Disclosure Tone and Short-Selling Pressure: Evidence from Regulation-SHO

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Abstract

Managers use disclosure tone as a strategic tool to manage investors' expectation and demand for information. I provide evidence that investors' actions can in turn exercise a disciplining effect on tone management. Using an exogenous relaxation in the short-selling constraints from Regulation-SHO, I find that short-selling pressure reduces tone management. Greater short selling pressure results in less optimism in tone unrelated to fundamentals, and in disclosures about the past rather than the future. This reduction in tone management is stronger for firms with higher short-selling constraints pre-SHO, overoptimistic and overconfident managers, and lower analyst coverage.

Key Words: Narrative Disclosures, Tone Management, Conference Call, Short-selling, Regulation-SHO

JEL Classification: M41, G14, D22, K22

1. INTRODUCTION

Disclosure tone, i.e., optimism or pessimism of qualitative managerial communications, is one of the important characteristics of textual disclosures (Li 2010a). It has a significant impact on stock prices (Henry 2008; Loughran and McDonald 2011). Since accounting numbers and analysts' estimates are either incomplete or biased, managers use disclosure tone to convey a signal of private information (Davis, Piger, and Sedor 2012; Li 2010a). However, managers also use it as a manipulation tool to manage investors and analysts' expectations by employing an overly optimistic or overly pessimistic tone (Huang, Teoh, and Zhang 2014) or by structuring their tone[1] (Allee and DeAngelis 2015). These voluntary narrative disclosures from earnings press releases and earnings conference calls are not subject to explicit rules about the disclosure format, which gives managers flexibility in disclosing tone through these outlets since they can choose what topics to cover, and how to frame specific information (Henry 2008). Unlike accounting numbers where auditors have accounting standards as a benchmark (Lo 2008), there is no benchmark for disclosure tone, which makes its verification harder (Cazier, Merkley, and Treu 2016). Since regulation and verification of disclosure tone is difficult, I examine if sophisticated players from the secondary market could play a disciplinary role in shaping disclosure tone.

Prior accounting and finance research examines how managers use disclosure tone to influence secondary market participants such as its impact on investors' reaction, information environment, and the cost of capital (Kothari, Li, and Short 2009; Loughran and McDonald 2011; Feldman, Govindaraj, Livnat, and Segal 2010), whereas the role of the secondary market participants in disciplining disclosure tone has not been given attention. Any relationship between disclosure tone and investors' action is subject to endogeneity, and Li (2010b)

[1] Allee and DeAngelis (2015) show that managers deliberately spread optimistic words in the conference calls to influence the perception of analysts and investors.

acknowledges the need for better empirical identification of research employing textual analysis of corporate disclosures. I fill the gap in the literature by examining if participants in the secondary market disciplines managerial tone and I use an exogenous shock to secondary market trading, to make a causal inference.

I choose short-selling pressure from the secondary market for my study as short-sellers are an important group of traders[2] who are sophisticated (Engelberg, Reed, and Ringgenberg 2012). Moreover, short-sellers reveal a signal of private information in the secondary market (Cohen, Diether, and Malloy 2007) and trade on the qualitative news (Beschwitz, Chuprinin, and Massa 2017). It is not clear ex-ante, how short selling pressure would affect the disclosure tone of managers. Managers have incentives to engage in tone management (Huang, Teoh, and Zhang 2014; Arsalan-Ayaydin, Boudt, and Thewissen 2015). However, overly optimistic tone can increase litigation (Rogers, Buskirk, and Zechman 2011) and reputational costs[3]. Therefore, managers face a trade-off between potential benefit and potential cost due to an overly optimistic tone and higher pressure from short-sellers is likely to affect this trade-off.

Prior academic evidence suggests that short-sellers improve stock price informativeness[4]. If short-sellers reveal a signal of negative private information to the market, managers could find it harder to mislead investors by employing an overly optimistic tone due to litigation and reputational concerns (*Disciplining Effect*). Prior studies document the disciplining effect of short-sellers in the context of timely disclosure of bad news earnings guidance (Clinch, Li, and Zhang 2016). On the other hand, regulators and practitioners believe

[2] Short-sellers accounted for approximately one third of share volume (31 percent) for NASDAQ-listed stocks and one fourth (24 percent) for NYSE-listed stocks in 2005 (Diether, Lee, and Werner 2009).
[3] Graham, Harvey, and Rajgopal (2005) argue that reputation is one of the main concerns for managers when they make disclosures.
[4] Theoretical (Miller 1977; Diamond and Verrecchia 1987; Duffie, Garleanu, and Pedersen 2002; Hong, Scheinkman, and Xiong 2006) and empirical (Bris, Goetzmann, and Zhu 2007; Boehmer, Jones, and Zhang 2008; Saffi and Sigurdsson 2010; Boehmer and Wu 2013) evidence suggests that short-sellers improve informational efficiency. Curtis and Fargher (2014) argue that short-sellers do not push the price below fundamental values.

that short-sellers destabilize the financial markets (Lamont 2012) and can also make the stock price overly sensitive to news (Hong, Kubik, and Fishman 2012; Savor and Gamboa-Cavazos 2011). Thus, when short-sellers create a downward pressure on the stock price (Mitchell, Pulvino, and Stafford 2004), managers could increase the optimistic tone strategically by either focusing on positive outcomes or obfuscating negative outcomes (*Stock Price Pressure Effect*). Li and Zhang (2015) argue that managers reduce the precision of bad news earnings guidance when the short-selling pressure is high, which makes the stock price less sensitive to the bad news. Thus, how short-selling pressure affects the disclosure tone of managers is an empirical question. In the current study, I test the above two competing hypothesis (*Disciplining Effect* and *Stock Price Pressure Effect*)[5].

The relationship between short-selling activity and disclosure tone is subject to endogeneity due to reverse causality and omitted variables. The overly optimistic tone could invite the attention of short-sellers (Blau, DeLisle, and Price 2015) and hence the direction of causality instead could be from disclosure tone to the short-selling activity. It is also possible that short-sellers take a position in a firm if they possess some negative private information and hence the relationship could be driven by omitted variables. Another possibility is that firms deliberately change the short-selling constraints in the secondary market (Lamont 2012). To address these potential endogeneity issues, I utilize a regulation-induced exogenous shock from Regulation-SHO to the short-selling constraints and employ a difference-in-differences approach.

Regulation-SHO relaxed short sale restrictions by abolishing the uptick rule[6] during the period May 2, 2005 to July 6, 2007, for a set of randomly selected 986 pilot stocks from the

[5] Blau, DeLisle, and Price (2015) find that short-sellers identify inflated talks only when firms have high earnings surprise. However, they do not examine how does ex-ante short selling pressure affects qualitative disclosures.
[6] Uptick rule states that a stock can be sold short only at a price which is above the last traded price of the stock.

Russell 3000 index. While pilot firms are in the treatment group in my study, other firms from the same Russell 3000 index are in the control group. Prior research documents an increase in short sale activity immediately following the implementation date of the pilot program on May 2, 2005 (Diether, Lee, and Werner 2009). I find that monthly short interest position increases by 6.8 percent for pilot firms as compared to control firms. There was no increase in the SEC scrutiny (Hope, Hu, and Zhao 2017) and investors' attention (Fang, Huang, and Karpoff 2016) for pilot firms during Regulation-SHO. Thus, regulation only increased the short-selling pressure for pilot firms and provides an ideal setting to examine the aforementioned hypothesis.

I test my hypothesis using a sample of 4,647 firm-year observations from 1,327 unique non-financial firms from the United States over the period 2002-2007. I analyze the content of earnings conference calls to measure disclosure tone as the conference call is one of the most important venues for company management to communicate its message (Brown, Call, Clement, and Sharp 2017; Frankel, Mayew, and Sun 2010) and also a proxy for voluntary disclosures. I calculate tone as the difference between the count of optimistic and pessimistic words in the presentation section and scale it by the total count of optimistic and pessimistic words. I employ the financial dictionary from Loughran and McDonald (2011) to classify words as optimistic or pessimistic. Since firm fundamentals also affect the tone of managers, I decompose tone into two parts - normal tone and abnormal tone. I follow Huang, Teoh, and Zhang (2014) and run annual cross-sectional regressions of tone on underlying firm fundamentals. Normal tone is the expected value of tone from this model and thus it captures a part of tone that can be justified by firm fundamentals. Abnormal tone is the residual from the model and thus captures a part of tone that is discretionary. This is the main variable of interest in my study.

I obtain a negative and significant (statistical and economic) association between short-selling pressure and abnormal tone from the difference-in-differences analysis. The negative

association is robust to firm (or industry) and year fixed effects. Specifically, I find that managers reduce abnormal tone by 14.5 percent of its standard deviation and thus the effect is economically significant. I do not find any significant effect of short-selling pressure on the normal tone. Hence, the short-selling pressure only reduces the discretionary part of tone. In another test, I focus on overoptimistic or overconfident managers as these managers are more likely to employ overly optimistic disclosure tone. I find that the negative relationship between short-selling pressure and abnormal tone exists only for firms with overoptimistic or overconfident managers. This evidence rules out the possibility that managers become conservative in tone and engage in downward tone management when the short-selling pressure is high. These findings are consistent with the disciplining effect hypothesis.

If the negative relationship between investors' activity (short-selling pressure) and abnormal tone is due to the disciplining effect, it should be only for the non-forward-looking disclosures as Private Securities Litigation Reform Act (PSLRA, 1995) provides safe harbor provisions to forward-looking disclosures. In fact, Cazier, Merkley, and Treu (2016) argue that only the tone of non-forward-looking disclosures increases litigation risk. I indeed find that negative association between short selling pressure and abnormal tone exists only for the non-forward-looking disclosures. In another test, I find that the negative association with abnormal tone is significant only for those firms that face higher short-selling constraints ex-ante. This finding suggests that short-selling pressure indeed drives the disciplining effect.

In addition to disclosure tone, I also examine the impact of short selling pressure on the structure of tone. Allee and DeAngelis (2015) show that managers create a positive perception among analysts and investors by deliberately spreading optimistic words (positive tone dispersion) during earnings conference calls and argue that tone dispersion has an additional effect on investors' perception, which is incremental to the level of tone. I calculate tone dispersion measures using their methodology and find that managers reduce the dispersion of

positive tone when short-selling pressure is high. I do not find any significant effect on negative tone dispersion. I also examine the immediate market reaction to tone dispersion and find that investors' response to positive tone dispersion decreases in the presence of short-selling pressure. This evidence suggests that investors can see through the tone dispersion in the presence of short-sellers and careful in their response.

From the cross-sectional analyses, I find that the effect of short-selling pressure is significant only for affected firms with lower analyst coverage. This finding suggests that short-sellers substitute for poor information environment and is consistent with the prior evidence from Pownall and Simko (2005), which shows that investors give more importance to the signal from short-sellers when the analyst coverage is lower. Overall, my findings are consistent with the disciplining effect of short-selling pressure and are robust to alternative explanations, additional controls, and cross-sectional placebo tests.

This study contributes to the literature in several ways. First, I contribute to the literature on disclosure tone. My study is the first one to document the disciplining role of secondary market participants on tone management and provide the causal evidence on the secondary market determinants of disclosure tone. Prior studies have focused on the consequences of disclosure tone such as investors' reaction, the cost of capital, information environment, and competitor behavior (Li 2010b; Loughran and McDonald 2011; Kothari, Li, and Short 2009; Durnev and Mangen 2011). Prior work shows how managers mislead investors by using overly optimistic or overly pessimistic tone (Huang, Teoh, and Zhang 2014); inviting favorable analysts to earnings conference calls who ask positive questions (Cohen, Lou, and Malloy 2014); structuring their tone (Allee and DeAngelis 2015); and blaming external factors when performance is poor (Zhou 2014). I show that trading activity in the secondary market could in turn discipline tone management. While Rogers, Buskirk, and Zechman (2011) argue that litigation is an ex-post disciplining mechanism for disclosure tone, my findings suggest

that ex-ante short-selling pressure could increase the perceived litigation concerns for management.

Li and Zhang (2015) show that managers increase the complexity (fog index) of bad news annual reports when short-selling pressure is high and claim that their findings are generalizable to other disclosures. I focus on tone and its structure and find evidence consistent with the disciplining effect rather than obfuscation.

Second, it adds to studies on short-sellers in the accounting and finance literature. Early research shows that short-sellers predict future negative events (Karpoff and Lou 2010; Christophe, Ferri, and Angel 2004; Desai, Krishnamurthy, and Venkataraman 2006; Christophe, Ferri, and Hsieh 2010; Kecskes, Mansi, and Zhang 2012). This literature assumes that short-sellers only affect the information flow into the market. However, recent evidence suggests that short-selling pressure can also directly influence the behavior of firm managers. Massa, Zhang, and Zhang (2015) and Fang, Huang, and Karpoff (2016) document the disciplining effect on earnings management due to short-selling pressure. My findings show that short selling pressure also disciplines tone management. Thus, I contribute to the policy debate on the controversial short-selling activity, by providing additional causal evidence on the benefits of short-selling regulation.

2. BACKGROUND AND HYPOTHESIS DEVELOPMENT

The importance of narrative disclosures has been documented in the literature (Loughran and McDonald 2016; Li 2010b). One of the important attributes of these narrative disclosures is tone that captures the optimistic or pessimistic sentiment (Li 2010a). Prior evidence shows that managers employ disclosure tone to give incremental information to investors regarding future firm performance and tone has positive association with future earnings and short-term market reaction (Henry 2008; Li 2011a; Davis, Piger, and Sedor 2012;

Davis and Tama-Sweet 2012; Loughran and McDonald 2011; Price, Doran, Peterson, and Bliss 2012). However, Huang, Teoh, and Zhang (2014) argue that managers mislead investors by employing an overly optimistic tone around important events such as SEOs (Seasoned Equity Offerings) and M&As (Merger and Acquisitions), and overly pessimistic tone around stock option grants. In another paper, Allee and DeAngelis (2015) argue that in addition to tone, placement of optimistic and pessimistic words in the conference call also influences the perception of investors and analysts. Thus, managers also use tone as a tool to mislead investors.

There is no formal guideline and benchmark for narrative disclosures which gives managers' flexibility in disclosing tone as they can choose what topics to cover and what topics to avoid. Managers need to follow Generally Accepted Accounting Principles (GAAPs) to report earnings. There are no such guidelines for narrative disclosures. Unlike quantitative disclosures, the verification of these narrative disclosures is also difficult. Although PCAOB (Public Company Accounting Oversight Board) recommends auditors to read the transcripts of earnings conference calls (Auditing Standard No. 12, PCAOB [2010]), narrative disclosures are not formally audited by external auditors (Hobson, Mayew, Peecher, and Venkatachalam 2017). Since disclosure tone is not monitored formally and difficult to be regulated, I examine if sophisticated players from the secondary market could play a disciplinary role in tone management. Prior literature has only focused on the secondary market consequences of disclosure tone (Henry 2008; Kothari, Li, and Short 2009; Loughran and McDonald 2011; Feldman, Govindaraj, Livnat, and Segal 2010; Price, Doran, Peterson, and Bliss 2012), whereas the role of secondary market participants in shaping disclosure tone has not been given attention.

I extend prior research by examining the disciplinary role of secondary market participants in disclosure tone. I specifically focus on short-sellers as they are an important

group of traders in the secondary market and do trade on the qualitative news (Beschwitz, Chuprinin, and Massa 2017). They accounted for approximately 31 percent of the trading volume for NASDAQ-listed stocks and 24 percent of the trading volume for NYSE-listed stocks (Diether, Lee, and Werner 2009). Moreover, Boehmer, Jones, and Zhang (2008) find that 75 percent of all short-sales are executed by institutions. Prior evidence suggests that short-sellers improve stock price informativeness[7], have superior ability to process publicly available information (Engelberg, Reed, and Ringgenberg 2012), and serve as important information intermediaries (Pownall and Simko 2005). If short-sellers reveal a signal of private information in the secondary market, investors will be more informed regarding the firm fundamentals. Thus, managers will find it difficult to mislead investors by employing an overly optimistic tone due to litigation (Rogers, Buskirk, and Zechman 2011) and reputational concerns. Massa, Zhang, and Zhang (2015) and Fang, Huang, and Karpoff (2016) document the disciplining effect of short-sellers on earnings management. I test if the short-selling activity also disciplines tone management (*Disciplining effect hypothesis*).

It is not obvious that short-sellers could discipline tone management because tone management is subtle and could be difficult to detect. Since short-sellers also make the stock price overly sensitive to news (Hong, Kubik, and Fishman 2012; Savor and Gamboa-Cavazos 2011), managers could increase the tone management in the presence of short-selling activity by either focusing more on positive outcomes or obfuscating negative outcomes. This could help managers in reducing the downward pressure on stock prices created by short-sellers. Li and Zhang (2015) argue that when the short-selling pressure is high, managers obfuscate bad news by selectively reducing the precision of bad news earnings forecasts and increasing the

[7] Theoretical (Miller 1977; Diamond and Verrecchia 1987; Duffie, Garleanu, and Pedersen 2002; Hong, Scheinkman, and Xiong 2006) and empirical (Bris, Goetzmann, and Zhu 2007; Boehmer, Jones, and Zhang 2008; Saffi and Sigurdsson 2010; Boehmer and Wu 2013) evidence suggests that short-sellers improve informational efficiency.

complexity of annual reports. Similarly, short-selling activity could increase the tone management (*Stock Price Pressure Hypothesis*).

Thus, it is not clear ex-ante how short-selling activity would affect the tone management. My hypothesis tests the relationship between short-selling activity and tone management.

H1A (Disciplining Effect Hypothesis): Short-selling activity is negatively associated with tone management.

H1B (Stock Price Pressure Hypothesis): Short-selling activity is positively associated with tone management.

Studying only earnings forecasts and readability of annual reports does not give a complete picture of firms' disclosures. Moreover, the decision to issue earnings forecasts largely differs from the decision to disclose other qualitative disclosures (Bozanic, Roulstone, and Buskirk 2017). I fill the gap in the literature by studying the effect of short-selling activity on another important attribute of disclosures i.e. disclosure tone.

3. EMPIRICAL METHODOLOGY

3.1 Construction of Tone Variables

I analyze the content of earnings conference calls to measure disclosure tone as the conference call is one of the most important venues for company management to communicate its message (Brown, Call, Clement, and Sharp 2017; Frankel, Mayew, and Sun 2010) and also a proxy for voluntary disclosures. I quantify disclosure tone by employing the "bag of words" approach using narrative disclosures in earnings conference calls as Henry and Leone (2016) show that the "bag of words" tone measures are as powerful as the Bayesian machine-learning tone measures. Under the "bag of words" approach, every document is represented by the

words it contains, ignoring its ordering and grammar. I parse earnings conference call scripts by writing Python programs. Each conference call has two sections – introductory remarks followed by the Q&A (Questions and Answers) section. I focus on the introductory remarks section[8] and remove the list of participants and legal disclaimers from each file. I count the frequency of optimistic and pessimistic words in each document using the financial dictionary from Loughran and McDonald (2011) and control for the negation of an optimistic word if it is accompanied by a negator within a distance of three words (Loughran and McDonald 2016)[9]. Following Allee and DeAngelis (2015), I remove the word "question" from the list of pessimistic words and ignore certain combinations of words that do not capture tone in the conference call[10].

I calculate *TONE* as the difference between the count of optimistic and pessimistic words divided by the total count of optimistic and pessimistic words in the conference call. For ease of interpretation, I scale this measure by multiplying by 100. Since *TONE* is jointly determined by firm fundamentals and managerial discretion, following Huang, Teoh, and Zhang (2014), I decompose *TONE* into two parts – *NTONE* and *ABTONE*. I obtain *NTONE* as the predicted value of *TONE* and *ABTONE* as the residual from the following annual cross-sectional regressions:

$$\boldsymbol{TONE_{i,t}} = \alpha + \beta_0 EARNINGS_{i,t} + \beta_1 RETURNS_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 BTM_{i,t} + \beta_4 STD\_RET_{i,t} + \beta_5 STD\_EARN_{i,t} + \beta_6 AGE_{i,t} + \beta_7 BUSINESS\_SEG_{i,t} + \beta_8 GEO\_SEG_{i,t} + \beta_9 LOSS_{i,t} + \beta_{10} \Delta EARNINGS_{i,t} + \beta_{11} AFE_{i,t} + \beta_{12} AF_{i,t} + \boldsymbol{\varepsilon_{it}} \quad \textbf{(1)}$$

[8] My results are robust when I use both sections in the analysis.
[9] I consider following negators: "*no*", "*not*", "*none*", "*neither*", "*never*", "*nobody*", "**n't*".
[10] I do not consider - "*good*" if it is followed by "*morning*", "*afternoon*", "*evening*", or "*day*"; "*effective*" if it is followed by "*income*", "*tax*", or "*rate*"; "*efficiency*" if it is followed by "*ratio*", and "*closing*" if it is followed by "*remark*" or "*remarks*".

The above regression controls for profitability (*EARNINGS*), earnings performance benchmarks (*LOSS, ΔEARNINGS, AFE* – analyst forecast error), expectation of future performance (*AF* – analyst consensus forecast for one year ahead), market performance (*RETURNS*), growth opportunities (*BTM*), operating and business risk environment (*STD_RET* and *STD_EARN*), age (*AGE*), and operating complexity of a firm (*BUSINESS_SEG* and *GEO_SEG*). Refer to the Appendix for a detailed definition of these variables. Since *ABTONE* is the residual from the above regressions, it captures that part of *TONE* that cannot be justified by the underlying firm fundamentals and thus at the discretion of managers. Table 1(A) presents the results from regression (1). By construction, the average value of *ABTONE* is zero (Table 1(B)).

[INSERT TABLE 1 HERE]

Using specification (1), I also obtain *ABTONE* of forward-looking disclosures (*FLD ABTONE*) and non-forward-looking disclosures (*Non-FLD ABTONE*) separately. I use the dictionary from Muslu, Radhakrishnan, Subramanyam, and Lim (2014) to classify each sentence in the conference call, into a forward-looking and non-forward-looking statement. Then, I count the frequency of optimistic and pessimistic words separately in forward-looking statements and non-forward-looking statements.

In addition to *TONE*, which captures the word choices, I capture the structure of tone by calculating tone dispersion of optimistic (*POSITIVE_ARF*) and pessimistic (*NEGATIVE_ARF*) words using Allee and DeAngelis (2015). *POSITIVE_ARF* (*NEGATIVE_ARF*) tone dispersion captures the degree to which optimistic (pessimistic) words are evenly distributed throughout the introductory remarks session of the conference call. Allee and DeAngelis (2015) argue that managers create a positive influence among analysts and

investors by increasing the dispersion of positive tone or by decreasing the dispersion of negative tone.

3.2 Research Design

The relationship between disclosure tone and short-selling pressure is subject to endogeneity due to reverse causality or omitted variables. The overly optimistic tone could also invite the attention of short-sellers (Blau, DeLisle, and Price 2015) and hence the direction of causality instead could be from disclosure tone to the short-selling activity. Moreover, as Lamont (2012) argues that the number of short positions depends upon both demand and supply of shorting. Therefore empirically estimating the cost and benefits of short-selling is tricky. It is possible that short-sellers take a position in a firm if they possess some negative private information and hence the relationship could be driven by omitted variables. Another possibility is that firms deliberately change the short-selling constraints in the secondary market (Lamont 2012). To address these potential endogeneity issues and make a causal inference, I utilize a regulation induced (Regulation-SHO) exogenous shock to short-selling constraints and employ a difference-in-differences approach.

Regulation-SHO, which was passed by the SEC, removed the uptick rule criteria for a set of randomly selected firms of the Russell 3000 index during the period May 2, 2005 to July 6, 2007. The uptick rule states that a stock can be sold short only at a price that is above the last traded price of the stock. (i.e. during an uptick). Prior evidence (Angel 1997; Alexander and Peterson 1999) shows that the uptick rule is binding and prevents the execution of short-sales. In an NYSE survey (Opinion Research Corporation 2008), 85 percent of surveyed managers were in favor of reinstitution of the uptick-rule "as soon as practical". This evidence shows that managers are concerned about short-selling activities and the uptick rule in particular. The SEC abolished the uptick rule for 986 stocks (called pilot stocks). While the list of pilot stocks was made public on July 28, 2004, the effective date was from May 2, 2005.

Refer to Figure 1 for the timeline of Regulation-SHO. Pilot stocks constitute the treatment group in my study and the remaining stocks in the Russell 3000 index during the year 2004 and 2005 constitute the control group.

[INSERT FIGURE 1 HERE]

Prior evidence shows that short-sales and share volume increased around the implementation date of Regulation-SHO (Diether, Lee, and Werner 2009; SEC 2007). However, Grullon, Michenaud, and Weston (2015) show that anticipated future removal of short-selling constraints increases the short-selling activity in the current period. Since the list of pilot firms was announced well in advance of the effective date (Figure 1), short-selling activity increased well before the effective date once the list of firms was made public. Therefore for the difference-in-differences analysis, I consider the period before the announcement date as the pre-event period and period after the effective date as the post-event period. I use the fiscal year-end date of a firm to classify each observation into pre-event or post-event period and consider observations starting from the fiscal year 2002[11] till the ending date of Regulation-SHO (July 6, 2007). I exclude observations between the announcement and effective dates (July 28, 2004 to May 2, 2005, which I call the announcement period) as these observations cannot be classified into pre-event or post-event period. Additionally, I also exclude financial firms as calculation of tone for these firms poses a problem. Some words are perceived as pessimistic for non-financial firms, but they are not necessarily pessimistic for financial firms (Jegadeesh and Wu 2013).

Regulation-SHO increased the short-selling pressure only for pilot firms without affecting the scrutiny by the regulator or the attention of investors. Hope, Hu, and Zhao (2017) find no significant increase in the number of SEC comment letters and the numbers of topics

[11] Conference call scripts are only available starting from the year 2002 (after SEC passed Regulation-FD).

covered in those comment letters and thus argue that SEC did not increase the scrutiny for pilot firms. In another study, Fang, Huang, and Karpoff (2016) do not find any increase in investors' attention. They use three proxies for investors' attention – the frequency with which a stock is searched on Google, total trading volume, and the number of forecasts by analysts. They do not find any evidence of lobbying for the Regulation-SHO pilot program. Moreover, I find that monthly short interest position increases by 6.8 percent for pilot firms as compared to control firms (Refer to Table A1). Thus, Regulation-SHO provides an ideal setting to examine the causal effect of short-selling pressure on disclosure tone.

I run the following empirical specification for the difference-in-differences analysis:

$$\boldsymbol{ABTONE_{i,t}} = \alpha + \beta_1 POST_{i,t} + \beta_2 POST_{i,t} * PILOT_{i,t} + \beta_3 PILOT_{i,t} + Controls + \varepsilon_{i,t} \qquad (\mathbf{2})$$

where *POST* is a dummy variable which is equal to 1 during the post-event period and 0 otherwise; and *PILOT* is a dummy variable which is equal to 1 for pilot firms and 0 otherwise. Controls include firms (or industry) and year fixed effects. I do not include dummy variable *PILOT* separately when I include firm fixed effects as firm fixed effects will absorb *PILOT* dummy.

The main coefficient of interest is β_2, which captures the causal impact of short selling pressure on *ABTONE* for pilot firms as compared to control firms. A positive and significant value of β_2 will be consistent with the *Stock Price Pressure Effect* (H1B), while a negative and significant value of β_2 will be consistent with the *Disciplining Effect* (H1A). An insignificant value of β_2 will imply that short-selling pressure does not affect disclosure tone.

4. DATA

I collect data from several sources. I hand collect annual conference call scripts from LEXISNEXIS database using Fair-Disclosure wire and extract the introductory remarks from each script by writing Python programs. I obtain accounting and short-interest data from

COMPUSTAT, and stock return data from CRSP and then match observations from LEXISNEXIS and COMPUSTAT using the name of a company and earnings announcement date. I ensure that the difference between the conference call date in LEXISNEXIS and the earnings announcement date from COMPUSTAT is not more than three days. I remove firms in the finance, insurance, and real estate sectors (SIC codes between 6000 and 6999). Finally, I obtain institutional ownership from THOMSON REUTERS, analyst forecasts from I/B/E/S, and index constituents for Russell 3000 from BLOOMBERG.

[INSERT FIGURE 2 HERE]

Figure 2 describes the sample selection process. I start with 7,571 observations after merging LEXISNEXIS and COMPUSTAT data for non-financial firms. I exclude 1,471 observations during the announcement period and consider only those firms that exist in pre-event as well as post-event periods. The final sample contains 4,647 observations from 1,327 unique firms. 386 unique firms are in the treatment group, and 941 firms are in the control group.

[INSERT TABLE 2 HERE]

Table 2 presents summary statistics of my sample. I winsorize all continuous variables at 1 percent to mitigate the effect of outliers. As shown in Panel A, the average length of conference call transcript is 3,040 words, out of which 57 words are optimistic and 26 words are pessimistic. These values are very similar to prior studies employing earnings conference call data (Blau, DeLisle, and Price 2015; Matsumoto, Pronk, Roelofsen 2011). Summary statistics of tone dispersion measures *POSITIVE_ARF* and *ADJ_POSITIVE_ARF* are also very similar to that of Allee and DeAngelis (2015). I decompose total variation in *TONE* and *ABTONE* and find that about 53 percent variation in these variables is time-series (Panel B).

This variation makes these tone variables a good proxy for discretionary tone and rules out the possibility that tone in the conference call could be boilerplate.

Panel C in Table 2 shows the univariate comparison between pilot and control firms during the *PRE* period. *PRE* period is the one-year period ending on the Regulation-SHO announcement date. Although the selection into the Regulation-SHO program was random, there are some differences between pilot and control firms. Pilot firms have larger market capitalization, lower return and earnings volatility, and are older as compared to control firms. Therefore, I control for all of these variables in my difference-in-differences regressions[12].

5. RESULTS AND DISCUSSION

5.1 Short-selling pressure and tone

[INSERT FIGURE 3 HERE]

I provide visual evidence of the impact of short-selling pressure on *TONE* in Figure 3. As can be seen, the level of *TONE* is comparable for pilot and control firms before Regulation-SHO. *TONE* increases during Regulation-SHO period for the pilot as well as control firms. However, the increase is smaller in magnitude for pilot firms. This suggests a disciplinary role of short-sellers on pilot firms.

[INSERT TABLE 3 HERE]

I provide formal evidence in Panel A of Table 3, which presents results of the difference-in-differences analysis from regression model (2). The coefficient of *PILOT * POST* captures the relationship between short-selling pressure and *TONE.* This coefficient is negative and statistically significant at the 5 percent level across all specifications. This negative relationship is robust to various fixed effects and control variables. I control for industry and year fixed effects in column (1), industry-year fixed effects in column (2), and firm and year

[12] Prior studies also document some differences in pilot and control firms (Li and Zhang 2015; Clinch, Li, and Zhang 2016).

fixed effects in columns (3)-(4), and cluster the standard errors at the firm level in all specifications. In column (4), I additionally control for all the determinants of *TONE* from the expected tone model (1) and find similar results. For brevity, I do not show coefficients for these control variables in column (4). I find that managers of pilot firms decrease their *TONE* in earnings conference calls by 3.91 (column 4) during Regulation-SHO as compared to control firms. This reduction in *TONE* corresponds to 14.3 percent of its standard deviation[13]. Thus, this effect is economically significant as well. This result is consistent with the *Disciplining Effect* hypothesis (H1A).

Next, I separately examine the effect of short-selling pressure on *NTONE* and *ABTONE*. While *NTONE* is the expected or predicted value of *TONE*, *ABTONE* is the residual from regression model (1). If the relationship between short-selling pressure and *TONE* is due to the disciplining effect, it should affect *ABTONE* without affecting *NTONE*, as *ABTONE* captures the discretionary component of *TONE*. I report regression results of *NTONE* in Table A2. The coefficient of *PILOT * POST* is insignificant across all specifications. Thus, *NTONE* is not affected by short-selling pressure.

Panel B of Table 3 reports the relationship between short-selling pressure and *ABTONE*. I find the main coefficient to be negative, which is statistically significant as well as economically meaningful, and robust to various fixed effects specifications. Specifically, I find that managers of pilot firms decrease *ABTONE* by 14.5 percent of its standard deviation (based on coefficient in column 5). The difference-in-differences design requires the parallel trend assumption. I test this assumption by adding an interaction term of *PILOT* and *PRE* variables in specifications (3) and (5), where *PRE* is a dummy variable which is equal to 1 for the one-year period ending on the announcement date of Regulation-SHO. Thus, *PILOT * PRE*

[13] Standard deviation of *TONE* is 27.37 (Table 2(A)). The coefficient of *PILOT * POST* in column (4) of Table 3 is 3.91 which is 14.3 percent of 27.37.

captures trends in *ABTONE* between pilot and control firms just before Regulation-SHO came into effect. I find the coefficient of *PILOT * PRE* to be statistically insignificant (column (3) and (5)). Thus, there is no pre-event trend in *ABTONE* between pilot and control firms. These results provide causal evidence that short-sellers discipline managers and that they help reduce tone management.

5.2 Overoptimistic and overconfident managers

If the negative relationship between *ABTONE* and short-selling pressure is due to the disciplining effect, then the short-selling pressure would only affect managers who are either overoptimistic or overconfident. I test this hypothesis by conducting a sub-sample analysis and separately running regression model (2) for firms with overoptimistic/overconfident managers and firms without overoptimistic/overconfident managers. I identify overoptimistic managers during the *PRE* period by employing positive *ABTONE* (*ABTONE* $\geq$ *0*) as a proxy for overoptimistic tone. I use three different proxies from prior literature to identify overconfident managers during the *PRE* period. My first proxy is *RETAINER* from Sen and Tumarkin (2015) and the other two proxies *OC_FIRM4* and *OC_FIRM5* are from Schrand and Zechman (2012).

[INSERT TABLE 4 HERE]

Column (1) of Table 4 reports results from the difference-in-differences analysis for firms with overoptimistic managers and column (5) reports results for firms without overoptimistic managers. I find that the negative relationship between short-selling pressure and *ABTONE* is statistically significant only for firms with overoptimistic managers. Similarly, I find that short-selling pressure disciplines overconfident managers (Columns (2) – (4)) and there is no effect on managers who are not overconfident (Columns (6)-(8)). *PILOT * POST* is significant at 5 percent level in columns (1) to (4) and is insignificant in columns (5) to (8). This evidence is consistent with the disciplining role of short-sellers and rules out the possible

alternative explanation that in the presence of short-selling pressure, managers engage in downward tone management or increase the conservatism in their tone.

5.3 Type of disclosure tone

Optimistic tone of managers increases the subsequent litigation risk. Rogers, Buskirk, and Zechman (2011) document a positive association between disclosure tone and subsequent litigation from shareholders. However, Private Securities Litigation Reform Act (PSLRA, 1995) provides safe harbor provisions to forward-looking disclosures, and therefore the positive relationship between disclosure tone and subsequent litigation exists only for tone from non-forward-looking disclosures (Cazier, Merkley, and Treu 2016). Thus, if the negative relationship between short-selling pressure and *ABTONE* is due to the disciplining effect, it should be only for the non-forward-looking disclosures.

I examine the association of short-selling pressure with *ABTONE* for forward-looking disclosures and non-forward-looking disclosures, separately. I calculate abnormal tone from forward-looking disclosures (*FLD ABTONE*) and non-forward looking disclosures (*Non-FLD ABTONE*) by employing the dictionary of forward-looking phrases from Muslu, Radhakrishnan, Subramanyam, and Lim (2014) and classifying each statement of the conference call into a forward-looking or non-forward statement. Table 5 presents the regression results[14]. I find that short-selling pressure affects only *Non-FLD ABTONE*. It has no significant impact on *FLD ABTONE*. These findings are consistent with the disciplinary role of short-sellers.

[INSERT TABLE 5 HERE]

5.4 Sub-Sample Analyses

[14] I remove 53 observations out of total 4,599 observations based on the highest values of |*DFBETA*| to ensure robustness of my results (top 1.1 percent observations). All results presented in this paper are robust to |*DFBETA*| sensitivity test using multiple cutoff values.

I create sub-samples based on short-selling constraints at the time of Regulation-SHO announcement (i.e. during the *PRE* period). Low institutional ownership is a proxy for short-selling constraints as many institutional investors lend shares to short-sellers (D'Avolio 2002). Smaller firms are also harder to short (Grullon, Michenaud, and Weston 2015). I create two sub-samples based on the median values of these two proxies of short-selling constraints during the *PRE* period and run difference-in-differences regressions. As shown in Panel A of Table 6, I find that the relationship between short-selling pressure and *ABTONE* is statistically significant only for those firms that faced higher short-selling constraints i.e. firms with low institutional ownership and those smaller in size. Although results for firms with low institutional holdings are statistically weaker and significant only at 10 percent (column 2), results for smaller firms are significant at 5 percent (column 4). Overall, the findings in Panel A are consistent with the fact that the impact of Regulation-SHO on short-selling activity is stronger for firms facing higher short-selling constraints ex-ante.

[INSERT TABLE 6 HERE]

Next, I create sub-samples based on the level of analyst coverage as prior evidence suggests that analysts play a significant monitoring role (Chen, Harford, and Lin 2015) and reduce the information asymmetry between investors and managers (Kelly and Ljungqvist 2012). I find that short-sellers discipline managers of those firms that have a lower analyst coverage (Panel B of Table 6). Thus, short-sellers substitute for a poor information environment. This finding is consistent with the prior evidence on the information intermediary role of short-sellers in Pownall and Simko (2005). They argue that investors give more importance to the signal from short-sellers when analyst coverage is lower.

5.5 Structure of tone

In addition to tone, managers use other subtle techniques to amplify the effect of positive or negative news. They deliberately spread good news during the conference calls and

bunch together bad news. This has an additional effect on investors' perception, which is incremental to the level of tone (Allee and DeAngelis 2015). Allee and DeAngelis (2015) is the first paper to measure the structure of tone (tone dispersion). They capture positive tone dispersion (negative tone dispersion) by calculating the degree to which optimistic (pessimistic) words are evenly distributed throughout the entire conference call and show that tone dispersion influences the perception of investors and analysts.

[INSERT TABLE 7 HERE]

I examine how short-selling pressure affects the structure of tone. Using the difference-in-differences specification (Table 7), I find that managers reduce positive tone dispersion (*POSITIVE_ARF*). This relationship is robust to an alternative measure of positive tone dispersion (*ADJ_POSITIVE_ARF*). Since total words, as well as optimistic or pessimistic words, could also influence tone dispersion measures, I control for the length of conference calls (*Total Words*), the total count of optimistic words (*Optimistic Words*), and the total count of pessimistic words (*Pessimistic Words*) in the regression model. These coefficients load up with significant values. I also include all determinants of tone from expected tone model (1) as control variables. For brevity, I do not show coefficient estimates for these control variables in Table 7. Although the primary coefficient (*PILOT * POST*) is statistically significant only at 10 percent level, it is economically significant. Pilot firms decrease the dispersion of optimistic words (*POSITIVE_ARF*) by 12 percent of its standard deviation as compared to control firms. In untabulated results, I find that the effect of short-selling pressure on negative tone dispersion (*NEGATIVE_ARF*) is not significant.

[INSERT TABLE 8 HERE]

Next, I examine investors' reaction to tone dispersion (*POSITIVE_ARF*) in the presence of short-selling pressure. I measure investors' response by calculating cumulative abnormal

returns around the three days window of earnings announcement date (*CAR[-1,+1]*). If short-sellers reveal a signal of private information to investors, then managers will find it difficult to mislead investors. For ease of interpretation, I use annual decile rankings (*D_POSITIVE_ARF*) of *POSITIVE_ARF* as an independent variable. Table 8 presents investors' reaction to *POSITIVE_ARF*. The main coefficient of interest is the triple interaction term – *PILOT * POST * D_POSITIVE_ARF*, which captures the incremental effect of investors' reaction for pilot firms after Regulation-SHO, due to positive tone dispersion. I additionally control for other double interaction terms and standalone terms as well. I control for *EARNINGS* and *D_SUE* (annual decile ranking of standardized unexpected earnings) to control for other contemporaneous quantitative disclosures. I find the main coefficient to be negative (column 2) and statistically significant at 10 percent. I interpret this as an evidence of investors' being more informed in the presence of short-selling pressure and thus exercising caution when responding to positive tone dispersion. This result is robust to industry and year fixed effects and firm characteristics such as size (*SIZE*), growth opportunities (*BTM*), stock performance (*RETURNS*), stock return volatility (*STD_RET*) and earnings volatility (*STD_EARN*)[15].

5.6 Additional Analyses and Robustness checks

I conduct additional tests to rule out alternative explanations of my results. Grullon, Michenaud, and Weston (2015) argue that short-selling pressure reduces the level of equity and debt financing. I control for these variables in the difference-in-differences specification. Additionally, I control for discretionary accruals because Massa, Zhang, and Zhang (2015) and Fang, Huang, and Karpoff (2016) show that managers reduce discretionary accruals in the presence of short-selling pressure. As shown in Table 9, I still obtain similar results.

[15] In untabulated test, I also include another triple interaction term - *PILOT * POST * D_NEGATIVE_ARF* in the same specification. I still find the coefficient *PILOT * POST * D_POSITIVE_ARF* to be negative and significant. But, the coefficient of *PILOT * POST * D_NEGATIVE_ARF* is insignificant.

[INSERT TABLE 9 HERE]

In addition to disclosure tone, I examine other characteristics of conference calls such as length and readability. I use total count of words and sentences in the introduction section as a proxy for length. I calculate readability using three proxies for business communication proposed by Loughran and McDonald (2014) – *Common Words*, *Financial Terminology*, and *Vocabulary*. Refer to the Appendix for a detailed definition of these variables. As shown in Table 10, length and readability of conference calls are not affected by the presence of short-selling pressure.

[INSERT TABLE 10 HERE]

As a further robustness check, I perform a cross-sectional placebo test. I randomly categorize firms in my sample as treatment and control firms and run the difference-in-differences regression model (2). I repeat the randomization process 1,000 times and perform a Monte-Carlo analysis. I obtain distribution of the main coefficient (β_2) from a Monte-Carlo analysis and find the main coefficient to be negative and significant at 5 percent level in two-tailed tests. Finally, I employ the *DFBETA* sensitivity check using multiple cutoff values for all results presented in this paper and find similar results. This test rules out the concern that few influential observations drive my results.

To provide external validity to my results, I additionally examine narrative disclosures from 10-Ks and calculate *ABTONE* using a similar procedure. I examine the association between short-selling pressure and *ABTONE* over the period 1993-2010. I measure short-selling pressure (*SHORT*) by calculating the annual average of monthly short-interest. I scale this measure by the total number of shares outstanding. I obtain a negative and significant

association between *SHORT* and *ABTONE* (Panel A in Table A3)[16]. I take care of endogeneity issues by employing fixed effect specifications. I control for CEO, firm, and year fixed effects. In another test (Panel B in Table A3), I find that the negative relationship between *SHORT* and *ABTONE* exists only for overly optimistic managers. These findings are consistent with the disciplinary role of short-sellers.

6. CONCLUSION

This paper provides causal evidence of secondary market determinants of disclosure tone. Prior studies only examine the consequences of disclosure tone such as its impact on investors' reaction, information environment, and the cost of capital. This is the first study to argue that trading in the secondary market plays a disciplinary role in tone management. I choose short-selling pressure as a setting because short-sellers are sophisticated players in the secondary market. I resolve endogeneity issues by exploiting a regulation-induced exogenous shock to short-selling constraints (Regulation-SHO). Since short-selling pressure only affects firms with overoptimistic or overconfident managers, my results show evidence of the disciplinary role of short-sellers and rules out the concern that managers could become conservative in their tone in the presence of short-sellers. While Rogers, Buskirk, and Zechman (2011) argue that litigation is an ex-post disciplining mechanism for disclosure tone, my findings suggest that ex-ante short-selling pressure could increase the perceived litigation concerns for management.

In addition to tone, I examine the structure of tone and argue that investors are more informed in the presence of short-sellers. Overall, my findings show the benefits of the controversial short-selling activity.

[16] I download 10-Ks from the SEC EDGAR database and collect CEO level information from EXECUCOMP for running this test.

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APPENDIX

Variable Definition

Variable	Definition/Measurement
EARNINGS	Earnings before extra-ordinary items/total assets
RETURNS	Annual stock return over the fiscal year
SIZE	ln (market capitalization)
BTM	Book-to-market ratio
STD_RET	Standard deviation of monthly stock returns over the fiscal year
STD_EARN	Standard deviation of *EARNINGS* over the last five years with at least three non-missing values
AGE	ln (1+ Age) where Age is no of years since a firm appears in CRSP
BUSINESS_SEG	ln (1+number of business segments)
GEO_SEG	ln (1+number of geographical segments)
LOSS	A dummy variable which is equal to 1 when *EARNINGS* < 0 and zero otherwise
Δ EARNINGS	Change in *EARNINGS*
AFE	(Actual EPS - median of most recent consensus analyst forecasts)/stock price at fiscal year ending
AF	Analyst consensus forecast for one-year-ahead EPS/stock price at the fiscal year ending
TONE	(optimistic words - pessimistic words) / (optimistic words + pessimistic words) * 100
ABTONE	Residual from the annual cross-sectional regressions **(1)**
NTONE	Predicted value from the annual cross-sectional regressions **(1)**
ACCRUALS	(Earnings before extra-ordinary items - operating cash flows)/total assets
SHORT	Annual average of monthly short interest scaled by the total no of shares outstanding
DA	Discretionary accruals from Dechow, Sloan, and Sweeney's (1995) modification of Jones's (1991) model

PILOT	A dummy variable for pilot firms during Regulation-SHO and zero otherwise
POST	A dummy variable which is equal to 1 for observations during the Regulation-SHO pilot program (2-May-2005 to 6-Jul-2007) and 0 for observations before the announcement date (28-Jul-2004)
PRE	A dummy variable which is equal to 1 for observations during the one-year period before the Regulation-SHO was announced (29-Jul-2003 to 28-Jul-2004) and 0 otherwise
NASDAQ	A dummy variable which is equal to 1 for firms which are listed on NASDAQ, and zero otherwise
SUE	Change in *EARNINGS* scaled by its standard deviations, calculated over previous 20 quarters data (with at least ten non-missing observations to calculate standard deviations)
Common Words	Average across all words in a particular document of the percent of documents in which each word appears, multiplied by hundred (Loughran and McDonald 2014)
Financial Terminology	Count of unique financial words divided by the total number of unique words in a particular document multiplied by hundred. I use Campbell Harvey's Hypertextual Finance Glossary to count financial words (Loughran and McDonald 2014)
Vocabulary	The proportion of unique words in a particular document from Loughran-McDonald's (2011) master dictionary, multiplied by hundred (Loughran and McDonald 2014)
POSITIVE_ARF	Average reduced frequency (*ARF*) of optimistic words calculated using the methodology from Allee and DeAngelis (2015)
ADJ_POSITIVE_ARF	Adjusted average reduced frequency (*ARF*) of optimistic words calculated using the methodology from Allee and DeAngelis (2015)
FLD ABTONE	*ABTONE* of forward-looking disclosures. Classification into forward-looking and non-forward-looking disclosures is done using the dictionary of phrases from Muslu, Radhakrishnan, Subramanyam, and Lim (2014)
Non-FLD ABTONE	*ABTONE* of non-forward-looking disclosures. Classification into forward-looking and non-forward-looking disclosures is done using the dictionary of phrases from Muslu, Radhakrishnan, Subramanyam, and Lim (2014)
RETAINER	A measure of CEO optimism from Sen and Tumarkin (2015)

OC_FIRM4	A measure of CEO overconfidence calculated using Schrand and Zechman (2012)
OC_FIRM5	A measure of CEO overconfidence calculated using Schrand and Zechman (2012)
Institutional Ownership	Percentage of institutional ownership
ANALYST	No of analysts following a firm during the fiscal year
D_POSITIVE_ARF	Annual decile ranking of *POSITIVE_ARF*
D_SUE	Annual decile ranking of *SUE*
EQUITY_ISSUANCE	Sale of common and preferred stock/total assets
DEBT_ISSUANCE	Long-term debt issues/total assets
Overoptimistic	A dummy variable which is equal to one when $ABTONE \geq 0$ and zero otherwise
Overconfident	A dummy variable which is equal to one for firms with overconfident managers and zero otherwise. I identify overconfident managers using any of these three proxies - *RETAINER*, *OC_FIRM4*, and *OC_FIRM5*.

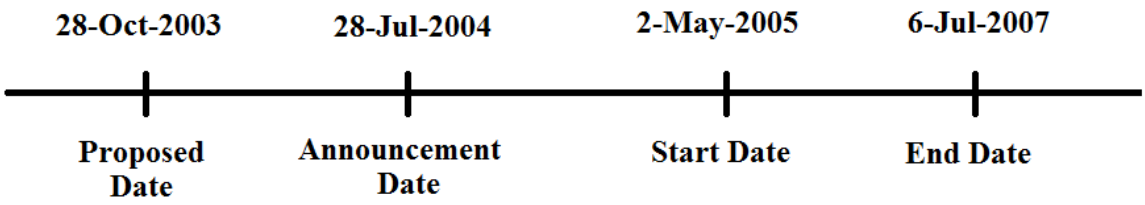

Figure 1: Timeline of Regulation-SHO

	Dropped	Observations
Conference call data merged with Compustat (Non-financial firms)		7,571
Exclude observations during the announcement period	1,471	6,100
Check if a firm exists during pre-event as well as post-event period	1,167	4,933
Control variables missing	286	4,647

No of unique treatment firms	386
No of unique control firms	941
No of unique firms	1,327

Figure 2: Sample Selection

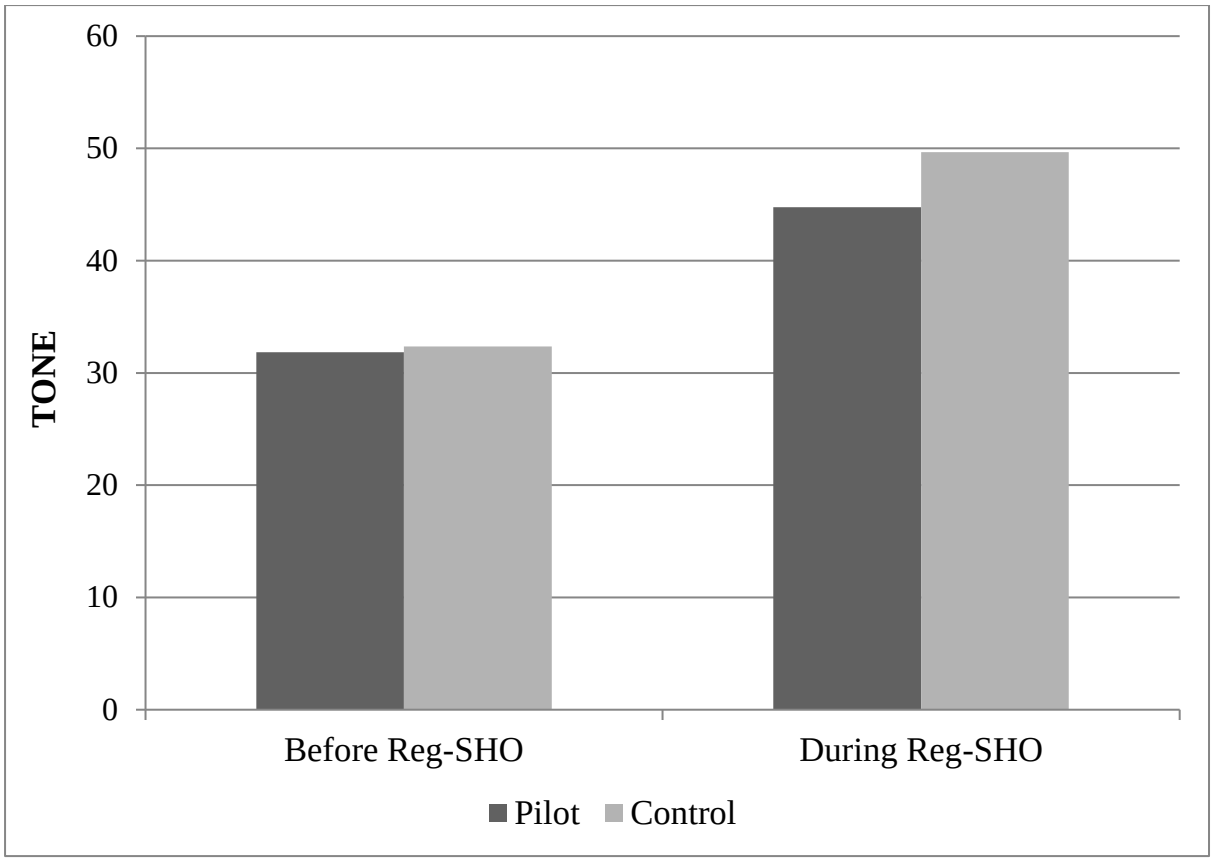

Figure 3: Impact of Regulation-SHO on TONE

Table 1: Calculation of Abnormal Tone

Panel A reports coefficient estimates from the annual cross-sectional regressions of *TONE* on its determinants from the model (1). Panel B shows summary statistics for *ABTONE*. All variable definitions are outlined in the Appendix. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A – Determinants of *TONE*

	TONE		
EARNINGS	-0.006	*GEO_SEG*	-0.005
	[-0.125]		[-0.053]
RETURNS	0.168***	*AGE*	-0.031
	[6.869]		[-1.599]
SIZE	0.055***	*LOSS*	-0.206***
	[6.650]		[-10.929]
BTM	-0.168**	*Δ EARNINGS*	0.145
	[-4.017]		[1.711]
STD_RET	-0.025	*AFE*	1.006***
	[-0.400]		[7.685]
STD_EARN	0.021	*AF*	0.083*
	[1.885]		[2.400]
BUSINESS_SEG	-0.056*	*INTERCEPT*	0.759***
	[-2.073]		[7.712]
Observations	11,193		
Adjusted R-squared	0.081		

Panel B – Summary Statistics

Variable	Mean	S.D.	0.25Q	Median	0.75Q
ABTONE	0.00	26.77	-16.26	2.78	19.09

Table 2: Summary Statistics

Panel A provides summary statistics of earnings conference call sample. Panel B reports variance decomposition for *TONE* and *ABTONE* and Panel C compares firm characteristics of pilot and control firms. All continuous variables are winsorized at top and bottom 1% to mitigate the effect of outliers. All variable definitions are outlined in the Appendix.

Panel A - Summary Statistics of Earnings Conference Calls

Variable	N	Mean	S.D.	0.25Q	Median	0.75Q
Length:						
Total Words	4,647	3,040	1,368	2,168	2,857	3,684
Total Sentences	4,647	162	74	116	152	195
ln (Total Words)	4,647	7.93	0.43	7.68	7.96	8.21
ln (Total Sentences)	4,647	5.00	0.41	4.75	5.02	5.27
Tone Variables:						
Optimistic Words	4,647	57	34	34	51	72
Pessimistic Words	4,647	26	18	14	22	34
TONE	4,647	35.88	27.37	18.68	39.24	56.14
ABTONE	4,647	0.46	26.39	-15.47	3.73	19.24
Forward/Non-Forward Looking Disclosures:						
FLD ABTONE	4,599	0.00	26.41	-16.84	2.48	18.72
Non-FLD ABTONE	4,599	-0.11	123.55	-27.77	1.32	28.47
The Structure of Tone:						
POSITIVE_ARF	4,597	0.56	0.05	0.52	0.56	0.59
ADJ_POSITIVE_ARF	4,597	-0.08	0.05	-0.11	-0.08	-0.05
Readability:						
Common Words	4,625	48.85	4.33	45.92	48.40	51.41
Financial Terminology	4,625	10.79	0.86	10.23	10.78	11.34
Vocabulary	4,625	1.52	0.27	1.35	1.54	1.7

Panel B – Variance Decomposition

	Between Variation	Within Variation
TONE	46.68%	53.32%
ABTONE	46.04%	53.96%

Panel C: Summary Statistics of Pilot and Control Firms

This table presents univariate differences in firm characteristics between pilot and control firms. The significance of differences in mean (median) between two samples is based on two-tailed t-tests (Wilcoxon rank-sum test). ***, **, and * correspond to 1%, 5%, and 10% significance levels.

	PILOT FIRMS			CONTROL FIRMS				
	MEAN	**MEDIAN**	**SD**	**MEAN**	**MEDIAN**	**SD**	**ΔMEAN**	**ΔMEDIAN**
EARNINGS	0.035	0.051	0.137	0.022	0.044	0.158	0.013	0.006
SIZE	7.290	7.031	1.388	7.051	6.831	1.354	0.238***	0.200**
BTM	0.408	0.381	0.271	0.416	0.362	0.298	-0.008	0.018
STD_RET	0.420	0.351	0.231	0.453	0.383	0.268	-0.033**	-0.032
STD_EARN	0.142	0.042	0.476	0.170	0.050	0.489	-0.027	-0.008**
BUSINESS_SEG	0.243	0.000	0.433	0.218	0.000	0.415	0.025	0.000
GEO_SEG	0.004	0.000	0.053	0.012	0.000	0.090	-0.008	0.000
AGE	2.758	2.708	0.697	2.654	2.565	0.727	0.104**	0.143**
LOSS	0.208	0.000	0.407	0.252	0.000	0.434	-0.043	0.000
Δ EARNINGS	0.021	0.006	0.127	0.025	0.008	0.141	-0.004	-0.002
AFE	0.000	0.001	0.020	0.000	0.000	0.026	0.000	0.000
AF	-0.008	-0.001	0.041	-0.020	-0.001	0.120	0.013*	0.000

Table 3: Impact of Short-Selling Pressure on Disclosure Tone

This table presents the impact of short-selling pressure on *TONE* (Panel A) and *ABTONE* (Panel B) from the difference-in-differences analysis. *PILOT* is a dummy variable which is equal to 1 for pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 for observations during the Regulation-SHO program and zero otherwise. *PRE* is dummy variable which is equal to 1 for observations during the one-year period before the Regulation-SHO was announced and zero otherwise. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Impact of Short-Selling Pressure on *TONE*

Specification (1) includes industry and year fixed effects, specification (2) includes industry*year fixed effects, and specifications (3) and (4) include firm and year fixed effects. Control variables in the specification (4) include all the determinants of *TONE* mentioned in the model (1).

	(1)	**(2)**	**(3)**	**(4)**
			TONE	
POST	1.467	1.624	-2.846	0.207
	[0.238]	[0.194]	[-0.547]	[0.040]
*PILOT * POST*	-3.554**	-4.303**	-3.676**	-3.910**
	[-2.112]	[-2.501]	[-2.181]	[-2.502]
PILOT	1.575	1.838		
	[1.133]	[1.277]		
Controls	No	No	No	Yes
Firm FE	No	No	Yes	Yes
Industry FE	Yes	No	No	No
Industry * Year FE	No	Yes	No	No
Year FE	Yes	No	Yes	Yes
Observations	4,647	4,647	4,647	4,647
Adjusted R-squared	0.087	0.095	0.372	0.427

Panel B: Impact of Short-Selling Pressure on *ABTONE*

Specification (1) includes industry and year fixed effects, specifications (2) and (3) include industry*year fixed effects, and specifications (4) and (5) include firm and year fixed effects.

	(1)	(2)	(3)	(4)	(5)
			ABTONE		
POST	0.826	-0.605	3.983	-1.729	4.357
	[0.108]	[-0.055]	[0.338]	[-0.267]	[0.585]
*PILOT * POST*	-3.591**	-4.154**	-4.321**	-3.934**	-3.827*
	[-2.267]	[-2.548]	[-2.126]	[-2.485]	[-1.890]
PILOT	0.770	0.967	1.133		
	[0.569]	[0.688]	[0.637]		
PRE			4.629		4.886
			[1.153]		[1.298]
*PILOT * PRE*			-0.453		0.063
			[-0.215]		[0.030]
Firm FE	No	No	No	Yes	Yes
Industry FE	Yes	No	No	No	No
Industry * Year FE	No	Yes	Yes	No	No
Year FE	Yes	No	No	Yes	Yes
Observations	4,647	4,647	4,647	4,647	4,647
Adjusted R-squared	0.064	0.065	0.065	0.349	0.349

Table 4: Impact of Short-Selling Pressure on Overoptimistic and Overconfident Managers

This table presents a sub-sample analysis of the impact of short-selling pressure on *ABTONE* for managers who were either overoptimistic or were overconfident when Regulation-SHO was announced (i.e. during the *PRE* period). Column (1) reports results for firms with overoptimistic managers (*Overoptimism = 1*) and column (5) reports results for firms without overoptimistic managers (*Overoptimism = 0*). Columns (2)-(4) report results for firms with overconfident managers (*Overconfidence = 1*) and columns (6)-(8) report results for firms without overconfident managers (*Overconfidence = 0*). I identify overoptimistic managers using the sign of *ABTONE* and overconfident managers using *RETAINER*, *OC_FIRM4*, and *OC_FIRM5* proxies for overconfidence. *PILOT* is a dummy variable which is equal to 1 for pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 during the Regulation-SHO program and zero otherwise. All specifications include firm and year fixed effects. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
				ABTONE				
	Overoptimism = 1	***Overconfidence = 1***			***Overoptimism = 0***	***Overconfidence = 0***		
	ABTONE≥0	***RETAINER***	***OC_FIRM4***	***OC_FIRM5***	***ABTONE<0***	***RETAINER***	***OC_FIRM4***	***OC_FIRM5***
POST	-9.419*	-5.757	1.460	6.837	-4.791	3.045	-27.474	-24.454*
	[-1.753]	[-0.789]	[0.279]	[1.142]	[-0.238]	[0.364]	[-0.921]	[-1.674]
*PILOT * POST*	-3.922**	-6.228**	-4.104**	-4.086**	-3.177	-0.411	0.166	-3.498
	[-2.043]	[-2.096]	[-2.380]	[-2.098]	[-1.214]	[-0.092]	[0.031]	[-1.074]
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,447	1,147	3,642	3,040	1,787	609	546	1,065
Adjusted R-squared	0.248	0.390	0.347	0.330	0.278	0.279	0.359	0.377

Table 5: Impact of Short-selling Pressure on Type of Disclosure Tone

This table presents the impact of short-selling pressure on *FLD ABTONE* (specification 1) and *Non-FLD ABTONE* (specification 2) from the difference-in-differences analysis. *FLD ABTONE* is the abnormal tone from forward-looking disclosures and *Non-FLD ABTONE* is the abnormal tone from non-forward-looking disclosures. Forward looking disclosures are identified using Muslu, Radhakrishnan, Subramanyam, and Lim (2014). *PILOT* is a dummy variable which is equal to 1 for the pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 for observations during the Regulation-SHO program and zero otherwise. All specifications include firm and year fixed effects. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) ***FLD ABTONE***	**(2)** ***Non-FLD ABTONE***
POST	2.234	-11.290
	[0.361]	[-0.547]
*PILOT * POST*	-1.571	-8.483**
	[-0.981]	[-1.985]
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	4,546	4,546
Adjusted R-squared	0.138	0.297

Table 6: Sub-Sample Analysis

This table presents a sub-sample analysis of the impact of short-selling pressure on *ABTONE*. Classification into *High* and *Low* is based on the proxies of short-selling constraints in Panel A and analyst coverage in Panel B, based on their median values during the *PRE* period. *PILOT* is a dummy variable which is equal to 1 for pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 for observations during the Regulation-SHO program and zero otherwise. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Sub-sample analysis based on short-selling constraints

Classification into *High* and *Low* is based on the level of institutional ownership in columns (1) and (2), and *SIZE* in columns (3) and (4).

	(1)	**(2)**	**(3)**	**(4)**
		ABTONE		
	Institutional Ownership		***SIZE***	
	High	***Low***	***High***	***Low***
POST	-7.119	12.709***	1.356	-13.109
	[-0.583]	[2.702]	[0.224]	[-0.968]
*PILOT * POST*	-3.080	-5.402*	-1.946	-6.297**
	[-1.127]	[-1.880]	[-0.896]	[-2.524]
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	1,494	1,424	2,217	2,017
Adjusted R-squared	0.319	0.360	0.340	0.357

Panel B: Sub-sample analysis based on analysts coverage

	(1)	(2)
	ABTONE	
	ANALYST	
	High	***Low***
POST	-1.096	-7.696
	[-0.179]	[-0.602]
*PILOT * POST*	-2.517	-5.566**
	[-1.113]	[-2.354]
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	2,208	2,026
Adjusted R-squared	0.354	0.338

Table 7: Impact of Short-selling Pressure on Positive Tone Dispersion

This table presents the impact of short-selling pressure on *POSITIVE_ARF* (Column 1) and *ADJ_POSITIVE_ARF* (Panel B) from the difference-in-differences analysis. *POSITIVE_ARF* and *ADJ_POSITIVE_ARF* capture tone dispersion of optimistic words and are calculated using Allee and DeAngelis (2015). *PILOT* is a dummy variable which is equal to 1 for the pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 for observations during the Regulation-SHO program and zero otherwise. Control variables in specifications (1) and (2) include all the determinants of *TONE* mentioned in the model (1). All specifications include firm and year fixed effects. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) ***POSITIVE_ARF***	**(2)** ***ADJ _POSITIVE_ARF***
POST	-0.009	-0.008
	[-0.816]	[-0.751]
*PILOT * POST*	-0.006*	-0.005*
	[-1.697]	[-1.664]
ln (Total Words)	0.022***	0.020***
	[2.820]	[2.880]
ln (Positive Words)	-0.016**	-0.001
	[-2.486]	[-0.115]
ln (Negative Words)	-0.005**	-0.005**
	[-2.458]	[-2.421]
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	4,492	4,492
Adjusted R-squared	0.248	0.262

Table 8: Investors' Reaction to Positive Tone Dispersion

This table presents investors' reaction to *POSITIVE_ARF* around earnings announcements. *D_POSITIVE_ARF* and *D_SUE* are annual decile ranking for *POSITIVE_ARF* and *SUE* respectively. *PILOT* is a dummy variable which is equal to 1 for the pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 for observations during the Regulation-SHO program and zero otherwise. Control variables include discretionary accruals (Modified Jones Model), *SIZE*, *BTM*, *RETURNS*, *STD_RET*, and *STD_EARN*. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**
	CAR [-1, +1]	
D_POSITIVE_ARF	0.001*	0.000
	[1.742]	[0.450]
*PILOT * POST * D_POSITIVE_ARF*		-0.003*
		[-1.798]
D_SUE	0.006***	0.006***
	[14.098]	[14.132]
EARNINGS	0.003	0.010
	[0.229]	[0.831]
Controls	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	4,589	4,498
Adjusted R-squared	0.061	0.063

Table 9: Robustness Test using Additional Controls

This table presents the impact of short-selling pressure on *ABTONE* from the difference-in-differences analysis. *PILOT* is a dummy variable which is equal to 1 for pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 for observations during the Regulation-SHO program and zero otherwise. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**	**(3)**
		ABTONE	
POST	7.582	11.945*	2.721
	[1.514]	[1.718]	[0.574]
*PILOT * POST*	-4.861***	-5.534***	-4.166**
	[-2.909]	[-3.166]	[-2.478]
PILOT	1.195	1.413	
	[0.843]	[0.954]	
DA	-8.652**	-9.268**	0.000
	[-2.445]	[-2.347]	[0.000]
EQUITY_ISSUANCE	4.337	5.404	-4.464
	[0.973]	[1.197]	[-0.970]
DEBT_ISSUANCE	1.038	1.409	0.913
	[0.521]	[0.691]	[0.408]
Firm FE	No	No	Yes
Industry FE	Yes	No	No
Industry * Year FE	No	Yes	No
Year FE	Yes	No	Yes
Observations	4,267	4,267	4,267
Adjusted R-squared	0.066	0.061	0.358

Table 10: Impact of Short-selling Pressure on Length and Readability

This table presents the impact of short-selling pressure on length and readability of conference calls from the difference-in-differences analysis. *PILOT* is a dummy variable which is equal to 1 for pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 for observations during the Regulation-SHO program and zero otherwise. Control variables in all specifications include all variables from the model (1). All specifications include firm and year fixed effects. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
	ln (Total Words)	***ln (Total Sentences)***	***Common Words***	***Financial Terminology***	***Vocabulary***
POST	-0.027	-0.017	0.113	0.429***	-0.011
	[-0.473]	[-0.314]	[0.127]	[2.693]	[-0.212]
*PILOT * POST*	-0.011	-0.006	-0.049	-0.034	0.005
	[-0.563]	[-0.295]	[-0.249]	[-0.760]	[0.409]
Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	4,647	4,647	4,625	4,625	4,625
Adjusted R-squared	0.649	0.657	0.585	0.458	0.580

ADDITIONAL RESULTS

Table A1: Impact of Regulation-SHO on Short Positions

This table presents the impact of Regulation-SHO on monthly short-selling activity. Panel A presents summary statistics and Panel B presents results from the difference-in-differences analysis. The dependent variable is monthly short-interest scaled by the total no of shares outstanding (*SHORT*). *PILOT* is a dummy variable which is equal to 1 for the pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 for observations during the Regulation-SHO program and zero otherwise. All specifications include firm and month fixed effects. All variable definitions are outlined in the Appendix. Standard errors have been clustered at the firm level in column (1), month level in column (2), and at the firm and month level in column (3)-(4). t-statistics reported in parentheses are based on heteroscedasticity-robust standard errors. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Summary Statistics of *SHORT*

	N	Mean	S.D.	0.25Q	Median	0.75Q
SHORT	89,876	0.05	0.05	0.02	0.03	0.07

Panel B: Regression Results

	(1)	(2)	(3)	(4)
		SHORT		
*PILOT * POST*	0.004***	0.004*	0.004*	0.003*
	[10.423]	[1.936]	[1.939]	[1.796]
SIZE				0.008***
				[4.500]
BTM				-0.001
				[-0.364]
EARNINGS				0.002
				[0.339]
RETURNS				-0.008***
				[-8.152]
STD_RET				0.028***
				[8.816]
NASDAQ				0.030***
				[5.887]
Firm FE	Yes	Yes	Yes	Yes
Months FE	Yes	Yes	Yes	Yes
Observations	89,876	89,876	89,876	85,275
Adjusted R-squared	0.694	0.695	0.694	0.709

Table A2: Impact of Short-Selling Pressure on *NTONE*

This table presents the impact of short-selling pressure on *NTONE* from the difference-in-differences analysis. *PILOT* is a dummy variable which is equal to 1 for the pilot firms in Regulation-SHO and zero otherwise. *POST* is dummy variable which is equal to 1 for observations during the Regulation-SHO program and zero otherwise. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**	**(3)**
		NTONE	
POST	-1.732	-2.043	-3.645***
	[-1.001]	[-0.942]	[-2.823]
*PILOT * POST*	0.147	-0.068	0.396
	[0.309]	[-0.143]	[0.831]
PILOT	0.791*	0.884**	
	[1.866]	[2.078]	
Firm FE	No	No	Yes
Industry FE	Yes	No	No
Industry * Year FE	No	Yes	No
Year FE	Yes	No	Yes
Observations	4,647	4,647	4,647
Adjusted R-squared	0.167	0.181	0.464

Table A3: Impact of Short-Selling Pressure on 10-K *ABTONE*

Panel A: This table reports the coefficient estimates of a regression of 10-K *ABTONE* on *SHORT* (annual average of monthly short interest scaled by the total no of shares outstanding). Standard errors have been clustered at the firm level in specifications (1) and (6), and at the CEO level in specifications (2)-(5). All variable definitions are outlined in the Appendix. t-statistics reported in parentheses are based on heteroscedasticity-robust standard errors. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	ABTONE				***Δ ABTONE***	***ABTONE***
	(1)	(2)	(3)	(4)	(5)	(6)
	Fixed Effect Specification				*Change Specification*	
SHORT	-9.872*	-13.159*	-15.433**	-14.642**		-5.655**
	[-1.818]	[-1.960]	[-2.291]	[-2.008]		[-2.079]
Δ SHORT					-11.185*	
					[-1.773]	
Lagged ABTONE						0.644***
						[69.868]
CEO FE	No	Yes	Yes	Yes	No	No
Firm FE	Yes	No	No	Yes	No	No
Industry FE	No	No	Yes	No	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,686	14,659	14,659	14,659	11,911	24,168
Adjusted R-squared	0.522	0.530	0.535	0.431	0.001	0.454

Panel B: This table reports the coefficient estimates of a regression of 10-K *ABTONE* on *SHORT* (annual average of monthly short interest scaled by the total no of shares outstanding) on subsamples. *ABTONE* ≥ 0 (Column 1) refers to firms with positive abnormal tone, whereas *ABTONE* < 0 (Column 2) refers to firms with negative abnormal tone. All specification includes firm and year fixed effects. All variable definitions are outlined in the Appendix. t-statistics (in brackets) are based on heteroscedasticity-robust standard errors that are clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	ABTONE	
	(1)	(2)
	ABTONE ≥ 0	*ABTONE < 0*
SHORT	-11.370***	4.416
	[-3.279]	[0.628]
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	15,895	12,791
Adjusted R-squared	0.477	0.402