q&A tone, which we do in Figure 4. Figure 4 does not show the same striking decline in management

tone over our calls, suggesting that managers do indeed advance bullish analysts on the call.

Figures 5 and 6 show that analyst tone has the expected properties of being lower when firms miss the analyst mean consensus EPS forecast, and higher when firms meet or beat this forecast. Figure 5 shows that, relative to Figure 6, the previously discussed decline in analyst tone over the call is more pronounced when firms miss the analyst mean consensus EPS forecast, suggesting that managers might be even more strategic in saving bearish analysts for the end of the call when earnings news is relatively unfavorable to the firm. In Section 3.3 we return to these within-call and across-call information dynamics and test whether these phenomena affect how traders react to analyst tone.

The correlations between analyst tone and management presentation tone and management discussion tone are significant at 0.23 and 0.28 (Table 1, Panel C), suggesting that analysts are not initiating an altogether disconnected information event (recall that we have already shown in Table 2 that an analyst's tone predicts her future calls on the company). We examine management-analyst correlation further in Table 3, where we regress aggregate analyst tone on the other covariates in Table 4, Panel A. Analyst tone is indeed significantly positively correlated with variables such as earnings news, management tone in the conference call, and presentation-period returns, as one would expect if analyst tone indeed relates to the news released in the call. In order to conduct a price test using analyst tone, we need a measure of traders' expectation of analyst tone. The leftover variation in the analyst tone in Table 3 can be viewed as capturing the unexpected component of analyst tone, and will drive the analyst tone results in Table 4, Panel A. That is, the analyst tone covariates in Tables 3 and 4 that occur before analyst speech will set up market expectations for the forthcoming analyst tone, only deviations from which will be priced.

Table 4, Panel A provides results on intraday returns during the conference call. The first column in Table 4, Panel A presents the returns to management disclosures. Prices react significantly to management presentation tone and unexpected earnings news, corroborating prior studies that view conference calls as informative events (e.g., Matsumoto et al., 2011).

The next column shows that during the Q&A portion of the call, prices react strongly to analyst tone: for a one standard deviation increase in analyst tone, abnormal returns significantly increase by 0.031 percent (1% level). The market is thus reacting not just to management disclosures but also to analysts' resulting belief revisions. This result obtains in conjunction with an extensive set of controls, including management disclosures, call length, momentum returns, and fixed effects. As noted previously, the residual variation in the analyst tone measure can be viewed as representing unexpected analyst tone, and the presence of fixed effects ensures that this result is within-firm and within-year-quarter. Furthermore, our result of 0.031 percent is on a per-call basis and most firms keep to a four-call-per-year schedule, implying that on an annual basis this effect is amplified by a factor of four.

To put the magnitude of our results in perspective, Matsumoto et al. (2011, Table 3) find that the average *unsigned abnormal* return for both the presentation and the discussion part of the conference call is 0.2 percent. A standard deviation change in analyst tone can, over the [Q&A Beginning, Q&A End +30 minutes] period, explain about a third of the total unsigned return for the discussion period. But our result is still much smaller in magnitude compared to other analyst outputs such as recommendations: Bradley et al. (2014) find a 2 percent return to recommendation changes. The previous difference in magnitudes illustrates the nature of analyst tone: it is a timely but a compressed and incomplete measure of analyst beliefs, whereas an analyst recommendation or a report is a more detailed and thorough output.²⁰

An immediate alternative explanation for our main result, based on Table 3, is that analysts are watching the stock price on the call and become more positive in their tone when they see positive stock price movements. One solution to eliminate this alternative explanation is suggested by Tetlock et al. (2008, p. 1452), who conjecture that traders need up to 30 minutes to fully digest and trade on media-driven news. So we look to returns

²⁰An alternative explanation for the substantial returns results for analyst recommendations is Loh and Stulz (2010), who find that these recommendations overlap with concurrent information events.

in the 30-minute period after the conference call ends. A result in that subsequent window cannot be attributed to analyst tone responding to stock price movements. Table 4, Panel A presents the results. We find that analyst tone predicts abnormal returns for the window of [Q&A End, +30 minutes]: for a one standard deviation increase in analyst tone, abnormal returns increase by 0.036 percent (1% level), after controlling for past returns. Our results therefore cannot be entirely attributed to analysts responding to the stock price in real time.²¹

As noted previously, past returns can also be construed as proxies for expected analyst tone (people expect analysts to be more positive when the stock price has moved up during the management presentation). In particular, an interesting result in Table 4, Panel C, Column 1 is that the abnormal return in the presentation period is associated with analyst tone, even though analysts have not spoken yet. This result suggests that active market participants form similar beliefs as analysts when listening to the management’s presentation and trade accordingly, in the process setting up an expectation for the upcoming analyst tone. This result therefore not only suggests the presence of fast-acting traders, but also justifies our construction of the measure of unexpected analyst tone in Table 4, Panel A by including covariates such as management disclosures on the call and past returns. It also justifies our focus on returns over the 30-minute period after the call.

If traders truly respond to unexpected analyst tone, then measures of expected analyst tone should have a negative coefficient, because the unexpected, by definition, is actual less expected. By and large, management disclosure measures and past returns, which we use as proxies for the market expectation of analyst tone, have a negative sign in the latter columns in Table 4, Panel A, though the magnitudes are largely insignificant, except for presentation-period returns. There are some significant exceptions, one being management

²¹A potential concern is that returns measured during the Q&A may capture some residual trading from the presentation. Our analysis of the 30-minute period after the call helps to ensure that our findings are not driven by such residual information. In addition, we include management presentation tone as a regressor in all of our returns tests, which will eliminate any effect due to (potentially latent) trades based on the presentation tone.

tone, which is strongly positively significant in the second column. One explanation for this finding is that the management presentation tone gets a renewed sense of credibility from the market after analysts speak.

The previous conjecture lends credence to one of our hypothesized alternatives for the association of intraday returns with analyst tone, namely that analyst comments could signal their propensity for acquiring new private information in the near future. For example, managers may reward bullish analysts by fielding their private requests for additional information after the call, where managers further help these analysts consolidate their bullish beliefs (and this process could be more credible than management touting the firm directly to investors).²² If smart investors interpret analyst comments this way and trade immediately on this information, even the shortest return window could not eliminate this effect (which could be correlated with analyst tone). Since we cannot directly confirm that analysts' comments are not related to their propensity to acquire new private information after the call, we measure and explicitly control for revisions to their other outputs up to 20 days after the call. Our reasoning is that analysts' current and future acquisition of private information will eventually enter into their earnings forecasts, price targets, and stock recommendations for a firm. In the presence of such controls, analyst tone can be plausibly construed as an intrinsic source of information, not a signal of analysts' future private information acquisition activities.²³

In Table 4, Panel B, our main results for the Q&A portion of the call and the Q&A End to +30 minutes still obtain with the future analyst revision controls (1% level), but at economic magnitudes that are 16.8% and 12% less than our initial results from Table 4, Panel A, respectively.²⁴ These results confirm that our main findings are not driven entirely by investor expectations of analysts' future private information acquisition activities, but

²²See footnote 5.

²³We recognize that traders may be unable to perfectly predict analysts' future earnings forecasts, price targets, and recommendations. We therefore use the actual realization of these outputs as the best available proxies.

²⁴Our findings are similar when using an indicator for recommendation upgrades (as opposed to using the full five-point scale for recommendations).

that investors find analyst tone to be intrinsically informative.

Another alternative explanation for the association of returns with analyst tone is front-running, i.e., smart investors trade on analyst tone not because tone is informative, but because it predicts future institutional trading based on analysts' future recommendation. Table 4, Panel A therefore includes as a control current and future institutional abnormal trading over the days $[0, +1]$. The significance of this regressor not only suggests that the front-running argument has merit, but also that our measure of institutional trading has the power to capture this phenomenon. Therefore, the incremental significance of analyst tone in the presence of the institutional trading regressor in Table 4, Panel A cannot be solely attributed to smart investors front-running institutional investors.²⁵

We next demonstrate that our returns results are unlikely to be due to investor sentiment (i.e., a behavioral reaction by traders to old news). In that case, investor reaction to analyst tone in the subsequent periods occurs from that portion of the analyst tone variation that already reflects known information. As a first step, note that this information has to be such that it is not captured by the extensive set of analyst tone covariates in Table 4, Panel A, including past returns. An additional test is suggested by Tetlock (2007, p. 1142), who argues that returns triggered by investor sentiment should reverse in the future as investor beliefs shift again toward fundamentals. We therefore test for returns reversals in future periods. For consistency with Table 4, Panel A, we measure the future in 30-minute intervals. Table 4, Panel C presents the results. For the three intervals we measure after the last period in Table 4, Panel A, we find that analyst tone is uniformly insignificant. These results suggest

²⁵We acknowledge, but do not consider, other classes of investors against whom the smart investors could be front-running. As with analysts' future private information activities, we recognize the importance of front running as a source of information for traders, but view this information as more speculative than analysts' true underlying assessment of the firm. Controlling for front running therefore helps to ensure that this effect is not the main driver of analyst tone and our returns results.

no evidence of return reversals.²⁶ Our analyst tone effect thus appears to have a persistent price impact, at least for our showcased during-the-call and after-the-call return windows.

Our main results establish analyst tone to be a different source of information to the market than management disclosures on the call. In asking their questions and in making other remarks, analysts indeed partially reveal their hand to the market. Our underlying premise is that this revelation is not complete, in that analyst questions and comments are too compressed and brief to give a full picture of the analyst’s assessment of the firm (the explanatory power of the regressions in Table 2 and the magnitude of the results in Table 4, Panel A provide evidence to support this assumption). Analysts are therefore willing to bear this cost in order to gain valuable insight about the firm. Our additional tests strengthen our inference from the main results that traders conceive of analysts as informationally advantaged market participants, which we argue occurs through expertise in processing management disclosures or through some other independent source of private information.

3.3 Robustness Checks and Additional Tests

We recognize that there are a number of additional analyses that we could apply to our data. We list below some tests that we believe strengthen the inferences from our main results.

We first test whether analyst EPS forecast, price target, and recommendation revisions occurring during or around the conference call time are driving our intraday return results. Figure 1 indicates that a majority of analyst outputs occur on the day of the conference call. In addition, Table 5 shows that some of these outputs occur during the call. We therefore eliminate calls that have concurrent analyst revisions in the hour windows of $[-8 \text{ hours}, -5$

²⁶There are significant differences in the nature of our information event and that studied by Tetlock (2007); so we cannot execute his tests literally. For example, our interval duration, which we motivate using the argument in Tetlock et al. (2008, p. 1452), is different than that of Tetlock (2007). Furthermore, between Table 4, Panels A and C, we use four future intervals, while Tetlock (2007) uses five. However, in unreported tests we find that the much longer window of daily returns is also positively correlated with analyst tone, providing further evidence of no reversals.

hours], $[-4 \text{ hours}, -1 \text{ hours}]$, $[0 \text{ hour}, +3 \text{ hours}]$, $[+4 \text{ hours}, +7 \text{ hours}]$, where hour 0 is the conference call start time.²⁷ Table 6 reports the results after these eliminations. Analyst tone retains similar levels of economic and statistical significance even after removing the calls with concurrent revisions. These results provide assurance that our intraday return tests measure the analyst tone effect, and not the effect of a correlated concurrent revision.

Our final tests are comparative statics tests. These tests are motivated in part by the various across-call and within-call information dynamics documented in Figures 2 through 6 and discussed in Section 3.2. First, we test whether the analyst tone effect is more pronounced in firms with more institutional investors, the natural clients of analysts. Second, we test whether the analyst tone effect is more pronounced in the technology sector, following suggestive evidence of analyst industry expertise in this sector and institutional investor industry preferences that might drive analyst coverage (Orie et al., 2002; Minton and Schrand, 2016). Third, we consider the amount and nature of new information released in the call, as proxied for by the magnitude of the earnings surprise, total words spoken during the call, total management Q&A forward looking statements (FLS) and financial words, the number of questions posed by analysts, and the magnitude of the analyst-management tone differential. Fourth, we consider whether the analyst tone effect is affected by other management disclosures, as proxied for by whether management provides quarterly earnings guidance.²⁸ We add the appropriate interaction terms to Table 4, Panel A and conduct various analyses of median and quartile sample splits (according to the relevant measures just discussed), but

²⁷We acknowledge that some intraday timestamps in I/B/E/S may be inaccurate. Bradley et al. (2014) find that recommendation timestamps cannot be corrected without manually checking each analyst report, and therefore we do not attempt to adjust the times. However, they find that in their limited sample, timestamps are delayed on average by 2.4 hours. We thus use three-hour windows when eliminating calls with concurrent analyst revisions.

²⁸Two realities are possible for analyses three and four: it could be that there is in general more information for analysts to interpret, which might lead to a stronger analyst tone effect, or that the additional information substitutes for analyst expertise on the call, which might lead to a lower analyst tone effect. We also recognize the possibility that analysts' comments may serve to summarize management's disclosures. If this summary is useful then traders are unable to process information as disclosed by management, and we are back to where traders rely on analysts' superior processing skills to fully interpret disclosure (Kim and Verrecchia, 1994). This is similar to how a novice researcher might benefit from a research paper's abstract even after reading the body of the paper.

find no systematic differences in our intraday results for any of these tests.²⁹

We also compute analyst tone and returns separately for the first and second halves of call; we find no systematic difference in the relation between tone and returns across the two halves. Finally, we hypothesize that more liquid stocks price public disclosures faster, and check if the stock price reaction to analyst tone is more pronounced for liquid stocks. We break the sample into deciles by Amihud illiquidity, trading volume, and bid-ask spreads but find no systematic difference or pattern in the relation between tone and intraday returns across the various deciles. The results in this section attest to the importance of using within-firm analyses to eliminate the possibility that across-firm effects, such as liquidity and the extent of analyst-manager agency problems, are driving our results (and likewise for time effects), and of choosing return windows that minimize the possibility of contamination from other information sources.

4 Conclusion

In this study, we examine earnings conference calls and find that the linguistic tone of financial analyst comments and questions moves the stock price in a manner that suggests that traders use analyst assessment of the firm to determine firm value, and thus that analyst assessment of the firm contains information not present in management disclosures on the call.

Our study develops a unique methodological innovation for identifying the information content of analyst output. To date, the analyst literature yields mixed results on the informativeness of analyst output: some studies find that analyst output is informative to

²⁹One exception is our sample split on median management Q&A financial words: the analyst tone effect is marginally larger in the above-the-median sample (coefficient of 0.119 versus 0.086; difference is significant at the 10% level). Brockman et al. (2015) include a multiplicative term for analyst tone and firm-level institutional investor holdings in their return tests, which unlike ours are long-window, and find that analyst tone effect is more pronounced in firms with higher institutional holdings. But they do not use firm-fixed effects, and therefore their result could arise from institutional investors' correlated (and unmodeled) stock selection strategies rather than institutions having a comparative advantage at interpreting analyst tone or direct access to analysts. We can, however, replicate Brockman et al. (2015)'s findings when we use long-window returns (daily abnormal returns around the conference call date) as the dependent variable.

traders, while others find that the opposite is true. One explanation for these mixed results is that analysts' private release of output to clients erodes the informativeness of that output for its subsequent public release as measured by researchers. An appropriate solution to this problem is to measure analyst output as it is being formed and to link it to prices in real time. The conference call setting that we employ provides an opportunity to conduct such an analysis for analyst comments.

Our findings raise interesting policy and welfare questions. Well-functioning markets are central to resource allocation in modern economies, and information asymmetry in financial markets can raise fears that select traders with private information or expertise will make large profits, potentially deterring other investors from entering the market and causing Akerlof-lemons breakdown of financial markets. One of the SEC's central tenets therefore is to level the information playing field by forcing firms to release informative public disclosures. From a theoretical standpoint though, public disclosures can substitute or complement traders' private information. Our extensive set of tests suggests that it is at least possible that public disclosures (made during conference calls) additionally advantage informed capital market participants such as analysts. The complementary aspect of public disclosures thus cannot be ignored as a theoretical curiosity.³⁰

³⁰While analysts are not traders themselves in the conventional sense, they do share an important attribute of traders found in many theoretical models: they have private information or expertise in processing public information. One can therefore think of a theoretical "trader" as comprised of two cooperating entities: one that has private information ("the analyst"), and another who trades on that information ("the client").

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Appendix A
Sample of Analyst Comments from Earnings Conference Calls from 2002 to 2013

Analyst Comment	Call	Positive Words	Negative Words
<i>"...the inside the regional mall stores were the ones that were problematic. Can you break out the average weekly sales or confirm that and sort of give us a sense of that differential?"</i>	California Pizza Kitchen, Oct. 23, 2003	0	1
<i>"Al, you've done a great job of positioning the company to the future in terms of external changes...Take us through your growth parameters, growth focus; what do you think you can do?"</i>	H.B. Fuller Company, Sept. 24, 2003	1	0
<i>"...in September of last year Citigroup successfully tapped the yen market with the largest ever Samurai offering, issuing bonds in 5, 7, 10, 15, 20 and 30...Would Citigroup ever consider a 40-year yen issue?"</i>	Citigroup, Feb. 10, 2006	1	0
<i>"We're all concerned about a price war out here. If I do the math on the full year revenue guidance it sounds like you guys are expecting about 15% sequential growth in Q3 and Q4."</i>	Intel, April 19, 2006	0	1

The bolded/underlined words represent words in the Loughran and McDonald (2011) positive and negative tone dictionaries.

APPENDIX B Variable Definitions

Variable*	Definition	Data Source
<i>Tone and Returns Measures</i>		
Analyst Q&A Tone _{it}	(Analyst Positive Words _{it} - Analyst Negative Words _{it}) / (Analyst Positive Words _{it} + Analyst Negative Words _{it})	Thomson Reuters Call Transcript
Management Presentation Tone _{it}	(CEO & CFO Positive Words _{it} - CEO & CFO Negative Words _{it}) / (CEO & CFO Positive Words _{it} + CEO & CFO Negative Words _{it})	Thomson Reuters Call Transcript
Management Q&A Tone _{it}	(CEO & CFO Positive Words _{it} - CEO & CFO Negative Words _{it}) / (CEO & CFO Positive Words _{it} + CEO & CFO Negative Words _{it})	Thomson Reuters Call Transcript
TAQ Abnormal Returns _{it}	Holding period return from the start to the end of the time interval being measured, net of the value weighted market return over the same time	Trade and Quote (TAQ) Database
<i>Individual Analyst Outputs for Analysts Matched from Conference Call Transcript</i>		
Individual Δ EPS Forecast _{ita}	(Analyst EPS forecast for quarter t+1 measured at end of day +20 - Analyst EPS forecast for quarter t+1 measured at end of day 0), 0 if no change	I/B/E/S
Individual Δ Price Target _{ita}	(Stock price target at end of day +20 - Stock price target at end of day 0) / Stock price target at end of day 0, 0 if no change	I/B/E/S
Individual Δ Recommendation _{ita}	Indicator variable that equals 1 if analyst upgrades stock, -1 if analyst downgrades stock, and 0 for no recommendation change from end of day 0 to end of day +20 (we do not distinguish between different types of upgrades and downgrades)	I/B/E/S
<i>Time-Varying Firm Variables</i>		
Earnings Surprise _{it}	(Actual EPS _{it} - Analyst consensus mean forecast EPS _{it}) / Stock price at fiscal quarter end date _{it}	I/B/E/S
Large Positive Surprise _{it}	Indicator that equals 1 if earnings surprise is in top 20% of sample earnings surprises _{it}	I/B/E/S
Large Negative Surprise _{it}	Indicator that equals 1 if earnings surprise is in bottom 20% of sample earnings surprises _{it}	I/B/E/S
Meet/Beat Analyst Forecast _{it}	Indicator that equals 1 if actual EPS equals or exceeds analyst consensus mean forecast EPS _{it}	I/B/E/S
Size _{it}	Log of Total Assets _{it}	Compustat
Market to Book _{it}	Market Value _{it} / Book Value of Assets _{it}	Compustat, CRSP
ROA _{it}	Income Before Extraordinary Items _{it} / Total Assets _{it}	Compustat
Log of Analyst Following _{it}	Log of outstanding analyst EPS forecasts at conference call date _{it}	I/B/E/S
S.D. of Analyst EPS Forecasts _{it}	Standard deviation of analyst EPS forecasts scaled by stock price on conference call date _{it}	I/B/E/S
Institutional Ownership _{it}	Percentage of common stock held by institutional 13F filers at fiscal quarter end date _{it}	Thomson Reuters 13F Holdings Database
Cumulative Abnormal Returns (CAR) _{it}	Firm returns from CRSP net of the value weighted market return	CRSP
Abnormal Institutional Trading _{it}	Abnormal daily institutional trading imbalance (net of control period; see Section 2.2.4 for precise equations)	Ancerno
<i>Conference Call Attribute Variables</i>		
Log of Total Words _{it}	Log of total words spoken by CEO & CFO and analysts _{it}	Thomson Reuters Call Transcript
Log of Pres. Words _{it}	Log of total words spoken by CEO & CFO during presentation portion of call _{it}	Thomson Reuters Call Transcript
Log of Mgmt. Q&A Words _{it}	Log of total words spoken by CEO & CFO during Q&A portion of call _{it}	Thomson Reuters Call Transcript
Log of Analyst Q&A Words _{it}	Log of total words spoken by analysts during Q&A portion of call _{it}	Thomson Reuters Call Transcript
Log of Mgmt. Pres. Fin. Words _{it}	Log of total financially oriented words (Matsumoto et al., 2011) spoken by CEO & CFO during presentation portion of call _{it}	Thomson Reuters Call Transcript
Log of Mgmt. Q&A Fin. Words _{it}	Log of total financially oriented words (Matsumoto et al., 2011) spoken by CEO & CFO during Q&A portion of call _{it}	Thomson Reuters Call Transcript
Log of Analyst Q&A Fin. Words _{it}	Log of total financially oriented words (Matsumoto et al., 2011) spoken by analysts during Q&A portion of call _{it}	Thomson Reuters Call Transcript
Log of Mgmt. Pres. FLS _{it}	Log of total forward looking words (Matsumoto et al., 2011) spoken by CEO & CFO during presentation portion of call _{it}	Thomson Reuters Call Transcript
Log of Mgmt. Q&A FLS _{it}	Log of total forward looking words (Matsumoto et al., 2011) spoken by CEO & CFO during Q&A portion of call _{it}	Thomson Reuters Call Transcript
Log of Analyst Q&A FLS _{it}	Log of total forward looking words (Matsumoto et al., 2011) spoken by analysts during Q&A portion of call _{it}	Thomson Reuters Call Transcript
Morning Call _{it}	Indicator variable that equals 1 if call starts before noon EST, 0 otherwise	Thomson Reuters Call Transcript

* Balance sheet and income statement data are for the fiscal quarter that precedes the call date. Index it represents firm i 's conference call for year-quarter t . Index a represents the individual analyst. Day 0 is the conference call day.

Table 1
Panel A: Sample Selection for Earnings Conference Calls from 2002 to 2013

<i>Sample Selection for Individual Analyst Tests</i>	
Earnings conference call transcripts extracted from Thomson from 2002 through 2013	186,069
Less foreign firms and calls missing Compustat, CRSP, and I/B/E/S data	(84,442)
Total calls for individual analyst tests	101,627
Number of analysts we successfully match to I/B/E/S based on name and bank from call transcript*	≈ 150,000
<i>Sample Selection for Intraday Abnormal Return Tests</i>	
Earnings conference call transcripts extracted from Thomson from 2002 through 2013	186,069
Less foreign firms and calls missing Compustat, CRSP, and I/B/E/S data	(84,442)
Less calls without TAQ data	(5,630)
Less calls occurring outside market hours	(49,556)
Less 6 observations for outliers in TAQ returns	(6)
Total calls for intraday TAQ analysis**	46,435

*The number of observations for the individual analyst tests in Table 3 vary based on whether the analyst issues an EPS forecast, price target, and stock recommendation. Analysts do not always provide all three of these, and our sample of earnings forecast matches stops in 2007.

** We follow Matsumoto et al. (2011) and: 1) define trading-hours calls to be those initiated from 9:30 AM EST to 2:30 PM EST; 2) define the call start time to be 116 seconds after the scheduled start time, which we obtain from the call transcript XML header; 3) estimate the length of the presentation assuming that 160 words are spoken per minute; 4) define the discussion start time to be 28 seconds after the end of the presentation; 5) estimate the length of the discussion assuming that 157 words are spoken per minute. All word counts come from the XML transcripts. Consistent with Matsumoto et al. (2011), who find that 39.6% of their sample firms always hold calls during trading hours, we find that 45.7% of our sample conference calls occur during trading hours.

Table 1
Panel B: Descriptive Statistics for Earnings Conference Calls from 2002-2013

#	Variable	n	Mean	S.D.	Min	25th %	Median	75th %	Max
<i>Aggregate Call Tone Measures</i>									
[1]	Analyst Q&A Tone _{it}	46,983	-0.04	0.27	-1.00	-0.22	-0.04	0.13	1.00
[2]	Management Presentation Tone _{it}	46,983	0.21	0.27	-1.00	0.04	0.23	0.40	1.00
[3]	Management Q&A Tone _{it}	46,983	0.11	0.27	-1.00	-0.06	0.12	0.29	1.00
<i>Individual Call Tone Measures</i>									
[4]	Individual Analyst Q&A Tone _{ita}	99,665	-0.05	0.55	-1.00	-0.40	0.00	0.33	1.00
<i>Individual Analyst Output Measures</i>									
[5]	Individual Δ EPS Forecast _{ita}	82,309	0.01	0.23	-0.96	-0.04	0.01	0.07	1.06
[6]	Individual $\% \Delta$ Price Target _{ita}	150,208	0.01	0.14	-0.54	0.00	0.00	0.04	0.35
[7]	Individual Δ Recommendation _{ita}	131,086	0.00	0.30	-1.00	0.00	0.00	0.00	1.00
<i>Intraday Abnormal Holding Period Returns (as a %)</i>									
[8]	TAQ Abnormal Return [0, Presentation End] _{it}	46,435	0.01	1.30	-99.87	-0.31	0.00	0.32	22.38
[9]	TAQ Abnormal Return [Pres. End, Q&A End] _{it}	46,337	-0.01	1.41	-22.09	-0.39	0.00	0.37	23.54
[10]	TAQ Abnormal Return [Q&A End, +30 min.] _{it}	45,891	-0.01	1.44	-26.11	-0.45	-0.01	0.44	73.44
[11]	TAQ Abnormal Return [Q&A End +30, +60 min.] _{it}	45,233	-0.01	1.77	-30.94	-0.39	-0.01	0.37	27.28
[12]	TAQ Abnormal Return [Q&A End +60, +90 min.] _{it}	45,182	-0.01	1.35	-21.56	-0.29	-0.01	0.31	25.77
[13]	TAQ Abnormal Return [Q&A End +90, +120 min.] _{it}	44,684	0.00	1.11	-20.01	-0.25	0.00	0.25	23.91
<i>Control Variables from Intraday Tests</i>									
[14]	Earnings Surprise _{it} *	46,883	0.00	0.01	-0.11	0.00	0.00	0.00	0.05
[15]	Large Positive Surprise _{it}	46,883	0.18	0.38	0.00	0.00	0.00	0.00	1.00
[16]	Large Negative Surprise _{it}	46,883	0.20	0.40	0.00	0.00	0.00	0.00	1.00
[17]	Meet/Beat Analyst Forecast _{it}	46,883	0.67	0.47	0.00	0.00	1.00	1.00	1.00
[18]	Size _{it}	46,864	7.17	1.84	0.50	5.96	7.18	8.33	14.67
[19]	Market to Book _{it}	46,806	1.16	1.36	0.00	0.44	0.81	1.42	69.10
[20]	ROA _{it}	46,829	0.00	0.04	-0.26	0.00	0.01	0.02	0.09
[21]	Log of Analyst Following _{it}	46,883	1.42	0.96	0.00	0.69	1.61	2.20	3.66
[22]	Institutional Ownership _{it}	46,883	0.60	0.31	0.00	0.39	0.68	0.85	1.00
[23]	[-2, -1] Abnormal Returns _{it}	46,879	0.00	0.04	-0.61	-0.01	0.00	0.02	1.55
[24]	[0, +1] Abnormal Institutional Trading _{it}	46,450	-0.02	3.15	-11.72	-0.49	0.00	0.58	10.89
[25]	Log of Total Words _{it}	46,883	8.57	0.45	5.48	8.31	8.63	8.90	9.94
[26]	Log of Pres. Words _{it}	46,883	7.61	0.55	1.79	7.32	7.67	7.98	9.34
[27]	Log of Mgmt. Q&A Words _{it}	46,883	7.50	0.82	0.69	7.11	7.65	8.06	9.64
[28]	Log of Analyst Q&A Words _{it}	46,883	6.91	0.67	0.69	6.58	7.04	7.37	8.82
[29]	Log of Mgmt. Pres. Fin. Words _{it}	46,883	4.51	0.65	0.00	4.20	4.60	4.93	6.48
[30]	Log of Mgmt. Q&A Fin. Words _{it}	46,883	3.49	0.88	0.00	3.04	3.64	4.09	5.97
[31]	Log of Analyst Q&A Fin. Words _{it}	46,883	3.04	0.78	0.00	2.64	3.18	3.58	5.46
[32]	Log of Mgmt. Pres. FLS _{it}	46,883	3.30	0.62	0.00	2.94	3.37	3.71	5.07
[33]	Log of Mgmt. Q&A FLS _{it}	46,883	3.21	0.77	0.00	2.83	3.33	3.74	5.40
[34]	Log of Analyst Q&A FLS _{it}	46,883	2.67	0.63	0.00	2.30	2.77	3.09	4.37
[35]	Morning Call _{it}	46,883	0.82	0.38	0.00	1.00	1.00	1.00	1.00
<i>Additional Control Variables Used in Individual Analyst Tests</i>									
[36]	S.D. of Analyst EPS Forecasts _{it}	99,665	0.00	0.01	0.00	0.00	0.00	0.00	0.32
[37]	[-90, -1] Abnormal Returns _{it}	99,665	0.00	0.16	-0.87	-0.08	0.00	0.08	3.40

The index it represents firm i 's conference call for year-quarter t . Index a represents the individual analyst. See Appendix B for variable definitions and Table 1, Panel A for TAQ timing definitions and sample selection criteria.

* Variable winsorized at the 1% and 99% level.

Table 1
Panel C: Subset of Pearson Correlations for Earnings Conference Calls from
2002-2013

Var. # from Table 1	[1]	[2]	[3]	[8]	[9]	[10]
[1] Analyst Q&A Tone _{<i>it</i>}	1.00					
[2] Management Presentation Tone _{<i>it</i>}	0.23***	1.00				
[3] Management Q&A Tone _{<i>it</i>}	0.28***	0.36***	1.00			
[8] TAQ Return [0, Presentation End] _{<i>it</i>}	0.02***	0.02***	0.01**	1.00		
[9] TAQ Return [Pres. End, Q&A End] _{<i>it</i>}	0.03***	0.01	0.01	0.02***	1.00	
[10] TAQ Return [Q&A End, +30 min.] _{<i>it</i>}	0.02***	0.00	0.01	0.00	0.01	1.00

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The index it represents firm i 's conference call for year-quarter t . See Appendix B for variable definitions and Table 1, Panel A for TAQ timing definitions and sample selection criteria.

Table 2
Regressions of Future Individual Analyst Output Revisions on
Individual Analyst Tone for Earnings Conference Calls from 2002 to 2007

Variable	Δ EPS Forecast Level _{it_a}		% Δ Price Target _{it_a}		Δ Recommendation _{it_a}	
	coefficient	t-stat	coefficient	t-stat	coefficient	t-stat
Analyst Q&A Tone _{it_a}	0.004**	(2.18)	0.669***	(8.23)	0.014***	(4.11)
Management Presentation Tone _{it}	0.012	(1.07)	3.211***	(8.37)	0.021**	(2.29)
Management Q&A Tone _{it}	0.018*	(1.75)	1.950***	(5.94)	0.019***	(3.27)
<i>Earnings Disclosure Controls</i>						
Earnings Surprise _{it}	2.870***	(5.41)	100.185***	(8.25)	0.613	(1.20)
Large Positive Surprise _{it}	0.000	(0.04)	1.127***	(8.33)	0.022**	(2.11)
Large Negative Surprise _{it}	-0.010	(-1.10)	-1.332***	(-4.94)	-0.015**	(-2.34)
Meet/Beat Analyst Forecast _{it}	0.014**	(2.61)	1.512***	(9.74)	-0.000	(-0.10)
<i>Time-Varying Firm Controls</i>						
Size _{it}	-0.028**	(-2.26)	-0.800	(-1.32)	-0.015	(-1.40)
Market to Book _{it}	0.011**	(2.77)	-0.009	(-0.08)	-0.005**	(-2.00)
ROA _{it}	-2.106***	(-9.82)	-11.821**	(-2.71)	-0.224***	(-2.67)
Log of Analyst Following _{it}	0.005	(0.60)	-0.039	(-0.30)	-0.006	(-1.12)
S.D. of Analyst EPS Forecasts _{it}	1.394	(1.12)	36.501***	(3.62)	0.059	(0.25)
Institutional Ownership _{it}	0.023**	(2.26)	-0.016	(-0.01)	-0.038**	(-2.11)
[-2, -1] Abnormal Returns _{it}	-0.016	(-0.27)	18.833***	(8.99)	0.019	(0.40)
[-90, -1] Abnormal Returns _{it}	0.054***	(4.25)	17.275***	(16.10)	-0.049***	(-4.22)
<i>Conference Call Attribute Controls</i>						
Log of Total Words _{it}	-0.054**	(-2.29)	-2.912***	(-4.86)	-0.013	(-0.64)
Log of Pres. Words _{it}	0.006	(0.31)	1.001***	(2.89)	-0.002	(-0.22)
Log of Mgmt. Q&A Words _{it}	0.020*	(1.88)	0.111	(0.33)	-0.000	(-0.08)
Log of Analyst Q&A Words _{it}	0.016*	(1.89)	-0.291	(-1.01)	-0.015	(-1.30)
Log of Mgmt. Pres. Fin. Words _{it}	-0.016*	(-1.91)	0.145	(0.64)	0.001	(0.30)
Log of Mgmt. Q&A Fin. Words _{it}	-0.006	(-0.85)	0.399**	(2.33)	0.003	(0.69)
Log of Analyst Q&A Fin. Words _{it}	-0.006	(-0.97)	-0.360**	(-2.58)	0.001	(0.07)
Log of Mgmt. Pres. FLS _{it}	-0.007	(-0.72)	-0.503**	(-2.25)	-0.005	(-1.24)
Log of Mgmt. Q&A FLS _{it}	0.001	(0.17)	0.200	(1.17)	0.002	(0.45)
Log of Analyst Q&A FLS _{it}	-0.003	(-0.27)	0.451*	(1.89)	0.004	(1.10)
Morning Call _{it}	0.010	(1.12)	0.083	(0.31)	0.000	(0.04)
Year-Quarter of the Call Date FE		Y		Y		Y
Analyst-Firm Fixed Effects		Y		Y		Y
Observations		82,309		150,208		131,086
R-Squared		0.282		0.451		0.277

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered by analyst-firm. The index it represents firm i 's conference call for year-quarter t . Index a represents the individual analyst. See Appendix B for variable definitions and Table 1, Panel A for sample selection criteria.

Table 3
Regression of Aggregate Analyst Tone on Call Characteristics for
Earnings Conference Calls from 2002 to 2013

Variable	Analyst Q&A Tone _{<i>it</i>}	
<i>Tone Covariates</i>	<i>coefficient</i>	<i>t-stat</i>
Management Presentation Tone _{<i>it</i>}	0.148***	(20.44)
Management Q&A Tone _{<i>it</i>}	0.231***	(32.52)
<i>Past Returns</i>		
[0, Presentation End] Abnormal Returns _{<i>it</i>}	0.003***	(2.98)
<i>Earnings Disclosure Covariates</i>		
Earnings Surprise _{<i>it</i>}	0.120	(0.91)
Large Positive Surprise _{<i>it</i>}	0.018***	(4.65)
Large Negative Surprise _{<i>it</i>}	-0.009*	(-1.81)
Meet/Beat Analyst Forecast _{<i>it</i>}	0.024***	(6.40)
<i>Time-Varying Firm Covariates</i>		
Size _{<i>it</i>}	0.010*	(1.87)
Market to Book _{<i>it</i>}	-0.003	(-1.29)
ROA _{<i>it</i>}	-0.052	(-0.91)
Log of Analyst Following _{<i>it</i>}	0.005	(1.36)
Institutional Ownership _{<i>it</i>}	0.019	(1.60)
[-2, -1] Abnormal Returns _{<i>it</i>}	0.086***	(2.60)
[0, +1] Abnormal Institutional Trading _{<i>it</i>}	0.001**	(2.06)
<i>Conference Call Attribute Covariates</i>		
Log of Pres. Words _{<i>it</i>}	-0.007	(-0.74)
Log of Mgmt. Pres. Fin. Words _{<i>it</i>}	0.014**	(2.48)
Log of Mgmt. Pres. FLS _{<i>it</i>}	-0.027***	(-4.47)
Morning Call _{<i>it</i>}	0.023***	(3.70)
Year-Quarter of the Call Date FE	Y	
Firm Fixed Effects	Y	
Observations	46,436	
Adjusted R-Squared	0.207	

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered by firm. The index it represents firm i 's conference call for year-quarter t . See Appendix B for variable definitions and Table 1, Panel A for sample selection criteria.

Table 4
Panel A: Regressions of Intraday Abnormal Returns
on Aggregate Analyst Tone for Earnings Conference Calls from 2002 to 2013

Variable	Intraday Abnormal Return Window (as a %)					
	[0, Presentation End] _{it}		[Pres. End, Q&A End] _{it}		[Q&A End, +30 min.] _{it}	
	coefficient	t-stat	coefficient	t-stat	coefficient	t-stat
Analyst Q&A Tone _{it}			0.113***	(4.05)	0.134***	(4.05)
Management Presentation Tone _{it}	0.056*	(1.88)	0.084**	(2.69)	-0.007	(-0.16)
Management Q&A Tone _{it}			0.002	(0.06)	0.012	(0.37)
[0, Presentation End] Abnormal Returns _{it}			-0.701***	(-3.85)	-0.100	(-1.19)
[Pres. End, Q&A End] Abnormal Returns _{it}					-0.004	(-0.33)
Earnings Disclosure Controls						
Earnings Surprise _{it}	0.587	(0.55)	2.462***	(3.13)	-0.718	(-0.62)
Large Positive Surprise _{it}	0.001	(0.04)	-0.027	(-1.20)	-0.002	(-0.07)
Large Negative Surprise _{it}	0.017	(0.85)	0.025	(0.97)	-0.023	(-0.88)
Meet/Beat Analyst Forecast _{it}	0.023*	(1.78)	-0.016	(-0.80)	-0.002	(-0.15)
Time-Varying Firm Controls						
Size _{it}	-0.008	(-0.33)	-0.017	(-0.42)	-0.003	(-0.11)
Market to Book _{it}	-0.006	(-0.54)	-0.006	(-0.49)	-0.040**	(-2.49)
ROA _{it}	-0.149	(-0.38)	-0.926**	(-2.68)	-0.544	(-0.84)
Log of Analyst Following _{it}	0.033	(1.77)	-0.003	(-0.13)	0.003	(0.23)
Institutional Ownership _{it}	-0.066	(-1.32)	-0.046	(-0.63)	-0.036	(-0.67)
[-2, -1] Abnormal Returns _{it}	-1.007**	(-2.20)	-0.825**	(-2.26)	-0.746***	(-2.79)
[0, +1] Abnormal Institutional Trading _{it}	0.011***	(4.36)	0.011***	(3.85)	0.014***	(5.10)
Conference Call Attribute Controls						
Log of Total Words _{it}			0.026	(0.42)	-0.024	(-0.30)
Log of Pres. Words _{it}	0.021	(0.58)	0.042	(0.72)	0.018	(0.32)
Log of Mgmt. Q&A Words _{it}			-0.018	(-0.79)	0.032	(0.98)
Log of Analyst Q&A Words _{it}			0.013	(0.38)	0.053	(1.34)
Log of Mgmt. Pres. Fin. Words _{it}	0.013	(0.62)	0.001	(0.05)	0.020	(0.54)
Log of Mgmt. Q&A Fin. Words _{it}			0.031	(1.57)	-0.019	(-0.93)
Log of Analyst Q&A Fin. Words _{it}			-0.025	(-1.40)	-0.028	(-0.97)
Log of Mgmt. Pres. FLS _{it}	-0.018	(-0.94)	-0.061*	(-1.91)	-0.030	(-1.36)
Log of Mgmt. Q&A FLS _{it}			-0.027	(-1.16)	0.004	(0.15)
Log of Analyst Q&A FLS _{it}			0.010	(0.51)	0.013	(0.39)
Morning Call _{it}	-0.049	(-1.37)	0.032	(1.66)	0.039	(1.35)
Year-Quarter of the Call Date FE		Y		Y		Y
Firm Fixed Effects		Y		Y		Y
Observations		46,436		46,337		45,891
Adjusted R-Squared		0.033		0.035		0.032

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered by calendar year-quarter. The index it represents firm i 's conference call for year-quarter t . See Appendix B for variable definitions and Table 1, Panel A for TAQ timing definitions and sample selection criteria.

Table 4
Panel B: Regressions from Panel A with Controls for Future Analyst Revisions

Variable	Intraday Abnormal Return Window (as a %)			
	[Pres. End, Q&A End] _{it}		[Q&A End, +30 min.] _{it}	
	coefficient	t-stat	coefficient	t-stat
Analyst Q&A Tone _{it}	0.094***	(3.60)	0.118***	(3.61)
Management Presentation Tone _{it}	0.060*	(1.94)	-0.030	(-0.69)
Management Q&A Tone _{it}	-0.004	(-0.14)	0.006	(0.19)
[0, Presentation End] Abnormal Returns _{it}	0.018	(0.95)	-0.006	(-0.55)
[Pres. End, Q&A End] Abnormal Returns _{it}			0.000	(0.94)
<i>Day 0 to Day 20 Mean Consensus Analyst Revisions For All Analysts</i>				
Δ EPS Forecast _{it}	0.000	(1.01)	-0.000	(-1.10)
% Δ Price Target _{it}	0.007***	(6.44)	0.007***	(10.56)
Δ Stock Recommendation _{it}	-0.006	(-0.38)	-0.016	(-0.95)
<i>Earnings Disclosure Controls</i>				
Earnings Surprise _{it}	2.256***	(2.80)	-0.834	(-0.71)
Large Positive Surprise _{it}	-0.041*	(-1.86)	-0.015	(-0.72)
Large Negative Surprise _{it}	0.031	(1.25)	-0.017	(-0.68)
Meet/Beat Analyst Forecast _{it}	-0.030	(-1.44)	-0.015	(-0.90)
<i>Time-Varying Firm Controls</i>				
Size _{it}	-0.006	(-0.14)	0.007	(0.25)
Market to Book _{it}	-0.006	(-0.49)	-0.039**	(-2.48)
ROA _{it}	-0.228	(-2.50)	-0.572	(-0.86)
Log of Analyst Following _{it}	0.000	(0.02)	0.007	(0.46)
Institutional Ownership _{it}	-0.042	(-0.59)	-0.032	(-0.61)
[-2, -1] Abnormal Returns _{it}	-0.961**	(-2.69)	-0.874***	(-3.19)
[0, +1] Abnormal Institutional Trading _{it}	0.010***	(3.72)	0.013***	(5.07)
<i>Conference Call Attribute Controls</i>				
Log of Total Words _{it}	0.033	(0.52)	-0.019	(-0.24)
Log of Pres. Words _{it}	0.044	(0.74)	0.019	(0.34)
Log of Mgmt. Q&A Words _{it}	-0.022	(-0.94)	0.030	(0.91)
Log of Analyst Q&A Words _{it}	0.013	(0.39)	0.054	(1.39)
Log of Mgmt. Pres. Fin. Words _{it}	-0.003	(-0.09)	0.016	(0.42)
Log of Mgmt. Q&A Fin. Words _{it}	0.032	(1.62)	-0.018	(-0.89)
Log of Analyst Q&A Fin. Words _{it}	-0.024	(-1.34)	-0.028	(-0.96)
Log of Mgmt. Pres. FLS _{it}	-0.058*	(-1.81)	-0.027	(-1.24)
Log of Mgmt. Q&A FLS _{it}	-0.026	(-1.17)	0.004	(0.15)
Log of Analyst Q&A FLS _{it}	0.010	(0.51)	0.012	(0.38)
Morning Call _{it}	0.030	(1.53)	0.037	(1.31)
Year-Quarter of the Call Date FE		Y		Y
Firm Fixed Effects		Y		Y
Observations		46,337		45,891
Adjusted R-Squared		0.038		0.034

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered by calendar year-quarter. The index it represents firm i 's conference call for year-quarter t . See Appendix B for variable definitions and Table 1, Panel A for TAQ timing definitions and sample selection criteria.

Table 4
Panel C: Regressions from Panel A for Additional Time Periods

Variable	Additional Intraday Abnormal Return Window (as a %)							
	[0, Presentation End] _{it}		[Q&A End +30, +60] _{it}		[Q&A End +60, +90] _{it}		[Q&A End +90, +120] _{it}	
	coefficient	t-stat	coefficient	t-stat	coefficient	t-stat	coefficient	t-stat
Analyst Q&A Tone _{it}	0.095***	(3.85)	0.040	(1.08)	0.031	(1.30)	0.015	(0.61)
Management Presentation Tone _{it}	0.034	(1.19)	0.087	(1.36)	0.034	(1.18)	-0.014	(-0.51)
Management Q&A Tone _{it}			0.072*	(1.84)	0.006	(0.38)	0.027	(1.25)
[0, Presentation End] Abnormal Returns _{it}			-0.031*	(-1.68)	0.004	(1.24)	0.007	(1.28)
[Pres. End, Q&A End] Abnormal Returns _{it}			-0.000	(-0.86)	0.002	(1.12)	-0.003	(-0.37)
[Q&A End, +30 min.] Abnormal Returns _{it}			-0.220	(-1.02)	0.001	(1.06)	-0.001	(-0.09)
[Q&A End +30, +60 min.] Abnormal Returns _{it}					-0.001	(-0.84)	0.002	(1.25)
[Q&A End +60, +90 min.] Abnormal Returns _{it}							-0.007	(-1.19)
Earnings Disclosure Controls								
Earnings Surprise _{it}	0.553	(0.51)	0.752	(0.62)	0.800	(0.98)	1.691*	(1.76)
Large Positive Surprise _{it}	-0.001	(-0.06)	0.057***	(2.91)	-0.005	(-0.42)	0.032	(1.39)
Large Negative Surprise _{it}	0.018	(0.91)	0.006	(0.21)	0.019	(0.97)	-0.019	(-1.55)
Meet/Beat Analyst Forecast _{it}	0.022	(1.65)	-0.009	(-0.45)	-0.006	(-0.53)	-0.012	(-1.06)
Time-Varying Firm Controls								
Size _{it}	-0.009	(-0.39)	-0.041	(-1.65)	0.033*	(1.70)	0.017	(0.99)
Market to Book _{it}	-0.007	(-0.65)	-0.035**	(-2.40)	-0.000	(-0.00)	-0.008	(-0.91)
ROA _{it}	-0.156	(-0.40)	0.887	(1.09)	0.202	(0.62)	-0.218	(-0.74)
Log of Analyst Following _{it}	0.029	(1.60)	-0.006	(-0.40)	-0.001	(-0.06)	-0.009	(-0.62)
Institutional Ownership _{it}	-0.068	(-1.37)	0.067	(1.15)	0.038	(1.18)	-0.055	(-1.23)
[-2, -1] Abnormal Returns _{it}	-1.016**	(-2.22)	-0.480	(-1.67)	-0.227	(-1.61)	-0.385*	(-1.98)
[0, +1] Abnormal Institutional Trading _{it}	0.011***	(4.36)	0.014***	(3.88)	0.006***	(2.97)	0.007***	(4.44)
Conference Call Attribute Controls								
Log of Total Words _{it}	-0.096*	(-1.76)	0.044	(0.59)	-0.013	(-0.29)	-0.017	(-0.33)
Log of Pres. Words _{it}	0.055	(1.50)	0.104	(1.42)	-0.038	(-1.31)	-0.046	(-1.02)
Log of Mgmt. Q&A Words _{it}	0.029	(0.83)	-0.003	(-0.11)	-0.003	(-0.13)	-0.015	(-0.74)
Log of Analyst Q&A Words _{it}	0.014	(0.38)	0.009	(0.30)	0.006	(0.22)	0.006	(0.24)
Log of Mgmt. Pres. Fin. Words _{it}	0.016	(0.75)	-0.061	(-1.25)	0.023	(1.14)	0.038*	(1.74)
Log of Mgmt. Q&A Fin. Words _{it}	-0.044**	(-2.68)	0.001	(0.06)	0.019	(1.51)	-0.008	(-0.57)
Log of Analyst Q&A Fin. Words _{it}	0.037	(1.59)	-0.016	(-0.72)	-0.007	(-0.61)	0.019	(1.17)
Log of Mgmt. Pres. FLS _{it}	-0.020	(-1.01)	0.004	(0.15)	0.014	(0.80)	0.017	(0.84)
Log of Mgmt. Q&A FLS _{it}	0.039	(1.26)	-0.048	(-1.03)	0.002	(0.10)	0.028	(1.31)
Log of Analyst Q&A FLS _{it}	0.001	(0.04)	0.019	(0.58)	-0.019	(-0.91)	-0.007	(-0.39)
Morning Call _{it}	-0.051	(-1.45)	-0.011	(-0.41)	0.031	(1.67)	-0.000	(-0.01)
Year-Quarter of the Call Date FE		Y		Y		Y		Y
Firm Fixed Effects		Y		Y		Y		Y
Observations		46,435		45,233		45,182		44,684
Adjusted R-Squared		0.034		0.045		0.034		0.025

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered by calendar year-quarter. The index it represents firm i 's conference call for year-quarter t . See Appendix B for variable definitions and Table 1, Panel A for TAQ timing definitions and sample selection criteria.

Table 5
Hourly Breakdown of the Timing of Analyst EPS Forecast, Target Price, and Recommendation Revisions on the Earnings Conference Call Date from 2002 to 2013

This table reports the average percentage of a firm's analysts who revise their EPS forecasts, target prices, and stock recommendations during the hours around the conference call time (time 0).

Hour Relative to Conference Call (T = 0)	Percentage of Firm's Analyst Following		
	EPS Revision	Target Price Revision	Stock Recommendation Revision
-12	0.000%	0.001%	0.000%
-11	0.002%	0.002%	0.012%
-10	0.005%	0.007%	0.010%
-9	0.017%	0.021%	0.033%
-8	0.253%	0.813%	0.026%
-7	0.314%	0.377%	0.061%
-6	0.223%	0.205%	0.046%
-5	0.266%	0.249%	0.090%
-4	0.491%	0.432%	0.566%
-3	1.243%	1.268%	1.168%
-2	2.462%	1.858%	1.147%
-1	3.729%	2.435%	1.229%
0	2.097%	1.148%	1.269%
+1	0.922%	0.519%	0.477%
+2	0.543%	0.297%	0.598%
+3	0.809%	0.507%	0.283%
+4	1.101%	0.736%	0.326%
+5	1.269%	0.912%	0.125%
+6	1.067%	0.772%	0.212%
+7	0.768%	0.498%	0.083%
+8	0.440%	0.296%	0.000%
+9	0.325%	0.216%	0.031%
+10	0.236%	0.161%	0.000%
+11	0.193%	0.120%	0.011%
+12	0.256%	0.216%	0.045%

Bold indicates statistical significance at the 10% level. We obtain the conference call time from the transcript and the analyst revision time from I/B/E/S. See Appendix B for variable definitions and Table 1, Panel A for sample selection criteria.

Table 6
Regressions of Intraday Abnormal Returns (from Table 4) on Aggregate Analyst Tone for Earnings Conference Calls from 2002 to 2013 Excluding Calls with Confounding Analyst Revisions

This table excludes conference calls that have a concurrent EPS forecast, target price, or recommendation revision during the window noted in the first column. We report the coefficient for analyst tone after re-estimating our regressions from Table 4 (including controls).

Hourly Window Relative to Conference Call (Hour 0)	n	[Pres. End, Q&A End] <i>Analyst tone coefficient</i>	[Q&A End, +30 min.] <i>Analyst tone coefficient</i>
Excluding [Hour -8, Hour -5]	45,117	0.1155***	0.1288***
Excluding [Hour -4, Hour -1]	44,686	0.1056***	0.1400***
Excluding [Hour 0, Hour +3]	43,120	0.1193***	0.1321***
Excluding [Hour +4, Hour +7]	44,868	0.1124***	0.1315***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered by calendar year-quarter. Controls from Table 4 are included.

FIGURE 1
Analyst Earnings Forecast, Target Price, and Stock Recommendation Revisions
Around Earnings Conference Calls from 2002 to 2013

This figure shows the on average percentage of a firm's analyst following that revise their EPS forecasts, target prices, and recommendations on the days leading up to and the days following the conference call date.

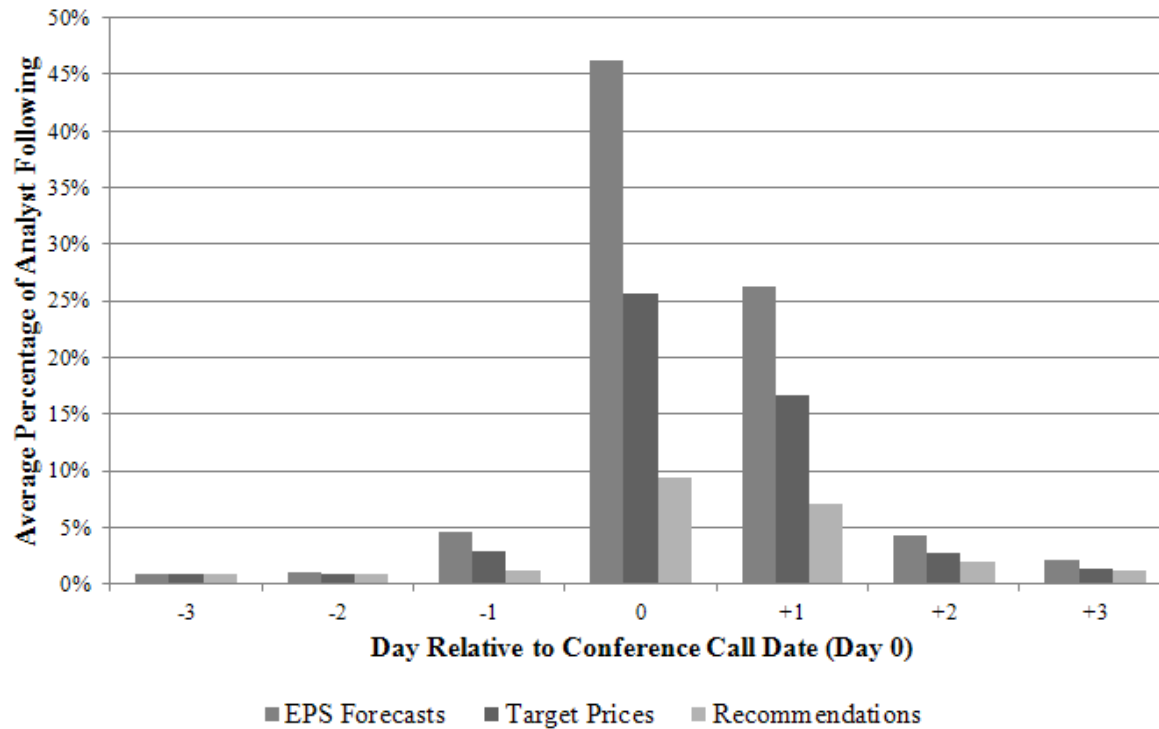


FIGURE 2

Average Analyst and Management Tone Charted by Year for Earnings Conference Calls from 2002 to 2013

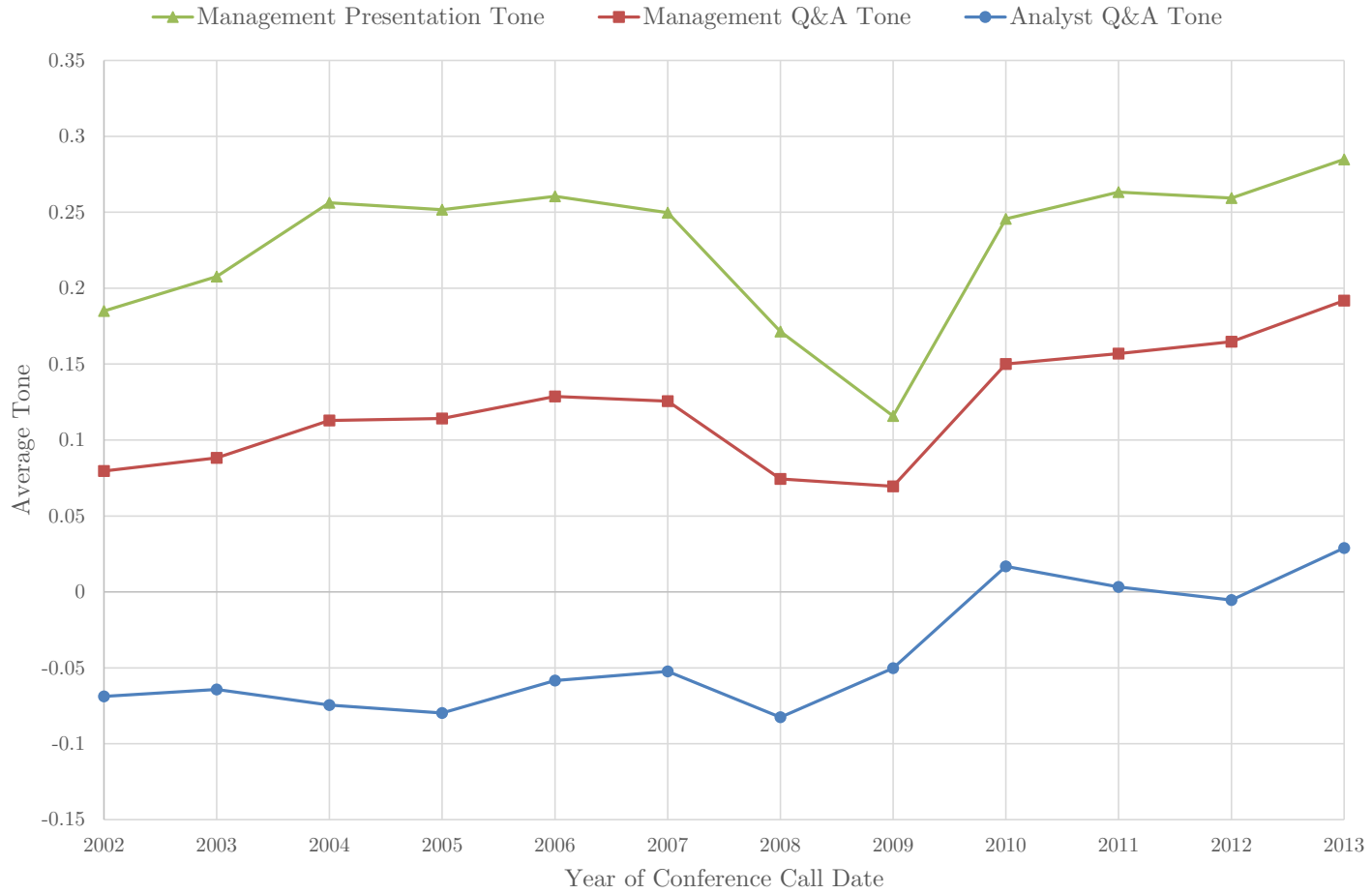
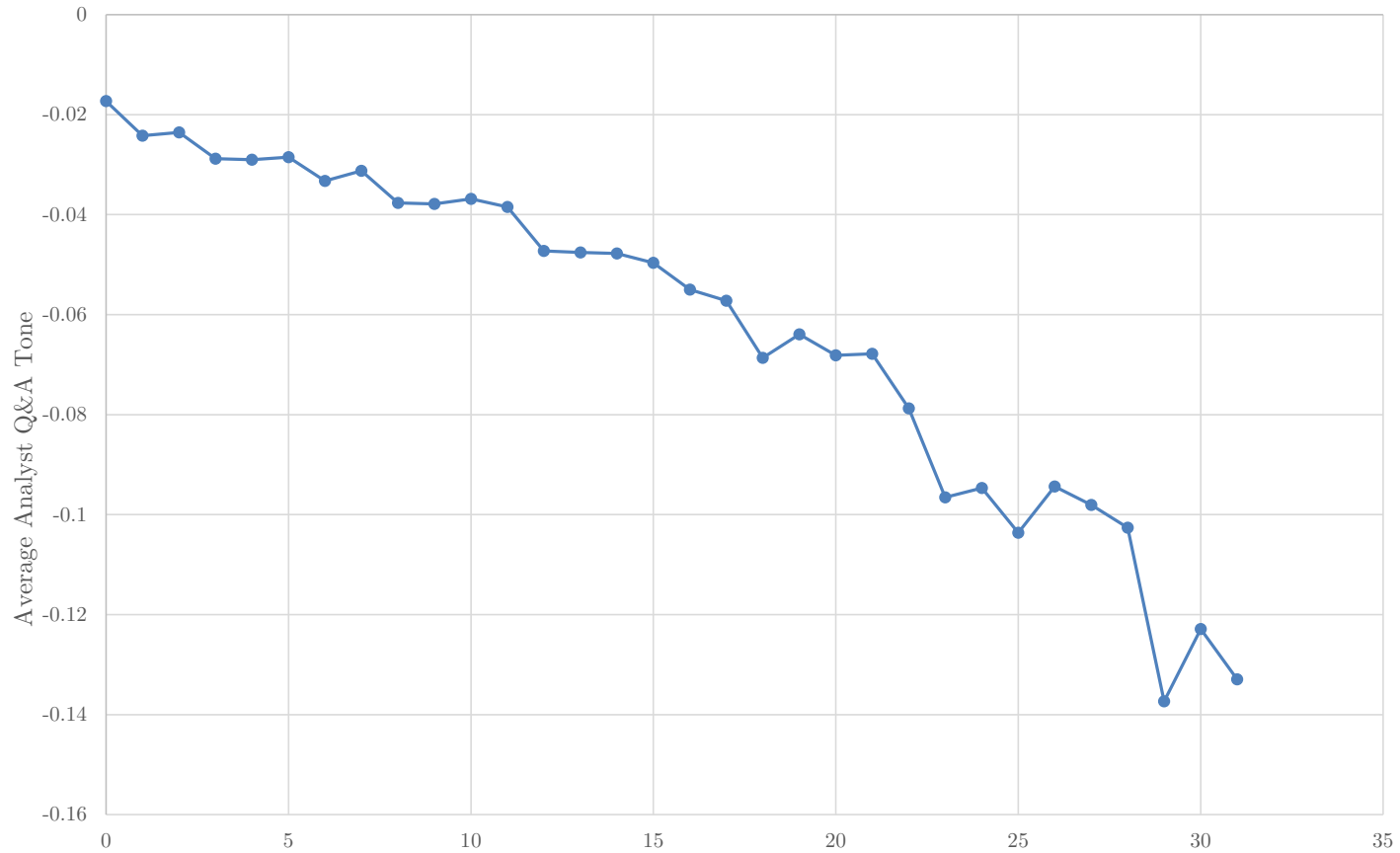


FIGURE 3

Average Analyst Q&A Tone Charted in 100-Word Increments for Earnings Conference Calls from 2002 to 2013



Each one unit increase on the x-axis represents a 100-word increment in words spoken by analysts during the Q&A (minimum 1,000 calls per each 100-word increment)

FIGURE 4

Average Management Q&A Tone Charted in 100-Word Increments for Earnings Conference Calls from 2002 to 2013

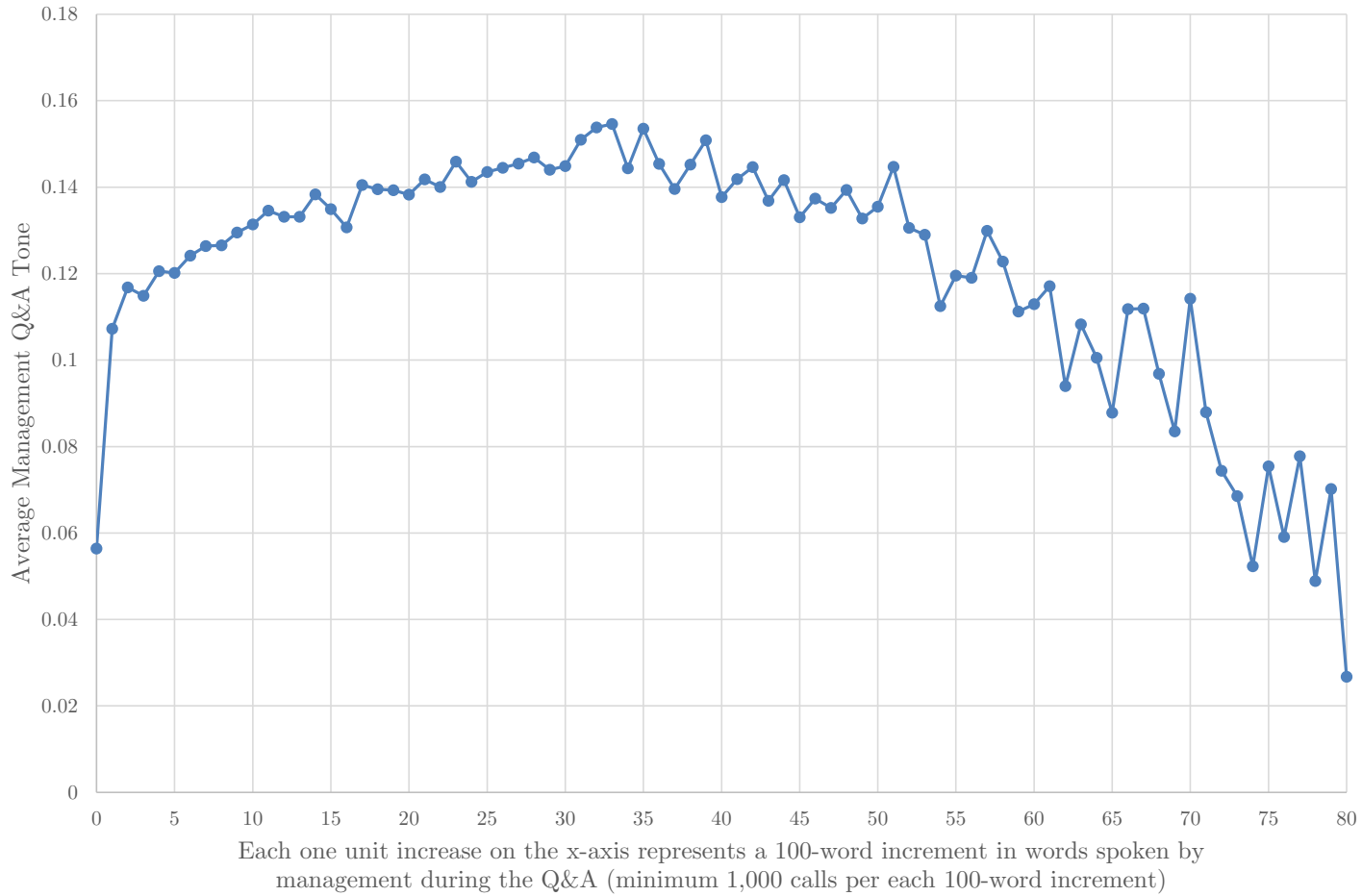


FIGURE 5

Average Analyst Q&A Tone Charted in 100-Word Increments
when Firm EPS is Less than Analyst Mean Consensus EPS

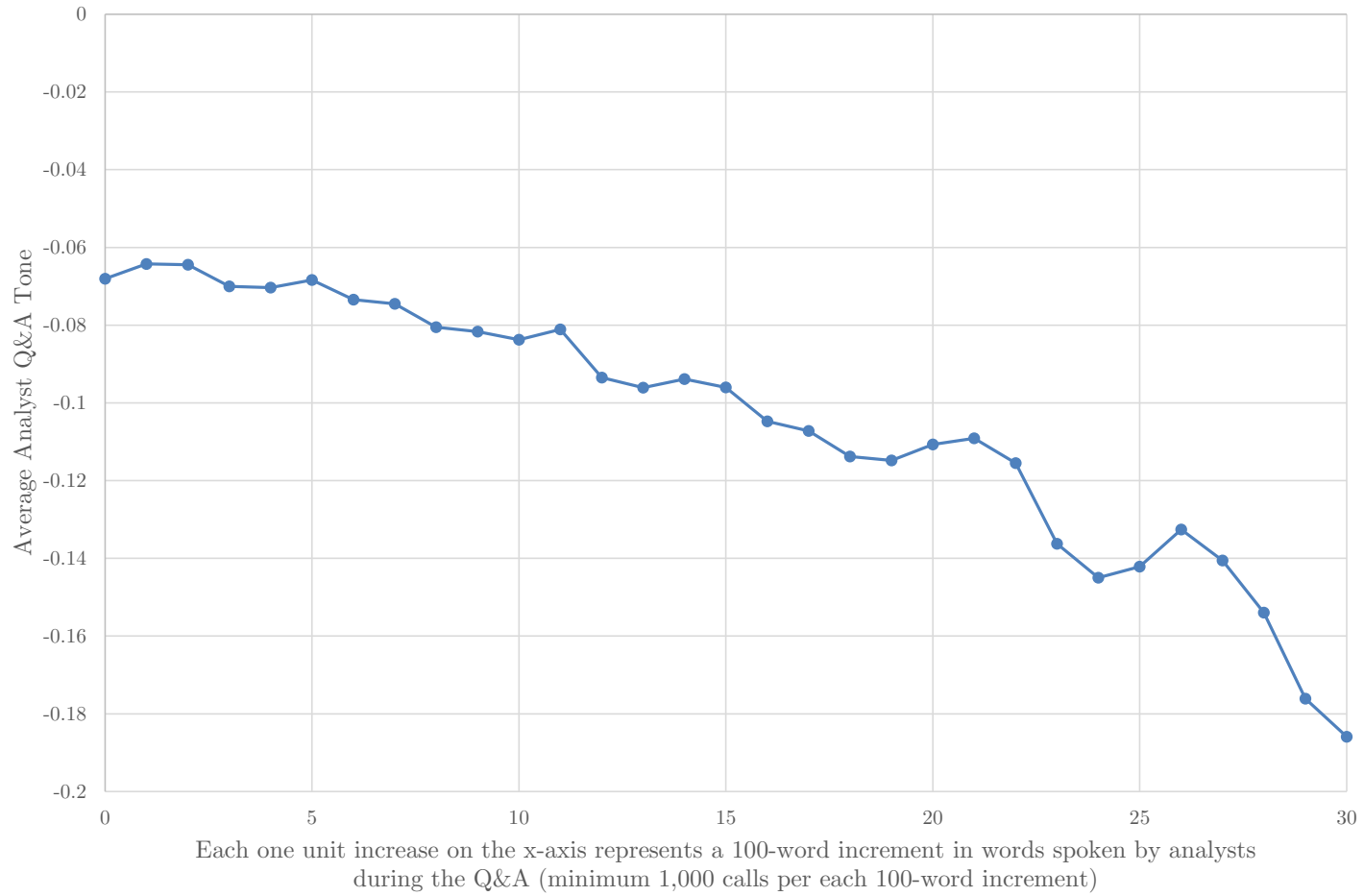


FIGURE 6

Average Analyst Q&A Tone Charted in 100-Word Increments
when Firm EPS is Greater than or Equal to Analyst Mean Consensus EPS

