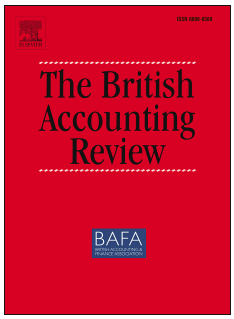

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Strategic Forward-Looking Nonearnings Disclosure and Overinvestment

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Abstract

We examine whether tone management in different aspects of forward-looking statements (FLSs) is related to managers' self-serving overinvestments. Using data for U.S.-listed firms between 2003 and 2019, we provide novel evidence that the abnormal tone of nonearnings-related qualitative FLSs' is significantly and positively related to firms' overinvestments but that other aspects of FLSs are insignificant to overinvestments. Moreover, this relation is more substantial in financially unconstrained firms. Our findings reveal the heterogeneous roles of different aspects of FLSs in firms' opportunistic disclosures concerning future overinvestments. Further analyses also indicate that this relationship is more pronounced for firms with less monitoring and managers with greater career concerns. We also employ instrumental variables with a two-stage least-square approach and a Heckman selection model to mitigate the endogeneity issue. Our results are robust after conducting a battery of robustness tests. Overall, our findings provide robust evidence that managers are likely to strategically manipulate nonearnings-related qualitative FLSs to mislead investors' perception of firms' future fundamentals to achieve self-serving purposes.

***Keywords*:** Tone management; Forward-looking statements; Textual analysis; Investment efficiency; Managerial opportunistic behaviour.

***JEL Classifications*:** G14, G31, G34, G38, M41

1. Introduction

Recent studies have found that the information conveyed in voluntary corporate disclosures is crucial to reducing firms' information asymmetry and mitigating agency problems between managers and market participants (Beyer, Cohen, Lys, & Walther, 2010). However, the degree to which voluntary disclosures can reduce information barriers relies on a firm's information credibility (Healy & Palepu, 2001), and this is particularly true that voluntary disclosures are not audited and are less verifiable by nature at the time of their release and ex-post (Baginski, Clinton, & Mcguire, 2014). Extant studies have also provided consistent evidence that managers might exploit this information asymmetry to pursue private benefits by manipulating perceptions about firms' prospects. Examples include linguistic features, format (Chen, Gee, & Neilson, 2021; Huang, Nekrasov, & Teoh, 2018), timing (Gong, Li, & Yin, 2019; Kothari, Shu, & Wysocki, 2009), and disclosure frequency (Baginski et al., 2014).

In this study, we examine whether tone management in different aspects of forward-looking statements (FLSs) is related to managers' self-serving overinvestments. We focus on FLSs since they are less regulated in nature (Peters & Schacht, 2014) and give managers more discretion when achieving self-serving benefits (Brennan, Guillamon-Saorin, & Pierce, 2009). Unlike prior disclosure studies treating FLSs as a whole, we separate FLSs into four aspects: earnings-related quantitative/qualitative and nonearnings-related quantitative/qualitative FLSs, then investigate the heterogeneous roles of different aspects of firms' forward-looking statements (FLSs), concerning firms' future overinvestments. Classifying FLSs into different aspects is important because

managers' disclosure decisions exhibit significant variations in the qualitative vs. quantitative related information disclosures corresponding to each type (earnings-related and nonearnings-related) of FLSs (Bozanic, Roulstone, & Van Buskirk, 2018). However, little is known about whether and how the different aspects of FLSs are related to managers' self-serving behaviour, such as overinvestment. We aim to fill this void.

Agency theory suggests that managers have incentives to pursue their self-interests at the expense of shareholder wealth, such as investments beyond the optimal level. Overinvestment is a typical managerial self-serving behaviour resulting from moral hazard and managerial myopia (Biddle, Hilary, & Verdi, 2009). Central to this idea is that information opacity can give shareholders more difficulty when monitoring firms' management, leading to managers having greater discretionary power to undertake overinvestment (Roychowdhury, Shroff, & Verdi, 2019).

From the perspective of signalling theory, disclosures, specifically nonearnings-related disclosures are predominantly used to convey a signal to the stakeholders (Ma, 2019; Merkley, 2014; Noh, So, & Weber, 2019; Richard Lu & Wu Tucker, 2012). Managers are likely and more easily to engage in tone management in qualitative disclosure in contrast to numbers reported in quantitative disclosures (Cazier, Merkley, & Treu, 2020; Hutton, Miller, & Skinner, 2003) to signal investors about firms' promising future development and prospects (Allee & DeAngelis, 2015; Schleicher & Walker, 2010). These messages more likely upwardly bias investors' perception of firms' actual situation and cause investors to have difficulty monitoring managers. This,

in turn, offers managers opportunities to misbehave to maximise their self-benefits, such as empire-building through engaging in overinvestment, to acquire greater resources under control.

We employ the abnormal tone proposed by Huang, Teoh, and Zhang (2014) to measure the extent of disclosure manipulation by managers. Among qualitative disclosure, we focus on nonearnings-related qualitative FLSs since they are the most likely part of FLSs to be manipulated as they leave greater discretionary disclosure rooms to managers and mainly consist of investment-related narratives about corporate strategies and development trends (Richard Lu et al., 2012).

Using a sample of 21,487 firm-year observations of U.S.-listed firms from 2003 to 2019, we find that the abnormal tone in nonearnings-related qualitative FLSs is positively related to overinvestments, but other aspects of FLSs are not. In addition, we find that managers of financially unconstrained firms tend to exhibit stronger self-serving behaviours. Further analyses also indicate that this relationship is more pronounced for firms with less monitoring and managers with greater career concerns.

We perform additional analyses to examine whether managers' opportunistic behaviour might differ for various important events. Specifically, we find that the abnormal tone used in nonearnings-related qualitative FLSs is significantly associated with firms' overinvestments after the global financial crisis (GFC). A potential explanation is that managers have faced increasing monitoring pressure after the GFC, which might have motivated them to search for alternatives to pursue private benefits. In addition, we demonstrate that firms increased overinvestments after the publication

of the Loughran-McDonald sentiment dictionary (hereafter, LM dictionary) in 2011, suggesting that this dictionary gives managers a reference when they decide on the sentiment level of corporate disclosures and, thus, more room to manipulate tone disclosures strategically.

To mitigate endogeneity concerns, we employ an instrumental variable (IV) with a two-stage least-squares (2SLS) approach to address the endogeneity issue. Specifically, we employ the abnormal tone of peer firms' nonearnings-related qualitative FLSs as the instrument because the tone that a firm uses is more likely to be influenced by the tone used by peers (Ertugrul, Lei, Qiu, & Wan, 2017; Hossain, Raghunandan, & Rama, 2020). Meanwhile, a firm's investments may not be influenced by the tone in the FLSs of peers (Cho & Muslu, 2021). We use two variables to indicate this IV: (1) the mean of nonearnings-related qualitative FLSs' abnormal tone in a given industry and a given year; (2) the mean of nonearnings-related qualitative FLSs abnormal tone in a given state and a given industry. We also add a firm fixed effect to the baseline model. In addition, we perform a Heckman selection model to prevent sample selection bias in the baseline results and to ensure that overinvestments are driven by self-serving managerial behaviour rather than other factors. Finally, our results remain robust after a battery of endogeneity and robustness tests.

Our study makes contributions to the academic literature. First, we contribute to the literature on information disclosure. While the extant literature reveals that managers have heterogeneous disclosure decisions on different aspects of FLSs (Bozanic et al., 2018), there is little evidence to show whether managers exert

distinguished tone manipulation behaviours across these four parts of FLSs. Through the classification of FLSs into four different aspects, we provide nuanced evidence to show that managers are most likely to engage in tone management to manipulate nonearnings-related qualitative FLSs for their own benefit at the expense of shareholders' wealth. Our study enriches the understanding of managerial FLS tone manipulation and responds to Bozanic et al. (2018)'s encouragement that future research should distinguish the varying types of FLSs.

Second, we contribute to the corporate investment literature. We employ the abnormal tone model to advance the discourse on tone management within the context of overinvestments. Previous literature has primarily focused on the impact of quantitative financial reporting quality on overinvestment (see Roychowdhury et al. (2019)). Qualitative information conveys managers' private insights, such as sentiment, and serves as a complement to quantitative data (Davis, Piger, & Sedor, 2012; Demers & Vega, 2014; Henry, 2008). However, there is limited evidence regarding how biased qualitative information can adversely impact a firm's real economic outcomes. We fill this gap by presenting the first study on how tone management, in turn, induces managers to behave in a self-serving way (i.e., overinvestment). Our findings echo Blankespoor, deHaan, and Marinovic (2020) review paper in that while they state that the biased tone can increase investors' information processing costs, we provide empirical evidence to show the real consequence of biased FLS tone, highlighting the importance of maintaining the credibility of qualitative information. Methodologically, we use textual analysis techniques to identify different aspects of FLSs and measure

linguistic tone from large SEC 8-K filings.

The remainder of this paper is organized as follows. Section 2 presents a literature review. Section 3 develops the hypotheses. Section 4 describes the sample selection and empirical methodology employed. Section 5 presents the main empirical results. Section 6 shows the results of the additional tests. Section 7 presents the results of the endogeneity tests. Section 8 provides the results of the robustness tests. Section 9 concludes the paper.

2. Literature review

2.1 Classification of firms' forward-looking statements (FLSs)

The extant literature on management earnings forecasts is largely based on signalling theory and has focused on whether these forecasts contain meaningful information for market participants. For example, Leuz and Verrecchia (2000) show that positive management earnings forecasts can lower firms' costs of borrowing. Similarly, information intermediates, such as analysts, have also been found to revise their estimates after the firm issues earnings disclosures (Cotter, Tuna, & Wysocki, 2006; Feng, Li, & McVay, 2009). Central to these findings is that these disclosures provide creditable supplementary to firms' current and future performance (Beyer et al., 2010; Billings, Jennings, & Lev, 2015; Hutton et al., 2003; Wasley & Wu, 2006). However, previous research examining firms' quantitative earnings forecasts seems to have provided limited evidence when explaining certain corporate outcomes and market anomalies (Abarbanell & Bernard, 1992), such as firm overinvestments and post-

earnings announcement drift.[1] Such findings have suggested that market participants might fail to fully incorporate the information content when judging solely based on the numeric aspect of firms' earnings forecasts. Instead, other information, such as qualitative disclosure (i.e., FLSs), should also be thoroughly examined, because FLSs in a narrative way convey managers' predictions and projections about their firms' prospects, risks, and operational outcomes. The signalling theory suggests that disclosures, specifically nonearnings-related disclosures are predominantly used to convey a signal to the stakeholders about the promising future of the firms (Ma, 2019; Merkley, 2014; Noh et al., 2019; Richard Lu et al., 2012).

Building on this line of research, recent disclosure studies have attempted to detect the content and impact of nonnumeric information that firm management tries to convey to investors. They adopt text-based methods to capture nonnumeric content (i.e., textual narratives) from firms' forward-looking statements based on keyword identification and linguistic tone analysis (Li, 2010b; Loughran & McDonald, 2011; Muslu, Radhakrishnan, Subramanyam, & Lim, 2015).[2] This is because the nonnumeric aspects of disclosures contain management's private information that does not exist in numerical information, including the managers' attitudes and sentiments about the company's prospects, risks, and operational outcomes, which might be useful for

[1] Ball and Brown (1968) point out that stock market returns continue to drift upward (downward) when firms issue an unexpected positive (negative) earnings surprise, and this phenomenon contrasts with that called for by efficient markets, which assumes that numeric information should be readily incorporated into prices if the information content becomes publicly available.

[2] Previous studies in social communication have indicated that people are likely to be affected by the words of others (Petty & Cacioppo, 1986). Consistent with this idea, recent studies in accounting and finance have provided evidence that text-based methods, such as word classification, provide information on firms' prospects (Davis, Piger, et al., 2012; Demers et al., 2014; Li, 2010a).

market participants to evaluate firm performance (Li, 2010a). The extant literature provides evidence that the information contents from FLSs are informative to corporate outcomes. For example, Li (2010a) studies the FLSs in the MD&A section of 10-K and 10-Q filings and finds that the tone of these statements is informative about a firm's future performance. Similarly, Mayew, Sethuraman, and Venkatachalam (2015) find that the information content in MD&As is valuable to auditors' perceptions of firms' financial health.

Among these studies, Bozanic et al. (2018) argue that FLSs generally consist of different aspects of a firm's information and that previous studies focused on the overall FLSs might draw inconsistent inferences depending on the types of FLSs used. For example, Richard Lu et al. (2012) and Bozanic et al. (2018) reveal that managers are prone to disclose more nonearnings-related FLSs when firms face poor performance and higher earnings uncertainty. Previous literature has suggested that managers are reluctant to make earnings quantitative forecasts (i.e., earnings guidance) when they face the same circumstances (Field, Lowry, & Shu, 2005; Houston, Lev, & Tucker, 2010; Waymire, 1985).

To isolate the different aspects of FLSs, studies have distinguished FLSs into earnings-related quantitative/qualitative FLSs and nonearnings-related quantitative/qualitative FLSs. In addition, they have grouped the classified FLSs into "Forecast-like FLSs" (including earnings-related quantitative FLSs) vs. "Other FLSs" (including earnings-related qualitative FLSs and all nonearnings-related, quantitative and qualitative FLSs) and show that "Other FLSs" disclosures are consequential,

resulting in stronger investor responses and greater changes in analyst forecast accuracy during the announcement period. Their results have also indicated that the amounts of different aspects of FLSs are unequally distributed, especially nonearnings-related qualitative FLSs, which account for the majority of FLSs (see Figure 1).

To date, however, there is limited research on whether and how the information content in firms' nonearnings-related qualitative FLSs (i.e., accounting for the majority of FLSs) affects corporate outcomes. In this paper, we extend this line of research by investigating the heterogeneous roles of different aspects of FLS tones in firms' opportunistic disclosures concerning firms' investment efficiency.

[Insert Figure 1 Here]

2.2 Firm investment efficiency

In a perfect capital market setting, managers are assumed to follow the neoclassical view, where they should engage in projects with a positive net present value (NPV). However, the extant literature has well documented that various frictions stand in the way of this ideal setting, with frictions resulting from information asymmetry receiving the most attention (Hubbard, 1998; Stein, 2003). Agency theory suggests that managers typically have more information about the firm and might exploit this information advantage and pursue their private interests at the expense of shareholders' wealth (Jensen & Meckling, 1976), such as investing beyond the optimal level (i.e., overinvestments).

Overinvestments are primarily caused by the moral hazard derived from

information asymmetry. Roychowdhury et al. (2019) point out that moral hazard raises two agency problems that lead to overinvestments: empire building and managerial myopia. According to agency theory, in terms of personal gain, growing the firm through acquisitions or other forms of expansion to build an "empire" allows managers to obtain more power and prestige (Jensen et al., 1976). Moreover, managers boost short-term performance in the event of poor performance by undertaking investments (e.g., corporate restructuring and takeovers), which is potentially detrimental to long-term value. The literature on investment efficiency has found that firms with worse reporting quality tend to be associated with overinvestment (Biddle et al., 2009). Relatedly, Cheng, Dhaliwal, and Zhang (2013) also provide evidence that firms with less disciplined managers are more likely to engage in overinvestments.

2.3 Tone management in a firm's FLSs and overinvestments

According to the signalling theory, the tone of narrative management disclosures can convey additional information, such as managers' attitudes and sentiments, that is useful for market participants to better access firms' fundamentals (Chen, Kim, Wei, & Zhang, 2019; Davis, Piger, et al., 2012; Demers et al., 2014; Li, 2010a). However, language is largely voluntary, subjective, and generally not audited, in contrast to numbers reported in quantitative disclosures (Cazier et al., 2020; Hutton et al., 2003). Recent disclosure studies have also found that this inherent complex nature allows managers to manipulate the tone of disclosures more easily to achieve private benefits, such as covering poor performance (Allee et al., 2015; Schleicher et al., 2010).

Following the above arguments, Huang et al. (2014) provide a nuanced analysis of managers' use of language and find that managers tend to manipulate tone to strategically mislead investors about firms' fundamentals. In particular, they find that firms with a greater abnormal positive tone are negatively associated with future earnings and cash flows. Moreover, they find that managers have stronger incentives to hype the tone when they face upward perception management events, such as just meeting/beating thresholds, future earnings restatements, SEOs, and M&As. Moreover, a line of the literature has followed Huang et al. (2014) to study managers' incentives to hedge their tones. Arslan-Ayaydin, Boudt, and Thewissen (2016) find that managers with equity-based compensation plans are prone to use an overly optimistic tone. Similarly, Cheng, Liu, and Wei (2021) show that CEOs with high compensation convexity are significantly more likely to employ an abnormal tone after recent high industry returns. In addition, managers opportunistically manage their tones when they intend to engage in inside trading, as shown by Xu and Qi (2020).

Given that the disclosure of FLSs can only be verified ex-post and often after significant time gaps (Gu & Li, 2007), safe harbour provisions also limit the enforcement of regulatory and legal actions regarding managers' qualitative disclosures (Cazier et al., 2020). It has become apparent that managers are likely to exploit this advantage to engage in tone management in FLSs. Therefore, due to information asymmetry, market participants cannot access the credibility of the perceived information and might be misled by the underlying message in firms' FLSs; thus, they cannot discipline managers' actions, possibly resulting in firms being overinvestment

(Cheng et al., 2013).

3. Hypotheses development

Under the agency framework, managers have incentives to exploit information advantages at the expense of shareholder wealth to maximize their personal interests, which might cause them to choose a level of investments beyond the optimal level (Jensen, 1986). Consistent with this idea, Broussard, Buchenroth, and Pilotte (2004) find that when managers' objectives differ from those of shareholders and when these firms lack efficient monitoring mechanisms, managerial discretion may lead managers to overinvest.

The signalling theory suggests that disclosures, specifically nonearnings-related disclosures are predominantly used to convey a signal to the stakeholders about the promising future of the firms (Ma, 2019; Merkley, 2014; Noh et al., 2019; Richard Lu et al., 2012). Managers can opportunistically manipulate investors' perceptions of firms' prospects by inflating the tone of the FLSs, similar to managers manipulating earnings numbers in financial reporting. These disclosures are unregulated (Davis & Tama-Sweet, 2012; Peters et al., 2014), giving management substantial flexibility when preparing what information to disclose to investors and which signals to be conveyed to investors. For example, managers can strategically disclose optimistic nonearnings-related qualitative FLSs to signal a firm's promising prospects. Prior research indicates that investors respond positively to managers' optimistic tone and disclosed nonearnings-related FLSs (Bozanic et al., 2018; Huang et al., 2014), suggesting that

managers consider these disclosures as informative and can be used to signal a positive future of the firm to investors. This creates opportunities for managers to undertake overinvestments to satisfy their self-serving interests.

We further argue that, unlike for quantitative earnings-related FLSs, shareholders are constrained in their ability to monitor managers' nonearnings-related FLSs, leaving more room for them to engage in tone management. The intuition is that nonearnings-related FLSs mainly consist of narratives about the firm- (i.e., strategic plans), industry-, or macro-specific forecast information (Bozanic et al., 2018; Richard Lu et al., 2012), where the information content is essential to gauging future investment decisions but for which managers are more likely to explain such FLSs' nonrealization as the product of unexpected circumstances (Richard Lu et al., 2012). This is in contrast to earnings-related disclosures, which are more readily available to the public and thus receive more attention from and scrutiny by investors since they are more sensitive signals for investors and more explanatory of investment returns (Graham, Harvey, & Rajgopal, 2005). Regarding qualitative information, extant studies have also indicated that language is inherently ambiguous (Bochkay, Hales, & Chava, 2020) and that shareholders might not distinguish between managers' choice of words as cheap talk or reliable communication in qualitative information. It is challenging for shareholders to assess the credibility of nonearnings-related qualitative FLSs; thereby, managers have a greater ability to manipulate these disclosures (Hutton et al., 2003).

Building on this line of argument, we propose that managers are motivated to manipulate tone through nonearnings-related qualitative FLSs to maximize their self-

benefits, such as overinvesting, to build their empire and acquire greater resources under their control. Perhaps the most common way is to distribute a more positive tone in disclosures to manipulate shareholders' perceptions about firms' prospects. Recent literature shows that tone manipulation weakens monitoring, and managers obtain more opportunities to invest in self-serving ways (e.g., empire-building) (Cheng et al., 2013; Richardson, 2006). It is also confirmed that managers attempt to manipulate tone to boost their equity-based compensation by including more positive words in qualitative disclosures (Arslan-Ayaydin, Bishara, Thewissen, & Torsin, 2020).

Given that nonearnings-related qualitative FLSs mainly consist of narratives about firms' subsequent investment decisions (Richard Lu et al., 2012)), we predict that managers are likely and more easily to engage in overinvestments by distributing an optimistic tone in nonearnings-related qualitative FLSs because shareholders have less ability to monitor this type of managers' opportunistic behaviour.

H1: The overly optimistic tone in nonearnings-related qualitative FLSs is positively related to overinvestments compared with other types of FLSs.

We further argue that managers with sufficient funds (e.g., more cash, less leverage) are more likely to overinvest due to the greater availability of free cash flows (Biddle et al., 2009). These firms are less likely to borrow externally, and managers are under less monitoring by the public (Richardson, 2006). DeBoskey, Luo, and Zhou (2019) find that managers are more likely to manipulate the tone used in earnings press releases

when they have greater power, and this relation is weakened when board oversight is stronger, suggesting the importance of monitoring the effect of tone manipulation. We, thus, set up the following hypothesis:

H2: The positive relation between an overoptimistic tone in nonearnings-related qualitative FLSs and overinvestments is more pronounced in financially unconstrained firms.

4. Research design

4.1 Sample selection and data sources

We use data from US-listed firms from 2003 to 2019. The firm-level data are obtained from Compustat, stock returns are obtained from CRSP, institutional investor ownership data are acquired from Thomson Reuters Institutional (13F) Holdings, CEO characteristics and compensation data are from ExecuComp, and analyst coverage and corporate governance data are from IBES and BoardEx.

Since forward-looking statements are not archived disclosures, we use a crawler to download quarterly earnings announcement press releases from EDGAR. The utilized press release URL list is from Bentley, Christensen, Gee, and Whipple (2018),[3] we successfully retrieve 253,974 press releases. Then, we extract FLSs from quarterly earnings press releases following prior studies (Bozanic et al., 2018; Li, 2010a; Muslu

[3] We thank Bentley for making this list publicly available.

et al., 2015) and apply textual analysis to classify these press releases following Anand, Bochkay, Chychyla, and Leone (2020), a monograph that guides financial and accounting researchers in performing textual analysis using Python (see Appendix B1).

We argue that earnings press releases are more appropriate because (1) compared to 10-K filings, quarterly filings are released more frequently and include more timely content throughout the year to enable managers to regularly disseminate information to outsiders. Previous literature has also focused on such disclosure outlines to examine managerial tone management (Arslan-Ayaydin et al., 2020; Arslan-Ayaydin et al., 2016). (2) Other disclosure outlets, such as 10-Q filings, have discussed less forward-looking information than earnings press releases. For example, management may provide expectations about a firm's future financial performance or "forward-looking earnings guidance" in an earnings release rather than a 10-Q filing (SEC, 2018).

Following prior research, we exclude financial firms (SIC 6000-6999) and utility firms (SIC 4800-4999), as such firms are subject to possibly confounding disclosure and regulatory regimes. Our final sample covers 21,487 firm-year observations from 2003 to 2019.[4]

4.2 Variable design and measurement

4.2.1 Measure of investment efficiency

Investment efficiency is defined as the allocation of capital to optimal investment

[4] Since 2003, EDGAR has required firms to submit earnings press releases. Thus, we begin our sample in 2003.

projects (Roychowdhury et al., 2019). We follow a stream of the literature that uses firms' opportunities to estimate expected investments (Chen, Hope, Li, & Wang, 2011; Chen, Cheng, Gong, & Tan, 2020; McNichols & Stubben, 2008) and derive the following investment estimation model:

$$Invest_{i,t} = \alpha_0 + \alpha_1 NEG_{i,t-1} + \alpha_2 REVGrowth_{i,t-1} + \alpha_3 NEG_{i,t-1} * REVGrowth_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

where *Invest* denotes total investment, namely, the sum of R&D expenditures, capital expenditures, and acquisition expenditures less cash receipts from sales of property, plant, and equipment multiplied by 100 and scaled by lagged total assets. *NEG* is a dummy variable that equals one if there is negative revenue growth and 0 otherwise. *REVGrowth* is the percentage change in sales from *t*-2 to *t*-1. Eq. (1) is estimated cross-sectionally for each industry with at least 20 observations in a given year based on the 2-digit SIC classification. The residual of Eq. (1) is the accounting-based measure of investment efficiency. We focus on the positive residual, as it is related to managers' self-serving investments (i.e., overinvestments).

4.2.2 Measure of abnormal tone

Managers include narrative statements in FLSs, and tone disclosure, which is discretionary, is used to express their opinions. We follow Huang et al. (2014)'s abnormal tone model (Eq. (2)) to measure the extent of managerial tone manipulation. This model decomposes tone into two parts. The first is the normal tone (*NTone*) component, which reflects a reasonable level of firm fundamentals through estimations

of currently available quantitative information. The remaining part is the residual component, defined as the abnormal tone component (*AbTone*), which is used as a proxy for opportunistic behaviour to mislead market participants.

The dependent variable *Tone_q* denotes the difference in frequency between positive and negative words scaled by their sum in each section of the FLSs. The positive/negative term dictionary is from Loughran et al. (2011). The residual represents an abnormal tone. Detailed variable definitions can be found in Appendix A.

$$TONE\_q_{i,q} = \alpha + \beta_0 EARN\_q_{i,q} + \beta_1 RET\_q_{j,q} + \beta_2 SIZE\_q_{i,q} + \beta_3 BTM\_q_{i,q} + \beta_4 STD_{RET}\_q_{i,q} + \beta_5 STD_{EARN}\_q_{i,q} + \beta_6 AGE\_q_{i,q} + \beta_7 BUSSEG\_q_{i,q} + \beta_8 GEOSEG\_q_{i,q} + \beta_9 LOSS\_q_{i,q} + \beta_{10} \Delta EARN\_q_{i,q} + \beta_{11} AEF\_q_{i,q} + \beta_{12} AF\_q_{i,q} + \mu_{i,q} \quad (2)$$

4.3 Empirical model

To test our hypotheses, we estimate the following panel regression:

$$Over\_invest_{i,t+1} = \beta_0 + \beta_1 AbTone_{i,t} + \beta_2 CONTROL_{i,t} + Industry_j + Year_t + \tau_{i,t} \quad (3)$$

where *Over_invest* is an indicator variable that equals one if a firm exhibits overinvestments in fiscal year *t+1* (i.e., the residual of investment efficiency is greater than 0) and 0 otherwise. We use a dummy variable because the sample size sharply declines by 70% if we use continuous overinvestment values, introducing noise into our regression. Furthermore, our key independent variable is *AbTone*, representing the

abnormal tone in each aspect of a firm's FLSs in a fiscal year. We then convert the abnormal tone measure from a quarterly to a yearly abnormal tone by averaging each firm's quarterly abnormal tone over every fiscal year to obtain annual aggregated values.[5] Thus, *AbTone* indicates the yearly abnormal tone in a firm's nonearnings-related qualitative FLSs (*NEqual_ABT*), yearly nonearnings-related quantitative FLSs (*NEquant_ABT*), and yearly overall nonearnings-related FLSs (*NE_ABT*). We also include a set of controls (*CONTROL*) in our model that has been previously found to affect firms' investment efficiencies (Biddle et al., 2009; Chen et al., 2019; Chen et al., 2011; Chen et al., 2020; Chen, Xie, & Zhang, 2017). Appendix A provides a complete description of the variables. Finally, we also employ industry and year-fixed effect to control for unobservable industry factors and market-wide performance fluctuations over the sample period. Due to the inclusion of fixed effects, we regress Eq. (3) by employing OLS with fixed effects to avoid "incidental parameters problem", a common issue in non-linear models (i.e., logit model)[6].

To mitigate the concerns of outliers, we winsorise all continuous variables at the bottom and top 1% levels. Standard errors are clustered at the firm and year levels.

[5] The residuals from Eq. (2) are quarterly data; however, we argue that a yearly abnormal tone is more suitable for our research context. This is because investments are long-term decisions, and we argue that managers' short-term tone manipulation is unlikely to distort shareholders' monitoring of managers' investment decisions; instead, long-term tone manipulation is needed.

[6] Lancaster (2000) points out that the happening of "incidental parameter problem" is because non-linear models with fixed effect lead to the maximum-likelihood estimator (MLE) being typically biased and inconsistent, causing inconsistent estimates of common parameters of interest in the fixed effects. Breuer and deHaan (2023) suggest that a common strategy for avoiding "incidental parameter problem" is to use OLS. Moreover, regarding the results interpretations, OLS is also suitable for estimating the marginal treatment effect in the case of results interpretation (Angrist & Pischke, 2009; Breuer et al., 2023).

5. Empirical results

5.1 Descriptive statistics

Table 1 provides the summary statistics of our sample variables. *Over_invest* has a mean of 0.421, indicating that approximately 42% of firms overinvest. This statistic is consistent with the statistic documented by Chiu, Kim, and Wang (2019). The mean values of the abnormal tone of overall nonearnings-related and earnings-related FLSs are 0.002 and 0.000, respectively, which indicates that an abnormal tone exists in nonearnings-related FLSs but does not appear in earnings-related FLSs. By comparing the qualitative and quantitative formats of the nonearnings-related FLSs, we only find that the mean abnormal tone in nonearnings-related qualitative FLSs is 0.002, suggesting that an abnormal tone exists in this type of FLS, which provides some support for our inferences that managers are most likely to manipulate disclosures in nonearnings-related and qualitative FLSs.

[Insert Table 1 Here]

Table 2 reports the Pearson correlation matrix of the sample variables. The results support similar arguments as supported by the descriptive statistics. Moreover, the correlation coefficients suggest no multicollinearity concerns. The correlation between *NE_ABT* and *NEqual_ABT* is 0.9414 because the latter is a part of the former.

[Insert Table 2 Here]

5.2 Main results

Table 3 shows the estimation results of Eq. (3) using the overinvestment indicator variable as the dependent variable. The three abnormal tone variables in Columns (1)-(3) of Table 3 represent the key independent variables. As shown in Column (3) of Table 3, *NE_ABT* is positively and significantly associated with firms' subsequent overinvestments, indicating that managers use an abnormal tone in nonearnings-related FLSs to achieve opportunistic purposes, then the increased information asymmetry leads managers to make overinvestments. Regarding our examination of the two classifications of nonearnings-related FLSs, Column (1) of Table 3 shows that the coefficient for *NEqual_ABT* is 0.02 and significant at the 1% level even after controlling for other firm characteristics that may influence firms' investments, whereas *NEquant_ABT* is insignificant. Regarding the marginal effect, the result suggests that one unit increase in *NEqual_ABT* will increase the probability of overinvestment by 2% points. In terms of economic magnitude, a one-standard-deviation increase in *NEqual_ABT* is associated with a 2% increase in the subsequent year's overinvestment occurrence probability relative to the mean, which is similar to the economic magnitude of *leadInd* (i.e., 2.2 %), a well-documented factor related to overinvestments (Rajkovic, 2020).[7] The results in Table 3 suggest that managers are more likely to manipulate the

[7] The economic magnitudes for *NEqual_ABT* and *leadInd* seem small in this study because the dependent variable is a dummy variable, thus its mean value is greater than the continuous value. If the regression model is replaced with the logistic model, the economic magnitudes of *NEqual_ABT* increase to 4%—comparable to the results in Chiu et al. (2019).

linguistic tone of nonearnings-related qualitative FLSs, making it more difficult for shareholders to discipline managers' opportunistic behaviour. Thus, managers under weaker monitoring have more room to overinvest.[8] These results are consistent with previous literature that a hyped tone blocks the dissemination of firms' real situations and increases the information asymmetry (Arslan-Ayaydin et al., 2016; Huang et al., 2014). Overall, Hypothesis 1 is supported.

Meanwhile, the governance control variables also show that the existence of lead independent directors may play a role in mitigating overinvestments; the coefficient for *leadInd* is -0.022 and significant at the 1% level. This negative coefficient suggests that lead independent directors could monitor managers and promote the organisation's information flow, leading to mitigating overinvestment (Rajkovic, 2020). Furthermore, the coefficient for analyst following is 0.023 and significant at the 1% level. It may be that a larger analyst following brings investment and performance pressures to managers, making them prone to invest beyond the optimal level (Biddle et al., 2009).

[Insert Table 3 Here]

We then examine Hypothesis 2, which focuses on whether the relation between an overoptimistic tone in nonearnings-related qualitative FLSs and overinvestments is more pronounced in financially unconstrained firms. We employ three measures to classify whether firms are financially unconstrained: the *KZ index*, *Free Cash Flow (FCF),* and *Net Leverage (NL).* The detailed calculation of these measures can be found

[8] The untabulated results of using logistic regressions are also similar. For brevity, we do not report the result, but it is available on request.

in Appendix B3. Following Linck, Netter, and Shu (2013), financially unconstrained firms are defined as follows: (1) *KZ Index*: the bottom 30% of firms are considered unconstrained; (2) *Free Cash Flow*: firms in the top 30% in terms of free cash flow are considered unconstrained; and (3) *Net Leverage*: firms with nonpositive net debt are unconstrained. To conduct this test, we use a dummy variable that is coded 1 if a firm is financially unconstrained and 0 otherwise. Then, we interact the financially unconstrained dummy with abnormal tone disclosure variables and rerun our baseline model in Eq. (3).

Panel A of Table 4 shows the results of Hypothesis 2 testing. The coefficient of the interaction term *NEqual*FU_KZ* is 0.037 and significant at the 5% level, indicating that the positive relationship between managers' opportunistic tone disclosure in nonearnings-related qualitative FLSs and overinvestment is aggravated in financially unconstrained firms. The findings suggest that managers of financially unconstrained firms receive less monitoring and have greater resources to undertake investment projects. Furthermore, Column (2) of Panel A in Table 4 shows that the interaction term *NEquant*FU_KZ* is insignificant, which is consistent with our expectation that managers are more likely to manipulate nonearnings-related qualitative FLSs to achieve opportunistic purposes. Overall, Hypothesis 2 is supported.

We then replace the *KZ index* with *FCF* and *NL*. The results in Panels B and C of Table 4 are largely the same. However, Column (2) of Panels B and C shows that the coefficients for the interaction terms *NEquant_ABT*FU_NL* and *NEquant_ABT*FU_FCF* become significantly positive, while *NEquant_ABT*FU_KZ*

in Panel A is insignificant. The positive results suggest that when managers are financially unconstrained, the nonearnings quantitative FLSs tone is also manipulated, providing managers with overinvestment opportunities.

Although the results of the interaction term *NEquant_ABT* are dissimilar, we argue that these dissimilar results are consistent with the argument that the agency problem induces managerial overinvestments. In particular, it is argued that managers avoid external financing to engage in overinvestments because external capital providers serve as additional monitors to discipline the use of funds (Jensen, 1986). Based on this argument, the *KZ index* measures the financial situation from the perspective of how various frictions in the process of *raising external capital* can generate financial constraints for firms (Hadlock & Pierce, 2010); hence, a financially unconstrained firm measured by the *KZ index* (i.e., has a low *KZ index*) indicates that this firm has a great ability to raise *external* capital; however, it does not always mean that this firm currently has sufficient *internal* funds. Therefore, the interaction term (i.e., *NEquant_ABT*FU_KZ*) is statistically insignificant when we use the *KZ index* to measure financial situations. Unlikely, *NL* and *FCF* measure firms' financial situations from the perspective of current *internal* available funds. Thus, managers with sufficient internal funds are unlikely to experience scrutiny from the external capital market, as suggested by the agency cost explanation that monitoring difficulty creates the potential for management to spend internally generated cash flow (Stulz, 1990). Hence, managers tend to utilize as many opportunities as possible to seek overinvestment opportunities when they control sufficient internal funds. Therefore, the results in

Panels B and C of Table 4 show that the nonearnings-related quantitative FLSs tone is also manipulated to pursue personal interests when *FCF* and *NL* indicate the classification of the financial unconstraint.

Moreover, as shown in Panels B and C of Table 4, the coefficients for *NEquant_ABT*FU_NL* and *NEquant_ABT*FU_FCF* are 0.02 and 0.033, respectively, which are lower than the coefficients for *NEqual_ABT*FU_NL* and *NEqual_ABT*FU_FCF* (0.035 and 0.053, respectively). Therefore, in the case of economic significance, the abnormal tone used in nonearnings-related qualitative FLSs still holds a more significant place in the relation between abnormal tone disclosures and overinvestments. Collectively, Hypothesis 2 is still supported.

[Insert Table 4 Here]

6. Additional analyses

In this section, we conduct two sets of cross-sectional tests to examine the moderating effects of two important external governance mechanisms that could mitigate managerial opportunism behaviour.

6.1 Moderating effect of information intermediaries

Prior studies have found that information intermediaries, such as analysts and institutional shareholders, play an effective monitoring role in the managerial behaviour (Graham et al., 2005; Healy et al., 2001; McConnell & Servaes, 1990; Shleifer & Vishny, 1986; Yu, 2008). For instance, Kim, Kim, Kim, and Park (2019) find that

institutional investors with long-term horizons have incentives to constrain opportunistic managerial behaviours. Hence, it is of interest to investigate whether managers respond to the intensity of the external monitoring of firms' overinvestments. To shed light on this issue, we conduct two separate cross-sectional analyses to examine the moderating effects of analyst following and institutional ownership. In the context of analyst following, we divide our sample into two groups (i.e., high- and low-analyst following) based on the median value of analyst coverage. Firm-year observations greater than the sample median are put into the high analyst coverage subsample and vice versa. Then, we estimate the baseline model for each subsample. We also follow the same classification procedures for institutional ownership.

[Insert Table 5 Here]

Columns (1) and (2) of Table 5 present the moderating effects of analyst followings and institutional ownership, respectively. The results in Column (1) of Table 5 show that the coefficient for *NEqual_ABT* is 0.036 and significant at the 1% level in the low analyst following subsample. In addition, we obtain a similar finding in the subsample with low institutional ownership. These results indicate that managers are likely to manipulate nonearnings-related qualitative FLSs to behave in their self-interest when the intensity of external governance is weak. One possible explanation is that when the intensity of analyst coverage is low, the ability to constrain managers' self-interest can be significantly compromised. Because analysts directly interact with management in private and public (e.g., raising questions to managers during conference calls) to express their concerns and question managers, analysts are also involved in information

production (Yu, 2008). Meanwhile, managers regard analysts as one of the most crucial groups affecting their firms' share prices (Graham et al., 2005). Therefore, lower analyst coverage leads managers to be less likely questioned, and less information may be disseminated to the market, in turn weakening firms' information environment and offering managers more room to behave in their self-interest. Similarly, institutional investors have stronger incentives to monitor firms than individual investors do because the former tend to have long-term horizons and large stakes in those firms. Moreover, institutional investors have information advantages and may actively engage in corporate monitoring such as through conference calls, shareholder proposals, and trading (Kempf, Manconi, & Spalt, 2017). Thus, the decrease in institutional ownership corresponds to a decrease in the ability to monitor firms. Collectively, managers are subject to less public scrutiny when the intensity of institutional ownership and analyst following is low, therefore, have more room to make discretionary decisions to extract private benefits, thereby increasing firms' future overinvestments.

6.2 Moderating effect of managers' career concerns

Managers care about the market perception of their ability because it is highly relevant to their career prospects. In the survey by Graham et al. (2005), managers note that concerns over career prospects and reputations are important considerations. Arslan-Ayaydin et al. (2020) find that managers tend to engage in upward-tone management when facing greater career concerns. To address this issue, we examine the moderating effect of career concerns on firms' overinvestments by conducting the following cross-

sectional test. We first employ the inevitable disclosure doctrine (IDD) by U.S. state courts as a proxy for managers' career concerns. IDD is a legal doctrine through which an employee may be enjoined from starting a new job or engaging in certain activities at a new job when his or her former employer can demonstrate that the employee's new duties will "inevitably" require the employee to disclose, use, or rely on his or her knowledge of the former employer's trade secrets (Kahnke & Bundy, 2016). The intuition is that the adoption of IDD restricts managers' outside employment opportunities and thereby aggravates managers' career concerns (Ali, Li, & Zhang, 2019; Chen, Jung, Peng, & Zhang, 2021; Klasa, Ortiz-Molina, Serfling, & Srinivasan, 2018). We then partition the sample into firms headquartered in states that have not adopted IDD and firms headquartered in states that have adopted IDD and estimate the baseline model for each subsample.

[Insert Table 6 Here]

Column (1) of Table 6 shows that the coefficient for *NEqual_ABT* is 0.029 and significant at the 10% level when firms are headquartered in IDD-nonadopted states. Furthermore, Column (2) of Table 6 reports that the coefficient for *NEqual_ABT* is 0.061 and significant at the 1% level when firms are headquartered in IDD-adopted states. To confirm whether the economic magnitude of the abnormal tone of nonearnings-related qualitative FLSs is overwhelming in IDD-adopted states, we conduct a Hausman test. The result shows that the coefficients are significantly different at the 10% level. Overall, consistent with our argument, these results confirm that when managers face greater pressure regarding their job security, they are more likely to

manipulate the tone of nonearnings-related qualitative disclosures to conceal firms' real situations, which provides managers with more overinvestment opportunities.

6.3 The influences of important events during the sample period

Throughout our sampling period, some important events, such as significant economic events and regulatory changes, may influence managers' information disclosure and corporate decisions.[9] To enrich our findings, we examine whether the relationship between disclosures with an abnormal tone and overinvestments is influenced by the GFC of 2007-2009 and the publication of the Loughran-McDonald sentiment dictionary in 2011.

The failure of risk management was one of the crucial factors that caused the GFC and brought severe consequences, such as stock market crashes, rising unemployment rates, and economic recessions. Therefore, prior studies have found that many countries attempted to improve corporate governance to better protect shareholder wealth after the GFC (Choi, Han, & Lee, 2014). Managers face increasing pressure from being in the public spotlight. Extant studies have also provided supporting evidence that managers decrease earnings management (Filip & Raffournier, 2014) in post-GFC periods, which might induce self-serving managers to search for alternative ways to pursue their private interests. Given that tone management is a more hidden way to alter investors' perceptions, we examine whether managers engage in tone management

[9] We thank the reviewer for this very helpful suggestion.

more readily after the GFC. To conduct this test, we split our sample into the periods of pre-, during-, and post-GFC and rerun our baseline model in Eq. (3). Following previous literature, we define pre-GFC as the year before 2007, during-GFC as 2007-2009, and post-GFC as the year after 2009 (Aebi, Sabato, & Schmid, 2012; Ahmad, Akbar, Halari, & Shah, 2021; Beltratti & Stulz, 2012; Fahlenbrach & Stulz, 2011; Ormazabal, 2018; Vallascas, Mollah, & Keasey, 2017).

Consistent with our argument, the results in Columns (1) and (2) of Table 7 report that both *NEqual_ABT* and *NEquant_ABT* are insignificantly related to overinvestments in the pre-and during-GFC periods. In comparison, *NEqual_ABT* is 0.023 and significant at the 5% level in the post-GFC period, suggesting that, after GFC, managers utilise tone management causing overinvestments.

[Insert Table 7 Here]

We then investigate whether managerial opportunistic behaviour changes after the introduction of the Loughran-McDonald sentiment dictionary [10] (hereafter, LM dictionary). Intuitively, Cao, Jiang, Yang, and Zhang (2023) find that managers tend to avoid using negative words if their disclosures are frequently examined through machine learning. Their results indicate that publishing the LM dictionary increases managers' awareness of engaging in tone management, which gives them greater discretion in choosing the language used in corporate disclosures. If the argument follows, we should expect that the relationship between abnormal tone disclosures and

[10] Loughran et al. (2011) present a customized dictionary of positive and negative words that fits the unique text of finance and accounting fields. The LM dictionary is now the most widely used dictionary to measure managerial sentiment in the extant literature (Henry & Leone, 2016).

overinvestment will be more pronounced after the LM dictionary becomes available to the public. Following Cao et al. (2023), we define the pre- and post-LM dictionary period as the year before and after 2011, which is the year the LM dictionary became available, and exclude 2011 from the analysis. Then, our sample is split into pre-2011 and post-2011, and we rerun our baseline model in Eq. (3).

Consistent with our argument, Column (1) of Table 8 shows that both *NEqual_ABT* and *NEquant_ABT* were insignificantly related to overinvestments before the LM dictionary was available. Meanwhile, Column (2) of Table 8 shows that the coefficient for *NEqual_ABT* is 0.025 and significant at 5% after introducing the LM dictionary. Complementing Cao et al. (2023) findings, we find that the LM dictionary results in managers being more aware of the language used in tone management, and managers are more "skilled" in disclosing an overoptimistic tone to cover their overinvestment.

[Insert Table 8 Here]

7. Endogeneity tests

While our results suggest that using an abnormal tone in nonearnings-related qualitative FLSs increases firms' subsequent overinvestments, these results might be subject to endogeneity issues. We address endogeneity concerns by several endogeneity tests; in particular, including firm-fixed effects and a 2SLS regression to address unobserved omitted variable concern, and conducting the Heckman two-stage test to prevent the baseline results from suffering from sample selection bias.

7.1 Firm-fixed effect

In our primary tests, we have included a series of firm-specific control variables, and industry- and year-fixed effects. Considering the possibility that a correlated omitted variable at the firm level might bias our findings, we examine the sensitivity of our results to firm-fixed effects. Table 9 reports the results of including firm- and year-fixed effects in Eq. (3). Consistent with our arguments, the coefficients remain the same, and *NEqual_ABT* is significantly related to overinvestments at the 5% level after controlling for firm-fixed effects. Therefore, our results remain unchanged.

[Insert Table 9 Here]

7.2 Two-stage least squares regressions (2SLS)

To further address the endogeneity issues related to unobserved omitted variables, we conduct a 2SLS regression analysis by employing the IVs that have been previously found to affect abnormal tones but are unlikely to directly influence firms' future overinvestments (Ertugrul et al., 2017; Hossain et al., 2020). The IV is based on the industry mean value of abnormal tones used in nonearnings-related qualitative FLSs (*Ind_AbTone*). An alternative IV is the mean value of the geographic peer firms' abnormal tone used in nonearnings-related qualitative FLSs (*Geo_AbTone*). While *Ind_AbTone* and *Geo_AbTone* are expected to be highly related to a firm's nonearnings-related qualitative FLSs, they are unlikely to directly affect firms' subsequent overinvestments. The reasons are as follows: (1) the overinvestment measure is

calculated based on the error term of the investment efficiency model, which controls for industry fixed effects; and (2) nonearnings-related qualitative FLSs are largely composed of information about firms' development strategy and general development trend (e.g., industry and macroeconomic) forecast descriptions (Richard Lu et al., 2012). Managers may pay more attention to the specific content of peer firms' strategy instead of tone; in addition, managers also acknowledge the general forecasts so that they are less likely to be misled by peer firms' abnormal tone in those descriptions. Empirically, Cho et al. (2021) illustrate that it is not clear whether the changes in the tone used in peer firms' FLSs drive a firm's investments. Therefore, it is unlikely that *Ind_AbTone* and *Geo_AbTone* are directly related to the measures of overinvestment (Ertugrul et al., 2017; Hossain et al., 2020).

Columns (1) and (3) of Table 10 report the first-stage regression results from our 2SLS analysis, which entails regressing our main variable of interest on the above IVs and the control variables from Eq. (3). The result depicts a significantly positive coefficient at the 1% level on *Ind_AbTone* (*Geo_AbTone*), which shows that our IV is an increasing function of the mean value of nonearnings-related qualitative FLSs in its industry (peer firms). We further verify whether our IVs suffer from weak instrument concerns. The partial F-statistic in our model specification is 13.26 (10.92), which is greater than the rule of thumb (i.e., F-statistics = 10). Therefore, the IVs in our regression do not suffer from a weak instrument problem. The second stage of 2SLS involves using the expected values of nonearnings-related qualitative FLSs from the first stage on firms' future overinvestments. Columns (2) and (4) of Table 10 show that

the coefficients for the instrumented values of the abnormal tone of nonearnings-related qualitative FLSs are 0.313 and 0.7, respectively, and both are significant at the 1% level. Overall, the 2SLS results are still in line with the baseline results.

[Insert Table 10 Here]

7.3 Heckman selection model

Although we argue that the primary driver of overinvestments in this study is attributed to managers' self-serving behaviours, it is also possible that other factors, such as firm-level factors and manager-specific factors, drive the results, resulting in the results suffering from sample selection bias.

To mitigate this concern, we employ the Heckman Selection model (Heckman, 1979), which is commonly used to mitigate sample selection bias.[11] In the first stage, we use a probit model to predict the presence of corporate overinvestments. We regress a dummy variable, which is set to 1 if a firm is overinvested (i.e., the residual of Eq. (1) greater than 0) and 0 otherwise, on *Loss*, *Operatingcycle*, *CEO_Age*, *CEO_Gender*, *CEO_Tenure*, *CEO_Cashcom*, and year and industry effects to estimate the Inverse Mills Ratio (*IMR*). *Loss* indicates whether a firm has negative revenue, and managers of poorly performing firms have insufficient cash flow to overinvest. In addition, *Operatingcycle* represents a firm's operating cycle, and Biddle et al. (2009) illustrate that firms in different business cycles have different discretionary accruals, thereby

[11] We thank the reviewer for this helpful suggestion.

impacting financial reporting transparency. Furthermore, we follow Dou, Wong, and Xin (2019) to add a group of CEO-specific factors: (1) *CEO_Age* is the age of CEOs; older CEOs are less likely to take risks, and overinvestments bring higher risks (Lo & Shiah-Hou, 2022); (2) *CEO_Gender* is a dummy variable equal to 1 if the CEO is male and 0 otherwise; we include this because male CEOs tend to take more risks than female CEOs; (3) *CEO_Tenure* indicates the number of years since the CEO first became the CEO of the firm; CEOs with longer tenure have more power; thus, they have greater opportunities to overinvest; and (4) *CEO_Cashcom* is a CEO's total current cash compensation; Guay (1999) states that CEOs with a higher cash compensation undertake riskier projects, as they can easily diversify their personal portfolios. In the second stage, we include *IMR* as an additional control variable in Eq. (3) to correct the sample selection bias. *IMR* stands for the part of overinvestment that cannot be explained by firm and manager-specific factors. As suggested by Lennox, Francis, and Wang (2012), to avoid the multicollinearity problem, we remove *Loss* from Eq. (3) to run the second stage, as it already presents in the first-stage regression.

Table 11 Column (1) shows the results of the first-stage regression. *Loss* and *CEO_Age* have significantly negative relations with overinvestments. Moreover, *CEO_Gender* and *CEO_Cashcom* are positively and significantly associated with overinvestments. Collectively, the first-stage firm- and manager-specific factors are powerful in predicting firms' overinvestments, and the results are consistent with our expectations. Columns (2)-(4) report the second-stage results. Consistent with our baseline results, *NEqual_ABT* is still positively and significantly related to

overinvestments, and there are no practically large differences in the coefficient of *NEqual_ABT* after correcting the sample selection bias (i.e., 0.02 to 0.016), suggesting that the baseline results are not largely influenced by sample selection bias (Wooldridge, 2015). Moreover, *NEquant_ABT* is insignificant, confirming that managers are most likely to manipulate nonearnings-related qualitative FLSs. Taken together, the second-stage regression results highlight that managerial self-serving behaviour is indeed the case for the sample of overinvestment firms.

[Insert Table 11 Here]

8. Robustness checks

We further conduct various robustness checks to enhance the validity of our results. First, to better capture firms' growth opportunities in our regression model, Eq. (1), we follow prior studies by employing two alternative measures, namely, *Tobin's Q* and firms' sales growth, to compute firms' subsequent overinvestments (Bae, Biddle, & Park, 2021; Biddle et al., 2009; Chen et al., 2019; Chen et al., 2011; Chen et al., 2020; Choi, Hann, Subasi, & Zheng, 2020; McNichols et al., 2008). Following prior estimations of firms' subsequent overinvestments using Eq. (1), we treat the residuals of the alternative measures as proxies for firms' subsequent overinvestments. We then rerun Eq. (3) with the alternative measures. Table 12 provides robust evidence that manipulating the tone of nonearnings-related qualitative FLSs gives managers opportunities to seek overinvestments.

[Insert Table 12 Here]

Second, managers might intentionally obfuscate information dissemination by destroying the readability of the narrative contents in financial reports to manipulate investors' perceptions of a firm (Li, 2008, 2010b). Therefore, we rerun our regression model Eq. (3) by including the unreadability of earnings press releases (*Unreadability*), measured using the Fog index, as an additional control variable.[12] The results in Table 13 Columns (1)-(3) remain unchanged after controlling for the unreadability of the financial reports.

Third, we examine whether the baseline results are affected by a two-year window between tone management and overinvestment to check if it takes longer for tone manipulation disclosures and firm characteristics (e.g., fundamental and corporate governance factors) to influence overinvestments. The results in Column (4) of Table 13 show that the coefficient for *NEqual_ABT* is 0.014 and significant at the 10% level, suggesting that such FLSs' tone manipulation persistently influences overinvestments in the following two years. Moreover, the coefficient for two-year lagged *NEqual_ABT* is lower than its one-year lagged coefficient, indicating that the influence of FLSs tone manipulation disclosures on overinvestments is the strongest in the following first year and then marginally diminishes. Overall, the baseline results are unchanged.

Fourth, to the extent that our main variable of interest, *NEqual_ABT*, is not normally distributed, which might cause our estimations to be sensitive to outliers

[12] An extensive previous body of literature, for example, Bonsall and Miller (2017), Ertugrul et al. (2017), Guay, Samuels, and Taylor (2016), and Bushee, Gow, and Taylor (2018), has adopted the Fog index as a proxy for unreadability.

(DeBoskey et al., 2019). We follow Muslu et al. (2015) by replacing *NEqual_ABT* with a dummy variable coded 1 if *NEqual_ABT* is positive and 0 otherwise. In addition, we use a quartile rank based on *NEqual_ABT*. We rerun our regression model Eq. (3), and the results in Columns (7) and (8) of Table 13 remain similar to those reported in Table 3.

[Insert Table 13 Here]

9. Conclusions

Drawing from the agency perspective that managers have incentives to behave in their self-interest, we examine the relationship between the tone management in FLSs and managers' inclination toward self-serving overinvestments. Using a large sample of US-listed firms from 2003 to 2019, we find that the abnormal tone of nonearnings-related qualitative FLSs is positively related to firms' subsequent overinvestments. Our findings remain robust across several tests to address endogeneity issues, including controlling for firm-fixed effects, a 2SLS regression, the Heckman selection model, and a battery of robustness tests. Further analysis indicates that managers are motivated to manipulate tone, particularly when firms are financially unconstrained. Additionally, our study demonstrates that managers are more inclined to engage in tone management when they perceive a lower level of external monitoring and when they harbour greater concerns about their career prospects. Our results also shed light on variations in managers' tone management during critical events, including the Global Financial Crisis (GFC) and the publication of the LM dictionary.

Our study makes theoretical contributions in that we apply agency theory in the context of information disclosure as well as investment efficiency. Theoretically, managers should disclose information about the firm to mitigate information disparities between managers and shareholders, so as to improve investment efficiency. However, in practice, moral hazard induces managers to manipulate the tone of the discretionary disclosures to impair information disclosure for their own benefit. While previous literature predominantly emphasizes the effect of quantitative information on disciplining agency problems and improving investment efficiency (Roychowdhury et al., 2019), we argue that management tone manipulation of qualitative information disclosure can mislead investors and weaken their oversight, thus eroding firms' investment efficiency. Our findings also have significant practical implications. They hold particular value for standard setters and policymakers in the formulation of firms' information disclosure guidelines.

Nevertheless, our study has some limitations. It is possible that we have not entirely mitigated the endogeneity issue related to unobservable omitted variables in our empirical model due to limited available data in this context. However, we believe that the inclusion of 2SLS and a battery of supplementary tests in our analysis substantially mitigates the risk of endogeneity. This limitation suggests that future research could explore a natural experiment that exogenously affects the abnormal tone of firms' nonrelated earnings-related qualitative FLSs. Furthermore, while we employ the tone of non-earnings-related qualitative FLSs in this study as an indicator of managers' manipulation of disclosure, which is closely linked to the investment (Richard Lu et al.,

2012), it can be argued that not all forward-looking statements may be used opportunistically by the managers and related to overinvestment. Future work could focus on identifying words in all forward-looking statements, which may be more relevant in the context of overinvestment.

References

Abarbanell, J. S., Bernard, V. L. (1992). Tests of analysts' overreaction/underreaction to earnings information as an explanation for anomalous stock price behavior. *The Journal of Finance, 47*(3), 1181-1207.

Aebi, V., Sabato, G., Schmid, M. (2012). Risk management, corporate governance, and bank performance in the financial crisis. *Journal of Banking & Finance, 36*(12), 3213-3226.

Ahmad, S., Akbar, S., Halari, A., Shah, S. Z. (2021). Organizational non-compliance with principles-based governance provisions and corporate risk-taking. *International Review of Financial Analysis, 78*, 101884.

Ali, A., Li, N., Zhang, W. (2019). Restrictions on managers' outside employment opportunities and asymmetric disclosure of bad versus good news. *The Accounting Review, 94*(5), 1-25.

Allee, K. D., DeAngelis, M. D. (2015). The structure of voluntary disclosure narratives: Evidence from tone dispersion. *Journal of Accounting Research, 53*(2), 241-274.

Anand, V., Bochkay, K., Chychyla, R., Leone, A. (2020). Using Python for text analysis in accounting research. *Foundations and Trends in Accounting, 14*(3–4), 128-359.

Angrist, J. D., Pischke, J.-S. (2009). *Mostly harmless econometrics: An empiricist's companion*: Princeton university press.

Arslan-Ayaydin, Ö., Bishara, N., Thewissen, J., Torsin, W. (2020). Managerial career concerns and the content of corporate disclosures: An analysis of the tone of earnings press releases. *International Review of Financial Analysis, 72*, 101598.

Arslan-Ayaydin, Ö., Boudt, K., Thewissen, J. (2016). Managers set the tone: Equity incentives and the tone of earnings press releases. *Journal of Banking & Finance, 72*, S132-S147.

Bae, J., Biddle, G. C., Park, C. W. (2021). Managerial learning from analyst feedback to voluntary capex guidance, investment efficiency, and firm performance. *Management Science, 68*(1), 583-607.

Baginski, S. P., Clinton, S. B., Mcguire, S. T. (2014). Forward-looking voluntary disclosure in proxy contests. *Contemporary Accounting Research, 31*(4), 1008-1046.

Ball, R., Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research, 6*(2), 159-178.

Beltratti, A., Stulz, R. M. (2012). The credit crisis around the globe: Why did some banks perform better? *Journal of Financial Economics, 105*(1), 1-17.

Bentley, J. W., Christensen, T. E., Gee, K. H., Whipple, B. C. (2018). Disentangling managers' and analysts' non-GAAP reporting. *Journal of Accounting Research, 56*(4), 1039-1081.

Beyer, A., Cohen, D. A., Lys, T. Z., Walther, B. R. (2010). The financial reporting environment: Review of the recent literature. *Journal of Accounting and Economics, 50*(2), 296-343.

Biddle, G. C., Hilary, G., Verdi, R. S. (2009). How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics, 48*(2-3), 112-131.

Billings, M. B., Jennings, R., Lev, B. (2015). On guidance and volatility. *Journal of Accounting and Economics, 60*(2-3), 161-180.

Blankespoor, E., deHaan, E., Marinovic, I. (2020). Disclosure processing costs, investors' information choice, and equity market outcomes: A review. *Journal of Accounting and Economics, 70*(2-3), 101344.

Bochkay, K., Hales, J., Chava, S. (2020). Hyperbole or reality? Investor response to extreme language in earnings conference calls. *The Accounting Review, 95*(2), 31-60.

Bonsall, S. B., Miller, B. P. (2017). The impact of narrative disclosure readability on bond ratings and the cost of debt. *Review of Accounting Studies, 22*(2), 608-643.

Bozanic, Z., Roulstone, D. T., Van Buskirk, A. (2018). Management earnings forecasts and other forward-looking statements. *Journal of Accounting and Economics, 65*(1), 1-20.

Brennan, N. M., Guillamon-Saorin, E., Pierce, A. (2009). Methodological insights: Impression management: Developing and illustrating a scheme of analysis for narrative disclosures – a methodological note. *Accounting, Auditing & Accountability Journal, 22*(5), 789-832.

Breuer, M., deHaan, E. (2023). Using and interpreting fixed effects models. *Available at SSRN*.

Broussard, J. P., Buchenroth, S. A., Pilotte, E. A. (2004). CEO Incentives, cash flow, and investment. *Financial Management, 33*(2), 51-70.

Bushee, B. J., Gow, I. D., Taylor, D. J. (2018). Linguistic complexity in firm disclosures: Obfuscation or information? *Journal of Accounting Research, 56*(1), 85-121.

Cao, S., Jiang, W., Yang, B., Zhang, A. L. (2023). How to talk when a machine is listening: Corporate disclosure in the age of AI. *The Review of Financial Studies*.

Cazier, R. A., Merkley, K. J., Treu, J. S. (2020). When are firms sued for qualitative disclosures? Implications of the safe harbor for forward-looking statements. *The Accounting Review, 95*(1), 31-55.

Chen, C., Kim, J. B., Wei, M., Zhang, H. (2019). Linguistic information quality in customers' forward-looking disclosures and suppliers' investment decisions. *Contemporary Accounting Research, 36*(3), 1751-1783.

Chen, F., Hope, O.-K., Li, Q., Wang, X. (2011). Financial reporting quality and investment efficiency of private firms in emerging markets. *The Accounting Review, 86*(4), 1255-1288.

Chen, J., Cheng, X., Gong, S. X., Tan, Y. (2020). Project-level disclosure and investment efficiency: Evidence from China. *Journal of Accounting, Auditing & Finance, 36*(4), 854-880.

Chen, J. V., Gee, K. H., Neilson, J. J. (2021). Disclosure prominence and the quality of Non-GAAP earnings. *Journal of Accounting Research, 59*(1), 163-213.

Chen, T., Xie, L., Zhang, Y. (2017). How does analysts' forecast quality relate to corporate investment efficiency? *Journal of Corporate Finance, 43*, 217-240.

Chen, W., Jung, S., Peng, X., Zhang, I. X. (2021). Outside opportunities, managerial risk taking, and CEO compensation. *The Accounting Review, 97*(2), 135-160.

Cheng, H., Liu, T., Wei, K. (2021). The effects of financial markets on managerial opportunistic behavior: Evidence from CEOs' tone manipulation. *SSRN Working Paper*.

Cheng, M., Dhaliwal, D., Zhang, Y. (2013). Does investment efficiency improve after the disclosure of material weaknesses in internal control over financial reporting? *Journal of Accounting and Economics, 56*(1), 1-18.

Chiu, T. T., Kim, J. B., Wang, Z. (2019). Customers' risk factor disclosures and suppliers' investment efficiency. *Contemporary Accounting Research, 36*(2), 773-804.

Cho, H., Muslu, V. (2021). How do firms change investments based on MD&A disclosures of peer firms? *The Accounting Review, 96*(2), 177-204.

Choi, J. K., Hann, R. N., Subasi, M., Zheng, Y. (2020). An empirical analysis of analysts' capital expenditure forecasts: Evidence from corporate investment efficiency. *Contemporary Accounting Research, 37*(4), 2615-2648.

Choi, Y. K., Han, S. H., Lee, S. (2014). Audit committees, corporate governance, and shareholder wealth: Evidence from Korea. *Journal of Accounting and Public Policy, 33*(5), 470-489.

Cotter, J., Tuna, I., Wysocki, P. D. (2006). Expectations management and beatable targets: How do analysts react to explicit earnings guidance? *Contemporary Accounting Research, 23*(3), 593-624.

Davis, A. K., Piger, J. M., Sedor, L. M. (2012). Beyond the numbers: Measuring the information content of earnings press release language. *Contemporary Accounting Research, 29*(3), 845-868.

Davis, A. K., Tama-Sweet, I. (2012). Managers' use of language across alternative disclosure outlets: Earnings press releases versus MD&A. *Contemporary Accounting Research, 29*(3), 804-837.

DeBoskey, D. G., Luo, Y., Zhou, L. (2019). CEO power, board oversight, and earnings announcement tone. *Review of Quantitative Finance and Accounting, 52*(2), 657-680.

Demers, E., Vega, C. (2014). The impact of credibility on the pricing of managerial textual content. *Available at SSRN 1153450*.

Dou, Y., Wong, M. F., Xin, B. (2019). The effect of financial reporting quality on corporate investment efficiency: Evidence from the adoption of SFAS No. 123R. *Management Science, 65*(5), 2249-2266.

Ertugrul, M., Lei, J., Qiu, J., Wan, C. (2017). Annual report readability, tone ambiguity, and the cost of borrowing. *Journal of Financial and Quantitative Analysis, 52*(2), 811-836.

Fahlenbrach, R., Stulz, R. M. (2011). Bank CEO incentives and the credit crisis. *Journal of Financial Economics, 99*(1), 11-26.

Feng, M., Li, C., McVay, S. (2009). Internal control and management guidance. *Journal of Accounting and Economics, 48*(2-3), 190-209.

Field, L., Lowry, M., Shu, S. (2005). Does disclosure deter or trigger litigation? *Journal of Accounting and Economics, 39*(3), 487-507.

Filip, A., Raffournier, B. (2014). Financial crisis and earnings management: The european evidence. *The International Journal of Accounting, 49*(4), 455-478.

Francis, J., LaFond, R., Olsson, P., Schipper, K. (2005). The market pricing of accruals quality. *Journal of Accounting and Economics, 39*(2), 295-327.

Gong, G., Li, L. Y., Yin, H. (2019). Relative performance evaluation and the timing of

earnings release. *Journal of Accounting and Economics, 67*(2-3), 358-386.

Graham, J. R., Harvey, C. R., Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics, 40*(1), 3-73.

Gu, F., Li, J. Q. (2007). The credibility of voluntary disclosure and insider stock transactions. *Journal of Accounting Research, 45*(4), 771-810.

Guay, W., Samuels, D., Taylor, D. (2016). Guiding through the Fog: Financial statement complexity and voluntary disclosure. *Journal of Accounting and Economics, 62*(2), 234-269.

Guay, W. R. (1999). The sensitivity of CEO wealth to equity risk: an analysis of the magnitude and determinants. *Journal of Financial Economics, 53*(1), 43-71.

Hadlock, C. J., Pierce, J. R. (2010). New evidence on measuring financial constraints: Moving beyond the KZ Index. *The Review of Financial Studies, 23*(5), 1909-1940.

Harakeh, M., Leventis, S., El Masri, T., Tsileponis, N. (2022). The moderating role of board gender diversity on the relationship between firm opacity and stock returns. *The British Accounting Review, 55*(4), 101145.

Healy, P. M., Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics, 31*(1), 405-440.

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica, 47*(1), 153-161.

Henry, E. (2008). Are investors influenced by how earnings press releases are written? *The Journal of Business Communication, 45*(4), 363-407.

Hossain, M., Raghunandan, K., Rama, D. V. (2020). Abnormal disclosure tone and going concern modified audit reports. *Journal of Accounting and Public Policy, 39*(4), 106764.

Houston, J. F., Lev, B., Tucker, J. W. (2010). To guide or not to guide? Causes and consequences of stopping quarterly earnings guidance. *Contemporary Accounting Research, 27*(1), 143-185.

Huang, X., Nekrasov, A., Teoh, S. H. (2018). Headline salience, managerial opportunism, and over-and underreactions to earnings. *The Accounting Review, 93*(6), 231-255.

Huang, X., Teoh, S. H., Zhang, Y. (2014). Tone management. *The Accounting Review,*

89(3), 1083-1113.

Hubbard, T. N. (1998). An empirical examination of moral hazard in the vehicle inspection market. *The RAND Journal of Economics*, 406-426.

Hutton, A. P., Miller, G. S., Skinner, D. J. (2003). The role of supplementary statements with management earnings forecasts. *Journal of Accounting Research, 41*(5), 867-890.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review, 76*(2), 323-329.

Jensen, M. C., Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305-360.

Kahnke, R. E., Bundy, K. L. (2016). *The secrets to winning trade secret cases*. Eagan, MN: Thomson Reuters.

Kaplan, S. N., Zingales, L. (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints? *The Quarterly Journal of Economics, 112*(1), 169-215.

Kempf, E., Manconi, A., Spalt, O. (2017). Distracted shareholders and corporate actions. *The Review of Financial Studies, 30*(5), 1660-1695.

Kim, H.-D., Kim, T., Kim, Y., Park, K. (2019). Do long-term institutional investors promote corporate social responsibility activities? *Journal of Banking & Finance, 101*, 256-269.

Klasa, S., Ortiz-Molina, H., Serfling, M., Srinivasan, S. (2018). Protection of trade secrets and capital structure decisions. *Journal of Financial Economics, 128*(2), 266-286.

Kothari, S. P., Shu, S., Wysocki, P. D. (2009). Do managers withhold bad news? *Journal of Accounting research, 47*(1), 241-276.

Lamont, O., Polk, C., Saaá-Requejo, J. (2001). Financial constraints and stock returns. *The Review of Financial Studies, 14*(2), 529-554.

Lancaster, T. (2000). The incidental parameter problem since 1948. *Journal of Econometrics, 95*(2), 391-413.

Lennox, C. S., Francis, J. R., Wang, Z. (2012). Selection models in accounting research. *The Accounting Review, 87*(2), 589-616.

Leuz, C., Verrecchia, R. E. (2000). The economic consequences of increased disclosure.

Journal of Accounting Research, 38, 91-124.

Li, F. (2008). Annual report readability, current earnings, and earnings persistence. *Journal of Accounting and Economics, 45*(2-3), 221-247.

Li, F. (2010a). The information content of forward-looking statements in corporate filings—A naïve Bayesian machine learning approach. *Journal of Accounting Research, 48*(5), 1049-1102.

Li, F. (2010b). Textual analysis of corporate disclosures: A survey of the literature. *Journal of Accounting Literature, 29*(1), 143-165.

Linck, J. S., Netter, J., Shu, T. (2013). Can managers use discretionary accruals to ease financial constraints? Evidence from discretionary accruals prior to investment. *The Accounting Review, 88*(6), 2117-2143.

Lo, H.-C., Shiah-Hou, S.-R. (2022). The effect of CEO power on overinvestment. *Review of Quantitative Finance and Accounting, 59*(1), 23-63.

Loughran, T., McDonald, B. (2011). When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks. *The Journal of Finance, 66*(1), 35-65.

Ma, G. (2019). The information content of operations-related disclosures. *Journal of Accounting Literature, 43*(1), 87-107.

Mayew, W. J., Sethuraman, M., Venkatachalam, M. (2015). MD&A Disclosure and the Firm's Ability to Continue as a Going Concern. *The Accounting Review, 90*(4), 1621-1651.

McConnell, J. J., Servaes, H. (1990). Additional evidence on equity ownership and corporate value. *Journal of Financial Economics, 27*(2), 595-612.

McNichols, M. F., Stubben, S. R. (2008). Does earnings management affect firms' investment decisions? *The Accounting Review, 83*(6), 1571-1603.

Merkley, K. J. (2014). Narrative disclosure and earnings performance: Evidence from R&D disclosures. *The Accounting Review, 89*(2), 725-757.

Muslu, V., Radhakrishnan, S., Subramanyam, K., Lim, D. (2015). Forward-looking MD&A disclosures and the information environment. *Management Science, 61*(5), 931-948.

Noh, S., So, E. C., Weber, J. P. (2019). Voluntary and mandatory disclosures: Do managers view them as substitutes? *Journal of Accounting and Economics, 68*(1), 101243.

Ormazabal, G. (2018). Are directors more likely to relinquish their riskiest directorships

after the Financial Crisis? *Journal of Corporate Finance, 53*, 1-20.

Peters, S. J., Schacht, K. (2014). *Forward-looking information: A necessary consideration in the SEC's review on disclosure effectiveness: Investor perspectives*. Retrieved from https://doi.org/10.2469/ccb.v2014.n5.1

Petty, R. E., Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. In R. E. Petty & J. T. Cacioppo (Eds.), *Communication and persuasion: Central and peripheral routes to attitude change* (pp. 1-24). New York, NY: Springer New York.

Rajkovic, T. (2020). Lead independent directors and investment efficiency. *Journal of Corporate Finance, 64*, 101690.

Richard Lu, H. Y., Wu Tucker, J. (2012). Nonearnings corporate guidance. *Financial Management, 41*(4), 947-977.

Richardson, S. (2006). Over-investment of free cash flow. *Review of accounting studies, 11*, 159-189.

Roychowdhury, S., Shroff, N., Verdi, R. S. (2019). The effects of financial reporting and disclosure on corporate investment: A review. *Journal of Accounting and Economics, 68*(2-3), 101246.

Schleicher, T., Walker, M. (2010). Bias in the tone of forward-looking narratives. *Accounting and Business Research, 40*(4), 371-390.

SEC. (2018). Request for comment on earnings releases and quarterly reports [Press release]. Retrieved from https://www.sec.gov/rules/other/2018/33-10588.pdf

Shleifer, A., Vishny, R. W. (1986). Large shareholders and corporate control. *Journal of Political Economy, 94*(3), 461-488.

Stein, J. C. (2003). Agency, information and corporate investment. *Handbook of the Economics of Finance, 1*, 111-165.

Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of financial Economics, 26*(1), 3-27.

Vallascas, F., Mollah, S., Keasey, K. (2017). Does the impact of board independence on large bank risks change after the global financial crisis? *Journal of Corporate Finance, 44*, 149-166.

Wasley, C. E., Wu, J. S. (2006). Why do managers voluntarily issue cash flow forecasts? *Journal of Accounting Research, 44*(2), 389-429.

Waymire, G. (1985). Earnings volatility and voluntary management forecast disclosure.

Journal of Accounting Research, 23(1), 268-295.

Wooldridge, J. M. (2015). *Introductory econometrics: A modern approach*: Cengage learning.

Xu, W., Qi, D. (2020). Abnormal tone in management earnings forecast, media negative coverage, and insider trading. *Asia-Pacific Journal of Accounting & Economics, 29*(4), 939-963.

Yu, F. (2008). Analyst coverage and earnings management. *Journal of Financial Economics, 88*(2), 245-271.

Appendix A. Variable List

Variables in Abnormal Tone Regression (Eq. **(1))**	
TONE_q	The number of positive words minus the number of negative words, divided by the sum of the number of positive words and the number of negative words in each aspect of forward-looking statements.
EARN_q	Quarterly earnings before extraordinary items (ibq) scaled by lagged quarterly total assets (atq).
RET_q	Buy-and-hold returns of firm j in quarter q of year t, for the 12-month period preceding the end of fiscal quarter q using CRSP monthly return data.
SIZE_q	Logarithm of the market value of equity at fiscal quarter-end (cshoq * prccq).
BTM_q	Total assets divided by market cap plus total liabilities (atq / (prccq * cshoq + ltq)).
STD_{RET}_q	Standard deviation of monthly stock returns over the fiscal quarter.
STD_{EARN}_q	Standard deviation of EARN calculated over the last eight quarters.
AGE_q	ln (1 + age from the first year the firm entered the Compustat dataset).
BUSSEG_q	ln (1+ number of business segments), or 1 if the item is missing from Compustat.
GEOSEG_q	ln (1 + number of geographic segments), or 1 if the item is missing from Compustat.
LOSS_q	An indicator variable is set to 1 when EARN is negative and is 0 otherwise.
ΔEARN_q	Change in quarterly earnings before extraordinary (ibq) item from q-4 to q, scaled by quarterly total assets (atq) in q-4.
AFE_q	Analyst forecast error, defined as I/B/E/S earnings per share minus the median of the most recent analysts' forecasts, deflated by stock price per share at the end of the fiscal quarter.
AF_q	Analyst consensus forecast for one-quarter-ahead earnings per share, scaled by stock price per share at the end of the fiscal quarter to control for managerial assessment about future performance.
Variables in Measuring Investment Efficiency (Eq. **(2), (5), and (6))**	
Invest	The sum of R&D expenditure (xrd), capital expenditure (capex), and acquisition expenditure (aqc) less cash receipts from sale of PPE (sppe) multiplied by 100 and scaled by lagged total assets (at).
REVGrowth	Annual revenue growth rate, the percentage change of sales (Revt) from t-1 to t.
NEG	An indicator variable is set to 1 if there is negative revenue growth, and 0 otherwise.
Tobin's Q	The market value of equity (csho * prcc_f) plus the book value of short- and long-term debt (dlc and dltt) scaled by total assets (at) measured at the end of year t − 1
CFO	Cash flow from operations (oancf) in year t-1.
Asset_Growth	The percentage change in firm i's assets between year t-2 and t-1.
SG	The percentage of sales growth from year t-2 to t-1.
Main Test Model (Eq. (3))	
Over_invest	An indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise.

NEqual_ABT	Abnormal value of Tone in the nonearnings-related qualitative FLS, calculated as the residual from the regression of Tone on the determinants of the (Huang et al., 2014) tone management model, as in Eq. (1).
NEquant_ABT	Abnormal value of Tone in the nonearnings-related quantitative FLS.
NE_ABT	Abnormal value of Tone in the overall nonearnings-related FLS.
Earn_ABT	Abnormal value of Tone in the overall earnings related FLS.
Size	Logarithm of the market value of equity at fiscal year-end (csho * prcc_f)
Earn	Yearly earnings before extraordinary items scaled by lagged total assets
BTM	Total assets divided by market cap plus total liabilities (at / (prcc * csho + lt))
Loss	An indicator variable is set to 1 when yearly Earn is negative and is 0 otherwise.
Zscore	Bankruptcy risk, 3.3 * Pi + Sale + 0.25 * Re + 0.5 * [(act – lct) / at]. High score, lower likelihood of bankruptcy.
Tangibility	The ratio of total property, plant and equipment (ppent) to total assets (at).
lnAge	ln (1 + age from the first year the firm entered the Compustat dataset).
Cash	The ratio of cash (che) to total assets (at).
CFO_vol	Cash flow volatility, measured by the SD of cash flow from operations (oancf) deflated by average total assets from years t-5 to t-1
Sales_vol	Sales volatility, the SD of the sales (revt) deflated by average from years t-5 to t-1.
Invest_vol	Investment volatility, the SD of investment from t-5 to t-1.
AQ	Accrual Quality. See Appendix B2 for a detailed measurement.
lnAnalyst	The natural logarithm of the number of analysts following the firm as provided by IBES.
Boardsize	The number of board members in a given firm's board of directors.
leadInd	An indicator variable that equals 1 if the firm with at least one lead independent director, and 0 otherwise.
Past_investment	An indicator variable that equals 1 if a firm's mean of investment efficiency residual (from Eq. (1)) in year t and t-1 greater than 0, and 0 otherwise.
BoardInd	The number of independent directors divided by the board size.
BoardDiv	The proxy of board diversity is calculated as the number of female directors divided by the board size.
Competition	Product market competition is calculated by HHI index. The HHI index is calculated as the sum of the squared market shares using firm sales, based on the Fama-French Industry Classifications.
Stock_Ret	buy-and-hold monthly returns for 12 months ending three months after the fiscal year-end.
Operatingcycle	The log of receivable (rect) to sale (sale) plus inventory (invt) to COGS (cogs) multiplied by 360.
CEO_Age	CEO's age in year t.
CEO_Gender	An indicator variable that equals 1 if a firm's CEO is male, and 0 otherwise.
CEO_Tenure	The number of years since the CEO first became the CEO of the firm.
CEO_Cashcom	The total current compensation, including salary and bonus (total_curr), scaled by total compensation (tdc1).

Appendix B1. The procedure of classifying forward-looking statements

We use Python to apply textual analysis techniques to clean the raw earnings press releases, extract FLSs from these releases, and classify the FLSs into different groups. The majority of our Python coding work follows Anand et al. (2020), a monograph that guides financial and accounting researchers in performing textual analysis using Python.

We clean the press releases following a series of standard procedures. First, we extract the earnings announcement section from each press release because only this part includes useful language descriptions and does not require the following accounting tables. To extract the earnings announcement section, we locate the beginning tags, such as <TYPE>EX-99.1, <TYPE>EX-99, <TYPE>Exhibition-99.1, and <TYPE>Exibition-99; the ending tag is </DOCUMENT> because pages in HTML format always end with this tag. Second, we remove any HTML tags and boilerplate statements, such as safe harbour statements and earnings conference call statements.

Then, we begin to identify FLSs and classify them into different groups. First, we follow the forward-looking terms dictionary of Bozanic et al. (2018) to extract sentence-level forward-looking statements (FLSs). We identify a sentence as an FLS if it incorporates at least one forward-looking term. Second, we follow the Bozanic et al. (2018) method to classify forward-looking statements into four groups: earnings-related quantitative/qualitative FLSs and nonearnings-related quantitative/qualitative FLSs. An FLS containing at least one earnings term is identified as an earnings-related FLS. The earnings-related terms are from Bozanic et al. (2018): “EPS”, “income”,

"loss", and "profit". In contrast, if an FLS does not contain any earnings terms, it is regarded as a nonearnings-related FLS. Moreover, an FLS is identified as quantitative if it includes words such as "dollars," "thousands," or "millions" or numbers followed by scale abbreviations (e.g., $1M or $1B). An FLS can also be identified as quantitative if it contains any references to US currency (i.e., "$") or percentages ("percentage" or the symbol "%"). In contrast, an FLS that does not contain at least one such quantitative term is classified as qualitative.

Appendix B2. Accrual Quality

Following Francis, LaFond, Olsson, and Schipper (2005), we estimate the accrual quality as the following model:

$$TAC_{i,t} = \alpha_0 + \alpha_1 OCF_{i,t-1} + \alpha_2 OCF_{i,t} + \alpha_3 OCF_{i,t-1} + \alpha_4 \Delta REV_{i,t} + \alpha_5 \Delta PPE_{i,t} + \varepsilon_{i,t}$$

where the *TAC* represents total current accrual that is calculated as the change in current assets (act) between year t-1 and year t minus the change in current liabilities (lct) between year t-1 and year t minus the change in cash (che) between t-1 and t, then plus the change in debt (dlc) between year t-1 and t. *OCF* is operating cash flow, equals income (ib) in a year minus the (TAC minus depreciation and amortization (dp) in year t). *ΔREV* is the change of sales from t-1 to t. Finally, *ΔPPE* is the change of gross PPE (ppegt) from t-1 to t.

This equation is estimated cross-sectionally for each industry with at least 20 observations in a given year based on the 2-digit SIC industry classification. Accruals quality (*AQ*) is measured by minus one (-1) times the standard deviation of the firm-level residuals from the regression during the year t-5 to t-1 (lagged extra one year because DD model includes one-year ahead cash flow from operations) (Biddle et al., 2009). Thus, the higher value of *AQ*, i.e., the lower standard deviation of residuals.

Appendix B3. Financial Constraint

1. KZ Index

Lamont, Polk, and Saaá-Requejo (2001) use the regression coefficient from Kaplan and Zingales (1997) to calculate the KZ index as follows: $KZ = -1.001909 * CashFlow/k + 0.2826389 * Tobin's\ Q + 3.139193 * Debt/TotalCapital - 39.3678 * Dividends/k - 1.314759 * Cash/k$

Where *CashFlow/k* is computed as the sum of income (ib) and depreciation and amortization (dp), then divided by net PPE (ppent). *Tobin's Q* is calculated as the total assets (at) plus CRSP December Market Equity minus total equity (ceq) minus deferred taxes (txdb), then divided by total assets (at). *Debt/TotalCapital* is the sum of long-term debt (dltt) and current liabilities (dlc), then divided by the sum of long-term debt (dltt), current liabilities (dlc), and stockholders' equity (seq). *Dividends/k* is computed as the sum of common shares' dividends (dvc) and preferred shares' dividends (dvp), then divided by the net PPE (ppent). *Cash/k* refers to cash (che) divided by the net PPE (ppent).

2. Free Cash Flow

Following Linck et al. (2013), the Free Cash Flow is computed as cash from operations minus average total investment in the past three years, scaled by the sum of long-term and short-term debt.

3. Net Leverage

Following Kaplan et al. (1997) and Hadlock et al. (2010), we calculate the Net Leverage as:

$$Net\ Leverage = Net\ Debt\ /\ (Net\ Debt + Equity)$$

where *Net Debt* equals long-term debt (dltt) plus current liabilities (dlc) minus excess cash (che – Max [lct – (act-che), 0]). *Equity* is stockholders' equity (seq).

Following Linck et al. (2013), we classify firms as financially unconstraint or constraint as follows: (1) KZ Index and SA Index: Top (bottom) 30 percent firms are constrained (unconstrained); (2) Net Leverage: Firms with non-positive net debt are unconstrained; the top 50 percent of firms with positive net debt are constrained.

Appendix C. Examples of Forward-Looking Statements

Ford (CIK: 37996) Full Year 2013 Earnings Press Release[13]

Earnings related, Quantitative

Ford North America pre-tax **profits** of **$8.8 billion will** generate profit-sharing payments of approximately **$8,800** per eligible employee on a full-year basis...This outlook reflects improved profitability… **$350 million profit** effect **will** occur in the first quarter.

Earnings related, Qualitative

Although Ford continues to **expect** higher market share and positive net pricing…It now **expects** the rest of the year to be about breakeven to a **loss** due to lower-than-expected industry volumes and weaker currencies…For the full year, Ford continues to **expect** Asia Pacific to earn a higher pre-tax **profit** than a year ago.

Nonearnings-related, Quantitative

Ford continues to **expect** its full-year operating effective tax rate to be about **35 percent**…For the full year, Ford **continues to expect** net interest expense to be about **$700 million**…The company **expects** third-quarter production to be about **1.5 million** units, down **12,000** units from a year ago...Ford now **expects** year-end managed

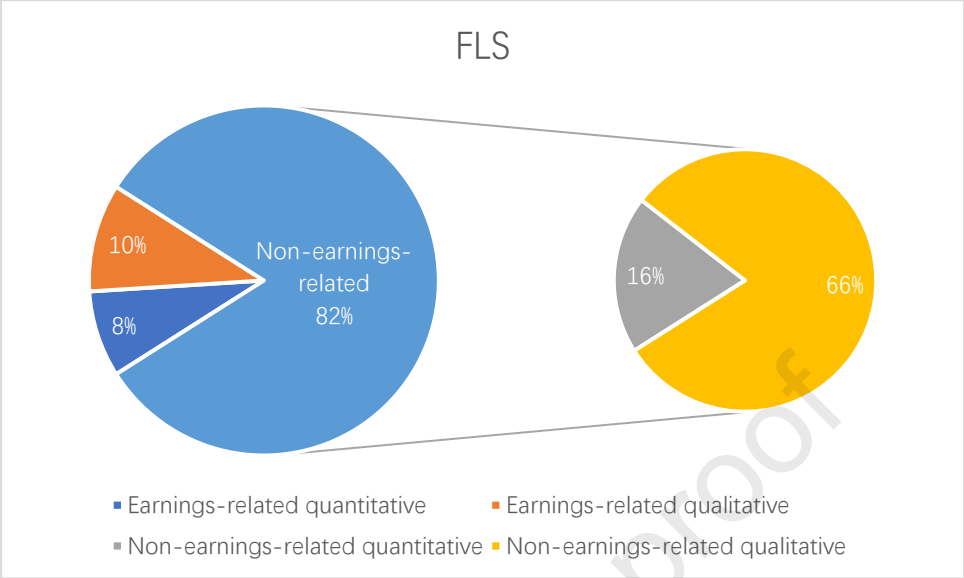
[13] Retrieved from: https://www.sec.gov/Archives/edgar/data/37996/000003799614000004/exhibit99toearnings8-kdate.htm

receivables of **$112 billion** to **$115 billion**, up from prior guidance of about **$110 billion**.

Nonearnings-related, Qualitative

As we look forward, we **expect** the payoff from our investments this year **will** be a strong lineup with higher volumes, revenue and margins in 2015 and beyond…Ford **expects** full-year results will be strong....Volume improvements **will be** more than offset by higher costs as Ford continues to invest for future growth…FORD PLANFord remains focused on delivering the key aspects of the One Ford plan, which are unchanged: "Our global team is delivering in 2014 and taking the critical **next steps** for an even stronger **future**," said Fields.

Figure 1. The proportions of each type of FLS *[Colour should be used in print]*



This figure describes the proportions of each aspect of forward-looking statements (FLS) in firms' quarterly earnings press releases. The deep blue part and orange part are the proportions of earnings-related quantitative FLS and earnings-related qualitative FLS in the entire FLS, respectively. The light blue part is the proportion of overall nonearnings-related FLS in the entire FLS. The grey part and yellow part are the proportions of nonearnings-related quantitative FLS and nonearnings-related qualitative FLS in the overall nonearnings-related FLS, respectively. The data is extracted from Bozanic et al. (2018).

Table 1. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Over_invest	21487	.421	.494	0	1
NEqual_ABT	21487	.002	.403	-1.256	.687
NEquant_ABT	21487	-.001	.246	-.801	.944
NE_ABT	21487	.002	.409	-1.272	.692
Earn_ABT	21487	0	.322	-.978	.949
Size	21487	6.983	1.813	1.952	11.421
Earn	21487	.015	.178	-1.169	.359
BTM	21487	.627	.279	.108	1.643
LOSS	21487	.264	.441	0	1
Zscore	21487	1.218	1.427	-7.581	4.399
Tangibility	21487	.244	.227	.002	.906
lnAge	21487	3.062	.592	1.792	4.205
Cash	21487	.199	.209	.001	.956
CFOvol	21487	.063	.057	.007	.384
salesvol	21487	.221	.196	.009	1.12
investvol	21487	10.164	13.15	.234	86.237
AQ	21487	-.04	.032	-.19	-.005
Past_investment	21487	.337	.473	0	1
lnAnalyst	21487	2.221	.766	.693	3.689
Boardsize	21487	7.576	2.564	3	14
leadInd	21487	.385	.487	0	1
BoardDiv	21487	.106	.104	0	.429
BoardInd	21487	.926	.116	.444	1
Competition	21487	.093	.064	.024	.578
Stock_Ret	21487	.111	.482	-1.492	1.891

This table reports descriptive statistics of variables used in the paper. *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. *NEqual_ABT* is the abnormal tone in the nonearnings-related qualitative forward-looking statements (FLS). *NEquant_ABT* is the abnormal tone in the nonearnings-related quantitative FLS. *NE_ABT* is the abnormal tone in the overall nonearnings-related FLS. *Earn_ABT* is the abnormal tone in the overall earningsrelated FLS. Other variable definitions are presented in Appendix A. All continuous variables are winsorised at the bottom and top 1% levels.

Table 2. Pearson correlation

	Over_ invest	NEqual_ABT	NEquant_ABT	NE_ABT	Earn_ABT	AQ	leadInd
Over_invest	1						
NEqual_ABT	0.0130*	1					
NEquant_ABT	0.0032	0.0785*	1				
NE_ABT	0.0137*	0.9414*	0.3099*	1			
Earn_ABT	-0.0077	0.0742*	0.0444*	0.0753*	1		
AQ	-0.0405*	-0.0126*	-0.0041	-0.0135*	0.0077	1	
leadInd	-0.0385*	-0.00250	0.0050	0.0013	0.0139*	0.1813*	1
lnAnalyst	-0.0048	0.0130*	0.0031	0.0150*	-0.0113*	0.2988*	0.2219*

This table reports the Pearson correlation coefficient of the main variables used in baseline regression. *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. *NEqual_ABT* is the abnormal tone in the nonearnings-related qualitative forward-looking statements (FLS). *NEquant_ABT* is the abnormal tone in the nonearnings-related quantitative FLS. *NE_ABT* is the abnormal tone in the overall nonearnings-related FLS. *Earn_ABT* is the abnormal tone in the overall earningsrelated FLS. *AQ* is accrual quality, and its measure is presented in Appendix B2. *leadInd* is an indicator variable that equals 1 if the firm with at least one lead independent director, and otherwise 0. lnAnalyst is the logged number of analysts following the firm. Significance at 5% or 1% level is indicated by *.

Table 3. Regression of nonearnings-related FLS abnormal tone on overinvestments

VARIABLES	(1) Overinvest$_{(t+1)}$	(2) Overinvest$_{(t+1)}$	(3) Overinvest$_{(t+1)}$
NEqual_ABT	0.020***		
	(2.62)		
NEquant_ABT		-0.006	
		(-0.49)	
NE_ABT			0.018**
			(2.31)
Size	-0.025***	-0.025***	-0.025***
	(-6.08)	(-6.06)	(-6.07)
Earn	-0.157***	-0.157***	-0.157***
	(-4.80)	(-4.78)	(-4.79)
BTM	-0.350***	-0.350***	-0.350***
	(-22.54)	(-22.53)	(-22.55)
LOSS	-0.047***	-0.047***	-0.047***
	(-4.81)	(-4.76)	(-4.79)
Zscore	-0.018***	-0.019***	-0.019***
	(-4.33)	(-4.38)	(-4.34)
Tangibility	0.346***	0.345***	0.346***
	(13.57)	(13.56)	(13.56)
lnAge	-0.015**	-0.015**	-0.015**
	(-2.11)	(-2.10)	(-2.12)
Cash	0.268***	0.267***	0.267***
	(11.48)	(11.42)	(11.46)
CFOvol	0.074	0.075	0.074
	(0.94)	(0.95)	(0.94)
salesvol	0.039*	0.040*	0.039*
	(1.87)	(1.93)	(1.87)
investvol	0.001***	0.001***	0.001***
	(3.02)	(3.00)	(3.02)
AQ	-0.204	-0.207	-0.204
	(-1.58)	(-1.60)	(-1.58)
Earn_ABT	-0.018*	-0.016	-0.018*
	(-1.87)	(-1.63)	(-1.86)
Past_investment	0.169***	0.170***	0.169***
	(22.03)	(22.06)	(22.01)
lnAnalyst	0.023***	0.023***	0.023***
	(2.97)	(3.01)	(2.97)
boardsize	-0.002	-0.002	-0.002
	(-1.08)	(-1.09)	(-1.06)
leadInd	-0.022***	-0.022***	-0.022***
	(-3.10)	(-3.10)	(-3.11)

BoardDiv	0.022	0.022	0.022
	(0.58)	(0.58)	(0.59)
BoardInd	0.002	0.002	0.003
	(0.07)	(0.05)	(0.09)
Competition	0.222	0.220	0.219
	(1.40)	(1.39)	(1.38)
Stock_Ret	0.026***	0.026***	0.026***
	(3.56)	(3.52)	(3.55)
Constant	0.611***	0.611***	0.611***
	(12.80)	(12.79)	(12.80)
Observations	21,487	21,487	21,487
Adjusted R-squared	0.174	0.174	0.174
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

This table reports the baseline results for relations between over-investment (*Over_invest*), and abnormal tone in the nonearnings-related qualitative forward-looking statements (FLS) (*NEqual_ABT*) in Column (1), abnormal tone in the nonearnings-related quantitative FLS (*NEquant_ABT*) in Column (2), and abnormal tone in the overall nonearnings-related FLS (*NE_ABT*) in Column (3). The dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 4. Regression of nonearnings-related FLS abnormal tone on overinvestments in financial unconstraint vs. financial constraint firms

Panel A. KZ Index

	(1)	(2)	(3)
VARIABLES	$Overinvest_{(t+1)}$	$Overinvest_{(t+1)}$	$Overinvest_{(t+1)}$
NEqual_ABT*FU_KZ	0.037**		
	(2.21)		
NEqual_ABT	0.008		
	(0.86)		
NEquant_ABT* FU_KZ		-0.010	
		(-0.36)	
NEquant_ABT		-0.003	
		(-0.23)	
NE_ABT* FU_KZ			0.036**
			(2.17)
NE_ABT			0.006
			(0.63)
FU_KZ	-0.026***	-0.026***	-0.026***
	(-3.10)	(-3.09)	(-3.10)
Constant	0.619***	0.620***	0.619***
	(12.94)	(12.95)	(12.95)
Observations	21,487	21,487	21,487
Adjusted R-squared	0.175	0.174	0.175
Controls	YES	YES	YES
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Panel B. Net Leverage

	(1)	(2)	(3)
VARIABLES	$Overinvest_{(t+1)}$	$Overinvest_{(t+1)}$	$Overinvest_{(t+1)}$
NEqual_ABT* FU_NL	0.035**		
	(2.22)		
NEqual_ABT	0.005		
	(0.50)		
NEquant_ABT* FU_NL		0.020***	
		(3.07)	
NEquant_ABT		-0.036**	
		(-2.27)	
NE_ABT * FU_NL			0.037**
			(2.38)

NE_ABT			0.001
			(0.15)
FU_NL	0.042***	0.043***	0.042***
	(4.77)	(4.81)	(4.76)
Constant	0.581***	0.582***	0.581***
	(12.07)	(12.08)	(12.07)
Observations	21,487	21,487	21,487
Adjusted R-squared	0.175	0.174	0.175
Controls	YES	YES	YES
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Panel C. Free Cash Flow

	(1)	(2)	(3)
VARIABLES	$Overinvest_{(t+1)}$	$Overinvest_{(t+1)}$	$Overinvest_{(t+1)}$
NEqual_ABT* FU_FCF	0.053***		
	(2.64)		
NEqual_ABT	0.010		
	(1.14)		
NEquant_ABT* FU_FCF		0.033***	
		(3.57)	
NEquant_ABT		-0.027*	
		(-1.89)	
NE_ABT * FU_FCF			0.069***
			(3.49)
NE_ABT			0.004
			(0.47)
FU_FCF	0.019*	0.019**	0.019*
	(1.95)	(1.97)	(1.92)
Constant	0.599***	0.600***	0.600***
	(12.47)	(12.48)	(12.48)
Observations	21,487	21,487	21,487
Adjusted R-squared	0.175	0.175	0.175
Controls	YES	YES	YES
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

This table Panel A reports results for relations between over-investment (*Over_invest*), and abnormal tone in the nonearnings-related qualitative forward-looking statements (FLS) (*NEqual_ABT*) in Column (1), abnormal tone in the nonearnings-related quantitative FLS (*NEquant_ABT*) in Column (2), and abnormal tone in the nonearnings-related FLS (*NE_ABT*) in Column (3) in financial unconstraint firms. The dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. The financial unconstraint is measured by the KZ index. Following Linck et al. (2013), firms in the bottom 30 percent of the KZ index are considered financially unconstrained. In panel B, the financial unconstraint measure is replaced by Net Leverage (NL), firms with non-positive net debt are unconstrained; other variables remain the same. Similarly, in panel C, the financial unconstraint measure is replaced by Free Cash Flow (FCF), firms in the top 30 percent

of FCF are considered unconstrained; other variables remain the same. The detailed measure for financial unconstraint is presented in Appendix B3. All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 5. The moderating effect of external monitoring on the relation between nonearnings-related FLS abnormal tone and overinvestments

DV: $Over\_invest_{(t+1)}$	(1) Analyst Following		(2) Institutional Ownership	
	High	Low	High	Low
NEqual_ABT	0.008	0.036***	0.015	0.026*
	(0.78)	(3.18)	(1.33)	(1.80)
Size	0.033***	0.016***	-0.029***	-0.013**
	(-5.77)	(-2.61)	(-4.38)	(-2.00)
Earn	0.194***	0.133***	-0.210***	-0.153***
	(-3.54)	(-3.20)	(-3.35)	(-2.74)
BTM	0.426***	0.275***	-0.376***	-0.295***
	(-18.21)	(-12.93)	(-15.00)	(-11.11)
LOSS	0.058***	0.042***	-0.017	-0.055***
	(-3.87)	(-3.15)	(-1.09)	(-3.16)
Zscore	-0.010	0.027***	-0.004	-0.024***
	(-1.49)	(-4.73)	(-0.52)	(-3.21)
Tangibility	0.440***	0.244***	0.435***	0.261***
	(12.61)	(6.60)	(11.91)	(5.68)
lnAge	-0.002	-0.028**	0.003	-0.048***
	(-0.24)	(-2.56)	(0.26)	(-3.64)
Cash	0.253***	0.269***	0.259***	0.286***
	(7.02)	(8.75)	(7.07)	(7.11)
CFOvol	0.052	0.052	0.100	-0.073
	(0.40)	(0.52)	(0.69)	(-0.58)
salesvol	0.035	0.046	0.030	0.058*
	(1.17)	(1.59)	(0.90)	(1.65)
investvol	0.001***	0.001	0.001***	0.001
	(2.85)	(1.61)	(2.91)	(1.39)
AQ	-0.363*	-0.124	-0.273	-0.185
	(-1.74)	(-0.74)	(-1.24)	(-0.87)
Earn_ABT	-0.000	0.040***	-0.008	-0.027
	(-0.00)	(-2.78)	(-0.63)	(-1.46)
Past_investment	0.133***	0.210***	0.138***	0.222***
	(12.95)	(18.08)	(12.75)	(15.61)
lnAnalyst	0.051***	0.000	0.039***	-0.000
	(3.21)	(0.03)	(3.25)	(-0.02)
boardsize	0.007***	0.004	-0.007**	0.008**
	(-2.73)	(1.42)	(-2.49)	(2.42)
leadInd	-0.011	0.034***	-0.031***	-0.021
	(-1.19)	(-3.12)	(-3.19)	(-1.56)
BoardDiv	0.021	0.028	-0.002	-0.035
	(0.39)	(0.54)	(-0.04)	(-0.52)

BoardInd	-0.010	0.010	0.055	-0.001
	(-0.21)	(0.23)	(1.06)	(-0.01)
Competition	0.361	0.111	0.286	0.070
	(1.53)	(0.53)	(1.32)	(0.23)
Stock_Ret	0.016	0.030***	0.019	0.024*
	(1.44)	(3.14)	(1.49)	(1.82)
Constant	0.622***	0.563***	0.531***	0.610***
	(8.41)	(8.15)	(7.00)	(7.56)
Observations	11,819	9,668	10,815	6,455
Adjusted R-squared	0.172	0.186	0.167	0.186
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

This table displays the results of the relation between abnormal tone in nonearnings-related qualitative FLSs and overinvestments when the level of external monitoring varies across firms. A firm is classified into high (low) external monitoring subsample if its analyst following (Column 1) or institutional ownership (Column 2) is above (below) the median of the sample. The key independent variable is the abnormal tone in the nonearnings-related qualitative forward-looking statements (FLS) (*NEqual_ABT*). The dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 6. The moderating effect of career concern on the relation between nonearnings-related FLS abnormal tone and overinvestments

	(1)	(2)
VARIABLES	IDD-nonadopted	IDD-adopted
Difference	*p=0.09**	
NEqual_ABT	0.029*	0.061***
	(1.66)	(2.67)
Size	-0.030***	-0.017
	(-3.48)	(-1.32)
Earn	-0.105	-0.276***
	(-1.54)	(-2.72)
BTM	-0.412***	-0.253***
	(-12.12)	(-5.26)
LOSS	-0.016	-0.059*
	(-0.76)	(-1.85)
Zscore	-0.028***	-0.003
	(-3.14)	(-0.20)
Tangibility	0.458***	0.314***
	(7.86)	(3.50)
lnAge	-0.006	-0.023
	(-0.40)	(-1.09)
Cash	0.336***	0.353***
	(6.92)	(5.23)
CFOvol	-0.159	0.264
	(-1.00)	(1.13)
salesvol	0.083*	-0.058
	(1.77)	(-0.79)
investvol	0.002***	0.001
	(2.82)	(1.27)
AQ	0.242	0.052
	(0.87)	(0.13)
Earn_ABT	-0.041*	-0.020
	(-1.79)	(-0.70)
Past_investment	0.159***	0.179***
	(9.60)	(7.63)
lnAnalyst	0.019	0.012
	(1.15)	(0.49)
boardsize	0.007*	-0.006
	(1.89)	(-1.03)
leadInd	-0.022	-0.056**
	(-1.35)	(-2.49)
BoardDiv	0.032	0.141
	(0.39)	(1.07)
BoardInd	0.174**	-0.092

	(2.50)	(-0.88)
Competition	0.667*	0.139
	(1.80)	(0.33)
Stock_Ret	0.028*	0.051**
	(1.82)	(2.13)
Constant	0.359***	0.643***
	(3.35)	(4.26)
Observations	4,229	2,257
Adjusted R-squared	0.188	0.221
Industry FE	YES	YES
Year FE	YES	YES

This table shows the results of the relation between abnormal tone in nonearnings-related qualitative FLSs and overinvestments when the career concern is varying. We argue that managers with high career concerns if they are in firms headquartered in the IDD-adopted states (Column 2). The list of IDD-adopted states is from Ali et al. (2019). The key independent variable is the abnormal tone in the nonearnings-related quantitative forward-looking statements (FLS) (*NEqual_ABT*). The dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 7. The influence of GFC

VARIABLES Dep var: Overinvest$_{(t+1)}$	(1) Pre-GFC (Before2007)			(2) During-GFC (2007-2009)			(3) Post-GFC (After 2009)		
NEqual_ABT	0.019			0.010			0.023**		
	(1.37)			(0.55)			(2.07)		
NEquant_ABT		-0.013			0.009			-0.008	
		(-0.49)			(0.31)			(-0.47)	
NE_ABT			0.018			0.008			0.019*
			(1.33)			(0.47)			(1.78)
Constant	0.703***	0.703***	0.703***	0.532***	0.531***	0.532***	0.595***	0.594***	0.595***
	(8.44)	(8.44)	(8.44)	(4.65)	(4.65)	(4.65)	(8.14)	(8.14)	(8.15)
Observations	6,205	6,205	6,205	4,474	4,474	4,474	10,807	10,807	10,807
Adjusted R-squared	0.193	0.193	0.193	0.185	0.185	0.185	0.172	0.171	0.172
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

This table displays the results of the relation between abnormal tone in nonearnings-related qualitative FLSs and overinvestments influenced by GFC. We follow prior literature to define pre-GFC as the year before 2007 (Column 1), during-GFC as 2007-2009 (Column 2), and post-GFC as the year after 2009 (Column 3). The key independent variable is the abnormal tone in the nonearnings-related quantitative forward-looking statements (FLS) (*NEqual_ABT*). The dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 8. The publication of the LM sentiment dictionary

Dep var: $Overinvest_{(t+1)}$	(1) Pre-LM_Publication			(2) Post-LM_Publication		
NEqual_ABT	0.014			0.025**		
	(1.36)			(2.01)		
NEquant_ABT		0.001			-0.015	
		(0.07)			(-0.78)	
NE_ABT			0.013			0.021*
			(1.31)			(1.66)
Constant	0.605***	0.605***	0.605***	0.623***	0.623***	0.624***
	(9.75)	(9.74)	(9.75)	(6.97)	(6.97)	(6.98)
Observations	11,913	11,913	11,913	8,150	8,150	8,150
Adjusted R-squared	0.184	0.184	0.184	0.179	0.178	0.179
Controls	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

This table displays the results of the relation between abnormal tone in nonearnings-related qualitative FLSs and overinvestments influenced by the publication of the LM dictionary in 2011. Column 1 shows the results before the LM dictionary publication. Column 2 shows the results after the LM dictionary publication. The key independent variable is the abnormal tone in the nonearnings-related quantitative forward-looking statements (FLS) (*NEqual_ABT*). The dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 9. Firm-fixed effect

VARIABLES	(1) Overinvest$_{(t+1)}$	(2) Overinvest$_{(t+1)}$	(3) Overinvest$_{(t+1)}$
NEqual_ABT	0.019**		
	(2.35)		
NEquant_ABT		-0.002	
		(-0.15)	
NE_ABT			0.016*
			(1.94)
Size	-0.076***	-0.076***	-0.076***
	(-8.82)	(-8.77)	(-8.82)
Earn	-0.070	-0.069	-0.070
	(-1.62)	(-1.60)	(-1.61)
BTM	-0.462***	-0.462***	-0.462***
	(-19.06)	(-19.05)	(-19.06)
LOSS	-0.057***	-0.057***	-0.057***
	(-5.49)	(-5.48)	(-5.47)
Zscore	0.008	0.007	0.008
	(1.09)	(1.06)	(1.08)
Tangibility	0.383***	0.383***	0.383***
	(5.98)	(5.99)	(5.97)
lnAge	0.037	0.037	0.037
	(1.01)	(1.01)	(1.00)
Cash	0.409***	0.408***	0.409***
	(10.34)	(10.31)	(10.34)
CFOvol	0.099	0.098	0.098
	(0.96)	(0.96)	(0.96)
salesvol	0.006	0.006	0.006
	(0.20)	(0.21)	(0.20)
investvol	-0.001*	-0.001*	-0.001*
	(-1.81)	(-1.82)	(-1.81)
AQ	0.148	0.147	0.147
	(0.89)	(0.89)	(0.89)
Earn_ABT	0.001	0.002	0.001
	(0.13)	(0.24)	(0.13)
Past_investment	-0.023***	-0.023***	-0.023***
	(-2.68)	(-2.66)	(-2.68)
lnAnalyst	-0.003	-0.004	-0.003
	(-0.30)	(-0.33)	(-0.31)
boardsize	-0.001	-0.001	-0.001
	(-0.32)	(-0.31)	(-0.31)
leadInd	-0.015	-0.015	-0.015
	(-1.59)	(-1.61)	(-1.60)

BoardDiv	0.036	0.036	0.036
	(0.63)	(0.63)	(0.64)
BoardInd	0.055	0.054	0.055
	(1.14)	(1.12)	(1.15)
Competition	0.251	0.249	0.248
	(1.63)	(1.61)	(1.61)
Stock_Ret	0.004	0.003	0.003
	(0.47)	(0.44)	(0.46)
Constant	0.911***	0.910***	0.912***
	(6.55)	(6.54)	(6.56)
Observations	21,149	21,149	21,149
Adjusted R-squared	0.355	0.355	0.355
Firm FE	YES	YES	YES
Year FE	YES	YES	YES

This table reports results for relations between over-investment (*Over_invest*), and abnormal tone in the nonearnings-related qualitative forward-looking statements (FLS) (*NEqual_ABT*) in Column (1), abnormal tone in the nonearnings-related quantitative FLS (*NEquant_ABT*) in Column (2), and abnormal tone in the overall nonearnings-related FLS (*NE_ABT*) in Column (3). The dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. Firm fixed effect is included to control omitted firm-level variables for mitigating endogeneity problems. All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 10. Two-stage least-squares (2SLS)

VARIABLES	(1) First-stage NEqual_ABT	(2) Second-stage Over_invest$_{(t+1)}$	(3) First-stage NEqual_ABT	(4) Second-stage Over_invest$_{(t+1)}$
Ind_AbTone	0.943***			
	(23.78)			
	F-statistic = 13.26			
Geo_AbTone			1.004***	
			(18.49)	
			F-statistic = 10.92	
NEqual_ABT_expected		0.313***		0.700***
		(5.85)		(7.68)
Size	0.000	-0.025***	0.001	-0.027***
	(0.00)	(-6.08)	(0.22)	(-6.11)
Earn	0.036	-0.164***	0.034	-0.174***
	(1.22)	(-4.82)	(1.14)	(-4.54)
BTM	0.009	-0.352***	0.008	-0.354***
	(0.64)	(-21.90)	(0.58)	(-20.70)
LOSS	0.024***	-0.054***	0.023***	-0.064***
	(2.74)	(-5.29)	(2.61)	(-5.58)
Zscore	-0.009**	-0.016***	-0.009**	-0.013**
	(-2.49)	(-3.58)	(-2.30)	(-2.56)
Tangibility	-0.038*	0.357***	-0.044**	0.372***
	(-1.76)	(13.36)	(-2.00)	(13.78)
lnAge	0.001	-0.015**	-0.000	-0.016**
	(0.12)	(-2.09)	(-0.01)	(-2.10)
Cash	-0.072***	0.289***	-0.070***	0.316***
	(-3.43)	(11.81)	(-3.32)	(11.97)
CFOvol	0.073	0.070	0.062	0.065
	(1.05)	(0.86)	(0.89)	(0.74)
salesvol	0.048**	0.020	0.043**	-0.004
	(2.57)	(0.92)	(2.32)	(-0.18)
investvol	-0.000	0.001***	-0.000	0.001***
	(-0.71)	(3.17)	(-0.64)	(3.18)
AQ	-0.089	-0.161	-0.136	-0.105
	(-0.77)	(-1.21)	(-1.17)	(-0.72)
Earn_ABT	0.090***	-0.047***	0.093***	-0.085***
	(10.05)	(-4.13)	(10.34)	(-5.95)
Past_investment	0.008	0.167***	0.008	0.164***
	(1.27)	(21.17)	(1.34)	(19.70)

lnAnalyst	0.023***	0.018**	0.021***	0.012
	(3.38)	(2.29)	(3.14)	(1.45)
boardsize	-0.001	-0.002	-0.001	-0.001
	(-0.43)	(-0.94)	(-0.51)	(-0.76)
leadInd	-0.000	-0.022***	-0.002	-0.022***
	(-0.05)	(-3.00)	(-0.28)	(-2.85)
BoardDiv	0.011	0.021	0.001	0.019
	(0.33)	(0.54)	(0.04)	(0.48)
BoardInd	-0.031	0.011	-0.030	0.022
	(-1.07)	(0.32)	(-1.03)	(0.62)
Competition	0.004	0.257	-0.109	0.303*
	(0.03)	(1.58)	(-0.79)	(1.80)
Stock_Ret	-0.011*	0.030***	-0.012*	0.035***
	(-1.72)	(3.95)	(-1.91)	(4.04)
Constant	-0.016	0.725***	-0.003	0.709***
	(-0.38)	(7.48)	(-0.08)	(6.95)
Observations	22,112	21,487	22,112	21,487
Adjusted R-squared	0.037		0.027	
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

This table reports the 2SLS results. We apply an instrumental approach to address potential endogeneity arising from omitted variables. We use a two-stage least square (2SLS) regression estimation approach. We consider the average nonearnings-related qualitative FLSs of industry peers (*Ind_AbTone*) and geographic peers (*Geo_AbTone*) as the instrumental variables (IVs). In the first stage, we regress those IVs and all control variables against abnormal tone in nonearnings-related qualitative FLSs, the results are shown in columns (1) and (3). Using the expected value (*NEqual_ABT_expected*), the second-stage regressions are conducted, and the results are presented in columns (2) and (4). All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 11. Heckman selection model

VARIABLES	(1) First-stage	(2) Second-stage	(3) Second-stage	(4) Second-stage
LOSS	-0.333***			
	(-11.15)			
Operatingcycle	-0.023			
	(-1.37)			
CEO_Age	-0.005***			
	(-2.77)			
CEO_Gender	0.313***			
	(5.00)			
CEO_Tenure	-0.004			
	(-1.26)			
CEO_cashcom	0.225***			
	(4.45)			
NEqual_ABT		0.016*		
		(1.67)		
NEquant_ABT			0.006	
			(0.40)	
NE_ABT				0.017*
				(1.82)
IMR		-0.288***	-0.286***	-0.288***
		(-3.22)	(-3.20)	(-3.22)
Constant	1.219***	1.219***	0.547***	0.549***
	(8.86)	(8.86)	(8.27)	(8.29)
Observations	16,441	16,441	16,441	16,441
Controls	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

This table displays the results of the Heckman Selection Model to ensure firms' overinvestment is driven by managerial self-serving behaviour. In the first stage, we employ *LOSS, Operatingcycle, CEO_Age, CEO_Gender, CEO_Tenure,* and *CEO_Cashcom* to perform a Probit model to predict the probability of firms' overinvestment and generate *Inverse Mills Ratio (IMR)*. Then, in the second stage, we add the *IMR* as an additional control variable. The key independent variable is the abnormal tone in the nonearnings-related qualitative forward-looking statements (FLS) (*NEqual_ABT*). The dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 12. Regression of using alternative measure of investment efficiency

VARIABLES	(1) Overinvest$_{(t+1)}$ --- Tobin's Q	(2) Overinvest$_{(t+1)}$ --- Tobin's Q	(3) Overinvest$_{(t+1)}$ --- Tobin's Q	(4) Overinvest$_{(t+1)}$ --- SG	(5) Overinvest$_{(t+1)}$ --- SG	(6) Overinvest$_{(t+1)}$ --- SG
NEqual_ABT	0.022***			0.014*		
	(2.89)			(1.85)		
NEquant_ABT		0.017			-0.001	
		(1.32)			(-0.11)	
NE_ABT			0.025***			0.013*
			(3.26)			(1.75)
Constant	0.444***	0.443***	0.444***	0.609***	0.608***	0.609***
	(9.84)	(9.83)	(9.84)	(12.88)	(12.87)	(12.89)
Observations	21,487	21,487	21,487	21,487	21,487	21,487
Adjusted R-squared	0.071	0.070	0.071	0.194	0.194	0.194
Controls	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

This table reports results using an alternative measure of investment efficiency for relations between over-investment (*Over_invest*) and abnormal tone in the nonearnings-related qualitative forward-looking statements (FLS) (*NEqual_ABT*), abnormal tone in the nonearnings-related quantitative FLS (*NEquant_ABT*), and abnormal tone in the overall nonearnings-related FLS (*NE_ABT*). In Columns (1)-(3), the Dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency measured by Tobin's Q is greater than 0, and 0 otherwise. In Columns (4)-(6), the Dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency is measured by sales growth greater than 0, and 0 otherwise. All independent variables are lagged by one year. Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 13. A battery of robustness tests

VARIABLES	(1) Overinvest$_{(t+1)}$	(2) Overinvest$_{(t+1)}$	(3) Overinvest$_{(t+1)}$	(4) Over_invest$_{(t+2)}$	(5) Over_invest$_{(t+2)}$	(6) Over_invest$_{(t+2)}$	(7) Overinvest$_{(t+1)}$	(8) Overinvest$_{(t+1)}$
NEqual_ABT	0.020***			0.014*				
	(2.60)			(1.72)				
NEquant_ABT		-0.008			0.003			
		(-0.60)			(0.20)			
NE_ABT			0.017**			0.015*		
			(2.26)			(1.82)		
Pos_AbTone							0.014**	
							(2.23)	
Q_AbTone								0.007***
								(2.62)
Unreadability	0.004**	0.004**	0.004**					
	(2.31)	(2.32)	(2.31)					
Constant	0.543***	0.542***	0.543***	0.604***	0.604***	0.604***	0.603***	0.592***
	(9.65)	(9.64)	(9.65)	(12.19)	(12.18)	(12.19)	(12.60)	(12.26)
Observations	21,478	21,478	21,478	20,016	20,016	20,016	21,487	21,487
Adjusted R-squared	0.174	0.174	0.174	0.164	0.164	0.164	0.174	0.174
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

This table displays the results of a battery of robustness checks. Columns (1)-(3) report the results for adding additional control variables to Eq. (3). We additionally control the unreadability of earnings press releases (*Unreadability*) to avoid the baseline results being driven by narrative financial reporting transparency. Furthermore, Columns (4)-(6) report results when we use two-year lagged independent variables to check the persistent influence of the disclosure and firm characteristics. Columns (7)-(8) report results using transformed abnormal tone in the nonearnings-related qualitative forward-looking statements (FLS) to examine the relation to overinvestments to avoid the baseline results being sensitive to outliers (Muslu et al., 2015). In Column (7), the abnormal tone in the nonearnings-related quantitative FLS is a dummy variable that equals 1 if

this abnormal tone is positive and 0 otherwise (*Pos_AbTone*). In Column (8), the abnormal tone in the overall nonearnings-related FLS is 4 quartiles ranked (*Q_AbTone*). The Dependent variable *Over_invest* is an indicator variable that equals 1 if the residual of investment efficiency Eq. (1) is greater than 0, and 0 otherwise. All independent variables are lagged by one year except in columns (4)-(6). Detailed variable descriptions can be found in Appendix A. Standard errors are two-way clustered by firm and year. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.