Do Actions Speak Louder Than Words? Optimistic Disclosure Tone, Insider Trading and Capital Structure

by

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Abstract

This paper examines the impact of managerial belief on capital structure. Computational tone analysis of Chairman's Statement is used to gauge time-varying managerial overconfidence. We find that optimistic tone is negatively related to leverage. This finding provides initial empirical evidence consistent with Malmendier, Tate and Yan's (2011) proposition that managerial overconfidence may lead to debt conservatism. The negative tone-leverage relationship is similar across firms with different degree of information asymmetry and information environment, ruling out two alternative explanations of tone (i.e. information asymmetry and impression management). We further investigate the joint effects of insider trading, as another window into managerial belief, and tone on leverage. As expected, high insider purchase (selling) confirms (contradicts) optimistic tone, which in turn enhances (weakens) the negative tone-leverage relationship. Overall, this study establishes a link between managerial optimistic words and conservative debt policy.

I. INTRODUCTION

A growing literature demonstrates the importance of the effect of managers on corporate policies (e.g., Bertrand and Schoar, 2003; Cadenillas *et al*., 2004). In particular Frank and Goyal (2007) document a first order effect that the differences among CEOs and especially CFOs matters for firm's capital structure. More specifically, recent theoretical (Heaton, 2002; Hackbarth, 2008; Malmendier *et al*., 2011) and empirical studies (Graham *et al*., 2013; Ben-David *et al*., 2012; Malmendier *et al*., 2011; Malmendier and Zheng, 2012) examine a particular trait of managers (i.e. managerial overconfidence) on financing decisions. One limitation of the above empirical tests of the role of managerial overconfidence is that their empirical measures of overconfidence are time-invariant. The reason why overconfidence can be time-varying is that people are subject to self-attribution bias, [1] described as "endogenous overconfidence" (Hillary and Hsu, 2011), and therefore will learn to be overconfident (Hirshleifer, 2001). With this in mind, this study examines the impact of time-varying managerial overconfidence as a determinant of leverage whereas related prior literature examines static measures of overconfidence.

A unique feature of this study is that we use both words and actions of managers to gauge their time-varying overconfident beliefs. The words-based measure of overconfidence is constructed using computational content analysis of the tone of UK Chairman's Statement. To ensure the validity of our tone measures, we construct composite tone index using principal component analysis, which consists of six individual measures of optimistic tone. [2] The action-based measure is related to how firm managers trade their own firm's shares. The idea is that overconfident managers are more likely to buy and less likely to sell. Interestingly,

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1 Self-attribution bias can be defined as a tendency to attribute good (bad) outcomes to own abilities (external factors) (Miller and Ross, 1975).

2 These six tone measures are calculated using (1) the wordlists developed by finance and accounting researchers (Henry, 2008; Loughran and McDonald, 2011) for the analysis of financial narratives and (2) relevant dictionaries (i.e. wordlists used to define various dimensions of language) in two linguistic analysis software (Diction and LIWC) (e.g. optimism and certainty). More explanations on the tone measures are available in the methodology section.

we can explore potential contradictions between managerial words and actions[3]. Recent work (Brockman, Li and Price, 2012) reports a reverse tone-insider trading pattern (i.e. positive (negative) conference call tone predicts net insider selling (purchase)). A key contribution of this paper is to empirically examine the implications of this type of contradiction for leverage.

The theoretical relationship between managerial overconfidence and leverage can be either positive or negative (Malmendier *et al*., 2011). Heaton's (2002) model suggests that overconfident managers believe that equity is undervalued by outside investors and are therefore reluctant to use equity financing. In other words, managerial overconfidence is associated with higher information cost, which in turn leads to higher leverage. Hackbarth (2008) incorporates managerial overconfidence in a trade-off framework and also predict that managerial overconfidence is positively related to leverage. This is because overconfident managers underestimate bankruptcy cost of debt and consequently use more debt to take tax benefits. However, Malmendier *et al*. (2011) show that managerial overconfidence may lead to either a preference for debt over equity financing, as predicted by Heaton's (2002) model, or debt conservatism. They argue that the net effect of managerial overconfidence on leverage depends on manager's perceived financing costs and investment returns as well as the availability of internal financing (more discussions on this model will be presented in Section II). The main purpose of this study is to empirically test the impacts of managerial overconfidence on leverage.

This study has two major findings. First, optimistic tone is negatively related to leverage. This finding is consistent with the proposition that managerial overconfidence may lead to conservative debt policy, especially when firms have sufficient retained earnings or perceived financing costs are higher than corresponding investment returns. Our subsample analysis

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[3] For example, insider selling may contradict optimistic tone, suggesting the possibility that managers attempts to intentionally disinform investors. More discussions on the combined effects of tone and insider trading will be provided later.

further confirms that the negative tone-leverage relationship is not driven by either information asymmetry or impression management.

Second, we find interesting joint effect of optimistic tone and insider trading. The coefficient on the interaction between tone and insider selling is negative, suggesting that high insider (especially CEOs) sales weaken the negative tone-leverage relationship. This observation can be attributed to the fact that insider selling contradicts optimistic tone which indicates that managers are not as confident as their words suggest. In contrast, insider purchase, which confirms that optimistic tone is a strong proxy for managerial overconfidence, enhances the negative tone-leverage relationship. Thus, we may conclude that "actions" of managers speak louder than "words".

The contribution of this study is threefold. First, we develop a time-varying measure of managerial overconfidence using computational tone analysis and we are one of the first studies that examine the effects of optimistic tone in corporate finance context. Second, to the best of our knowledge, we provide new evidence that managerial overconfidence may lead to lower leverage. This important evidence supports Malmendier *et al.*'s (2011) proposition that debt conservatism may be caused by managerial overconfidence. Third, we explore the empirical implications of the inconsistency between managerial words and actions, both of which provide useful windows into managerial beliefs.

We proceed as follows. Section II first reviews alternative explanations of optimistic tone and then develops hypotheses regarding the effects of managerial overconfidence on leverage. Section III describes our two measures of managerial overconfidence, namely tone of Chairman's Statement and insider trading of CEO and CFO, and our sample. Section IV discusses main findings and alternative interpretations of our results and conducts robustness checks. Section V concludes.

II. HYPOTHESIS DEVELOPMENT

This section first discusses various alternative interpretations of corporate disclosure tone and then develops the link between tone and leverage. Finally, we show the joint effects of tone and insider trading on leverage.

A. Corporate disclosure tone - an overview

A growing body of accounting literature examines the tone (i.e. the use of optimistic/pessimistic or positive/negative language) of various corporate disclosures including Managerial Discussion and Analysis (MD&A) (Davies and Tama-Sweet, 2012), earnings press releases (Davis, Piger and Sedor, 2012; Demers and Vega, 2011) and conference calls (Price *et al*., 2012). However, the effects of disclosure tone on corporate financial decisions remain a neglected area of research. Interestingly, previous studies suggest that disclosure tone has multiple interpretations, namely "inform", "intentionally disinform" and "unintentionally disinform" investors. In particular, disclosure tone is subject to three major alternative interpretations from information asymmetry, impression management and overconfidence (hubris) perspectives respectively. [4]

A.1. Information asymmetry perspective: "inform investors"

First, positive disclosure tone can be interpreted as "incremental information" (Merkl-Davies and Brennan, 2011), which "inform" investors and therefore reduces information asymmetry between managers and investors. This information asymmetry interpretation of tone is based on the assumption that investors are rational and are able to undo reporting bias. Considering that reporting bias will reduce stock price performance and managerial reputation (Baginski *et al*., 2000), managers therefore have no incentive to engage in biased reporting. Lang and

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[4] See Merkl-Davies and Brennan (2011) for a comprehensive review on various explanations of narrative disclosures and a conceptual framework of impression management. They provide four explanations for corporate disclosure, namely incremental information, impression management, hubris and retrospective sense-making.

Lundholm (2000) investigate voluntary disclosure activities around equity offerings and their impacts on stock prices. They find that firms with a consistent level of disclosure experience relatively smaller price declines at the announcement date. This is because disclosure reduces information cost associated with equity offering. Furthermore, Kothari, Li and Short (2009) find that positive management disclosure is negatively related to equity cost of capital and return volatility, which supports the view that disclosures can mitigate information asymmetry[5] (see e.g., Diamond and Verrecchia, 1991; Easley and O'Hara, 2004).

A.2. Impression management perspective: "intentionally disinform investors"

Second, disclosure tone can be regarded as a way of impression management. In other words, managers attempt to "intentionally disinform" investors or manipulate investors' perception of firm performance. More specifically, impression management can be caused by agency problems between managers and investors where biased reporting is a strategic choice of self-interested managers to maximize their personal wealth (e.g., Adelberg, 1979; Merkl-Davies and Brennan, 2007). Moreover, impression management may be used as another mechanism (in addition to "reducing information asymmetry") to reduce cost of equity, namely "hyping" (Lang and Lundhold, 2000). Empirically, Lang and Lundhold (2000) document that firms with a considerable increase of disclosure in the six months before the offering experience price increase prior to the equity offering. However, those firms have much larger negative returns at and subsequent to the announcement. This observation is consistent with the proposition that disclosure is used to "hype the stock".

A.3. Managerial overconfidence perspective: "unintentionally disinform investors"

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[5] In particular, positive/favourable disclosures are associated with market makers' favourable evaluation of firm future value and risk, which in turn reduce the transaction cost of equity (i.e. adverse-selection component of the bid-ask spread).

Third, from behavioural/psychological perspective, optimistic disclosure tone can be a product of managerial overconfidence/hubris (Merkl-Davies and Brennan, 2011). In this case, irrational managers "unintentionally disinform" investors. However, this behavioural interpretation of tone is largely neglected by existing literature of corporate disclosure (Brennan and Conroy, 2013). Amernic and Craig (2007) emphasize the importance of monitoring excessive narcissist-like language used by narcissist CEOs, who are prone to be overconfident, in their letters to shareholders. Recent studies report evidences of cognitive bias (e.g. overconfidence) detected using manual and computational linguistic analysis of corporate disclosures. For example, Craig and Amernic (2011) detect destructive narcissism of CEOs of Enron, Starbucks and General Motors based on CEO's letter to shareholders. In a similar vein, Brennan and Conroy (2013) also conduct manual content analysis of narratives in bank CEO letters to shareholders to reveal CEO personality traits (e.g. narcissism, hubris, overconfidence and CEO-attribution). Furthermore, computational content analysis of managerial statements are employed to measure overconfidence of CEO and fund managers (e.g., Liu, Taffler and John, 2009; Eshraghi and Taffler, 2012). Davis, Matsumoto and Zhang (2012) examine the effect of managerial style on the tone of earnings conference calls. Their empirical evidences support the notion that "tone used in corporate disclosures is potentially influenced by unintentional, manager-specific tendencies [6] to be overly optimistic or pessimistic". From this perspective, optimistic tone can be regarded as a proxy for managerial overconfidence. This study makes important contribution to this under-researched behavioural perspective of disclosure tone and tests the relationship between optimistic tone and leverage.

B. Testable hypotheses

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[6] It is considered as managerial bias that is closely related to their personalities, experience and values (Davis, Matsumoto and Zhang, 2012).

This section first develops the link between "contemporaneous" optimistic tone, as a proxy for managerial overconfidence, and firm's leverage and then shows the combined effects of insider trading patterns and tone on leverage.

B.1. Optimistic tone and leverage

Before developing our hypotheses on the tone-leverage relationship, it is important to draw a difference between contemporaneous tone and lagged tone. In particular, given that Chairman's Statement is only available for investors to read (several weeks) after fiscal year end, the only channel through which contemporaneous tone influences leverage is managerial overconfidence. In other words, the contemporaneous tone can be considered as an ex-post measure of managers' overconfident beliefs. Empirically, to directly examine the roles of the other two alternative channels, namely "reducing information asymmetry" and "hyping the stock", we have to use lagged tone measures. [7] In this case, the market reacts to lagged tone of Chairman's Statement, which in turn influences firms' leverage. However, the problem is that the lagged tone can also be considered as a proxy for previous year's managerial overconfidence. Therefore, because of the difficulties in disentangling lagged tone, our empirical tests focus on the behavioural perspective of disclosure tone, where we use contemporaneous tone to measure managerial overconfidence.

Next, we discuss the effects of managerial overconfidence on leverage. Based on a recent model by Malmendier *et al*. (2011), the theoretical relationship between managerial overconfidence and firm leverage depends on the relation between "overestimated investment returns, cash holdings and perceived financing costs".

In particular, managerial overconfidence may lead to lower level of debt (i.e. debt conservatism) if the firm has sufficient internal finance (i.e. retained earnings), which is

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[7] In an "inform" or "intentionally disinform" context, contemporaneous tone is *not* expected to influence firms' contemporaneous leverage.

particularly true because overconfident managers may retain cash for future investment. [8] In brief, managerial overconfidence could make the firm forgo tax benefits and therefore be underleveraged relative to the optimal target debt ratio. To empirically examine Malmendier *et al*.'s (2011) proposition that managerial overconfidence may lead to conservative debt policy, we test the following hypothesis:

> ***Hypothesis 1a (H1a):*** contemporaneous tone, as a measure of *managerial overconfidence*, is *negatively* related to leverage, if managerial overconfidence is associated with *debt conservatism*.

On the other hand, however, as pointed out by Malmendier *et al*. (2011), debt conservatism caused by overconfidence "can, but need not" lead to low leverage. This is because managerial overconfidence may enhance the preference for debt over equity financing. Put differently, overconfident managers tend to issue equity more conservatively than debt. Similarly, an earlier model by Heaton (2002) also suggests that optimistic managers believe that equity is undervalued by outside investors and therefore prefer debt to equity. Using Shyam-Sunder and Myers's (1999) financing deficit framework, Malmendier *et al*. (2011) and Malmendier and Zheng (2012) find supporting evidences that overconfident managers are more willing to use debt to meet external financing needs. Furthermore, from trade-off perspective, Hackbarth's (2008) model predicts that overconfident managers will underestimate financial distress costs associated with debt and hence tend to use more debt than their rational counterparts. Taken together, managerial overconfidence is also likely to be positively related to leverage.

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[8] Another explanation for the negative overconfidence-leverage relationship is related to "perceived financing costs". More specifically, overconfident managers tend to overestimate the information costs associated with external financing including both debt and equity. In this case, it is possible that overconfident manager's perceived financing costs outweigh investment returns (Malmendier *et al*., 2011). Consequently, if internal financing is not sufficient, overconfident managers are likely to forgo investment opportunities. In brief, managerial overconfidence may lead to underinvestment and lower financing needs.

Hypothesis 1b (H1b): contemporaneous tone, as a measure of *managerial overconfidence*, is *positively* related to leverage, if managerial overconfidence is associated with *enhanced preference for debt over equity*.

B.2. Joint effect of tone and insider trading on leverage

One may argue that "contemporaneous tone" may also indirectly influence leverage through the other two channels considering the possibility that managers maintain similar level of optimistic tone throughout the fiscal year. For example, firm managers may have already delivered similar financial narratives to investors via other ways of business communication especially the mandatory quarterly reporting[9] (including interim management statements and quarterly results announcements). More specifically, the tone of Chairman's Statement might be similar to that of other narratives published earlier in the same fiscal year.

One way to empirically distinguish alternative effects of tone is to compare managers' personal beliefs about firms' prospects gauged from their action and words. More specifically, we double check managers' overconfidence beliefs as indicated by their optimistic tone using their insider trading patterns which serves as another window into their beliefs. The idea is that insider selling may indicate that optimistic tone is used to "hyping the stock", while insider purchase may indicate that optimistic tone is driven by managerial overconfidence.

In particular, to further distinguish between "intentionally disinform" and "unintentionally disinform", we investigate the interaction between insider trading and tone. In the context of shareholder litigation, Rogers *et al*. (2011) find that litigation risk is greater when managers use optimistic language and engage in insider selling. This is because insider

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[9] UK government strongly supports European Commission's recent proposal that the requirement to publish quarterly financial reports under the EU Transparency Directive should become voluntary. The purpose is to reduce excessive focus on short-term earnings and encourage long-term decision-making, as a response to John Kay's Review of UK Equity Markets published in July, 2012.

selling signals managers' intent to mislead investors using optimistic language. Following the same logic, we expect that insider selling and purchase may indicate "intentionally disinform" and "unintentionally disinform" respectively. Therefore, we expect the following combined effects of insider trading and tone on tone-leverage relationship.

Hypothesis 2 (H2): the interaction between tone and insider selling will *weaken* the tone-leverage relationship, when insider selling *contradicts* optimistic tone and indicates that optimistic tone is used to "intentionally disinform" investors.

Hypothesis 3 (H3): the interaction between tone and insider purchase will *enhance* the tone-leverage relationship, when insider purchase *confirms* optimistic tone and indicates that optimistic tone is used to "unintentionally disinform" investors.

III. METHODOLOGY AND DATA

This section first introduces our two measures of managerial overconfidence and then describes our sampling procedures and presents summary statistics and correlation analysis. We postpone the description of various empirical model specifications until the next section.

A. Measurement of managerial overconfidence

We use both words-based and action-based measures of managerial overconfidence. Different from the static measures of overconfidence commonly employed in the literature, our overconfidence measures are time-varying. [10]

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[10] Existing behavioural finance studies (e.g., Malmendier and Tate, 2005; Malmendier, Tate and Yan, 2011) tend to model managerial overconfidence as a habitual behaviour which is static. This static approach can be problematic because other behavioural biases, especially self-attribution bias, may affect the confidence level. In other words, although the level of overconfidence can be quite persistent over time, we should not examine overconfidence in isolation.

A.1. Words-based measure of overconfidence: optimistic tone

We construct two composite tone indices. One is based on the raw tone measures. The other is orthogonalized so that each component is not correlated with certain firm-specific variables (especially standard capital structure determinants).

Raw Tone Index

Our first measure of managerial overconfidence is based on tone analysis[11] of Chairman's Statement. We construct optimistic tone measures by counting both optimism-increasing and optimism-decreasing words. We use six individual wordlists. Our first three wordlists are the same as those in Rogers, Buskirk and Zechman (2011) and Davis, Ge, Matsumoto and Zhang (2012), namely *TONE_OPTIMISM*, *TONE_H* and *TONE_LM*. *TONE_OPTIMISM* is a measure of net optimism[12] counted using a dictionary in Diction 6. [13] Liu, Taffler and John (2009) conduct content analysis of CEO speech in the context of merger and acquisitions and also use the optimism variable in Diction as a proxy for CEO overconfidence. More recently, Eshraghi and Taffler (2012) use TONE_OPTIMISM as a measure of fund manager overconfidence. *TONE_H* and *TONE_LM* are two wordlists developed by Henry (2008) and Loughran and McDonald (2011) respectively to measure positive and negative words especially in a financial context. In particular, *TONE_H* and *TONE_LM* are calculated as the ratio of the difference between positive and negative words to the sum of positive and negative words[14] (i.e. $\frac{Positive_{it} - Negative_{it}}{Positive_{it} + Negative_{it}}$).

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[11] Tone analysis (and more generally textual analysis) is becoming increasingly popular in recent accounting and finance studies. For example, Rogers, Buskirk and Zechman (2011) examine the relation between disclosure tone and shareholder litigation. For a review on studies of corporate disclosures, please see Li (2010a).

[12] In Diction, optimism is defined as "language endorsing some person, group, concept or event, or highlighting their positive entailments".

[13] As a unique feature of Diction software, there is standardization procedure when calculating a particular item. In particular, we compare our collected Chairman's Statements to three alternative norms in Diction including (1) all cases, (2) corporate financial reports and (3) corporate public relations. Our empirical results are qualitatively similar using alternative norms.

[14] The terms "positive/negative" and "optimistic/pessimistic" are often used interchangeably in the literature (e.g., Davis, Piger and Sedor, 2012). Li (2010b) standardize the terms to "positive/negative" instead of "optimistic/pessimistic".

Besides, we also use another three tone measures, all of which are positively related to optimism, including *TONE_CERTAIN1*, *TONE_CERTAIN2* and *TONE_EMOTION*. *TONE_CERTAIN1* and *TONE_EMOTION*[15] are measured using dictionaries in Linguistic Inquiry and Word Count (LIWC) 2007. *TONE_CERTAIN2* is another measure of certainty[16] based on a dictionary in Diction 6. *TONE_CERTAIN2* has also been used to measure overconfidence of fund managers (Eshraghi and Taffler, 2012). Similarly, Li (2010b) includes "uncertain tone", which is highly associated with negative tone, in his tone measure.

To address potential endogeneity issues associated with the above six individual tone measures, we form a composite tone index using principal component analysis (PCA). In particular, we define $Tone\ Index_{it}$ as the first principal components of the correlation matrix of six raw tone measures. The first component, with an eigenvalue of 2.609, [17] explains 43.5 percent of our sample variance.

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\begin{aligned}
Tone\ Index_{it} &= \sum_{j=1}^{6} Loading_{ij} * Tone\_X_{ijt} \\
&= 0.496 Emotion_{it} + 0.192 Certain1_{it} + 0.446 Optimism_{it} \\
&\quad + 0.027 Certain2_{it} + 0.480 Tone\_H_{it} + 0.536 Tone\_LM_{it} \quad (1)
\end{aligned}
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where, $Tone\_X_{ijt}$ represent individual tone measure *j* of firm *i* in fiscal year *t*. $Loading_{ij}$ is the loading for individual tone measure *j* of firm *i*. The loading for *Certain1* and *Certain2* is much lower compared with other tone measures. However, our empirical results are qualitatively similar when we exclude those two measures of certainty tone.

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[15] An earlier version of LIWC has a category named "optimism", however in the 2007 version words are classified more broadly into "positive emotion" and "negative emotion".

[16] In Diction, certainty is defined as "language indicating resoluteness, inflexibility, and completeness and a tendency to speak ex cathedra".

[17] The eigenvalue of second component is close to one (i.e. 1.135).

Orthogonalized Tone Index

To address the concern that the raw tone might be contaminated by firm-specific variables[18], a composite index of the orthogonalized tone measures is constructed as follows. First, we regress each individual tone measure on standard determinants of capital structure as follows:

$$Tone\_X_{ijt} = \alpha + \beta_1 Profit_{it} + \beta_2 MB_{it} + \beta_3 Size_{it} + \beta_4 Tangibility_{it} + \varepsilon_{ijt} \qquad (2)$$

where, $Tone\_X_{ijt}$ represents six individual tone measures. ε_{ijt} is the corresponding orthogonalized individual tone measures.

Next, a composite index ($Tone\ Index_{it}^{\perp}$) is formed based on the first principal component of six residuals (i.e. $Tone\_X_{ijt}^{\perp} = \varepsilon_{ijt}$) from the above regressions. The first component explains 41.8 percent of the sample variance[19].

$$Tone\ Index_{it}^{\perp} = \sum_{j=1}^{6} Loading_{ij} * Tone_{X_{ijt}}^{\perp} = \sum_{j=1}^{6} Loading_{ij} * \varepsilon_{ijt}$$

$$= 0.495 Emotion_{it}^{\perp} + 0.154 Certain1_{it}^{\perp} + 0.440 Optimism_{it}^{\perp}$$

$$+ 0.036 Certain2_{it}^{\perp} + 0.490 Tone\_H_{it}^{\perp} + 0.545 Tone\_LM_{it}^{\perp} \qquad (3)$$

The use of orthogonalized tone is also inspired by a paper on tone management by Huang, Teoh and Zhang (2011). They argue that disclosure tone can be used to either "inform" or "disinform" investors. On the one hand, positive tone may reflect firm's fundamental and thus can "inform". For example, more profitable firms may use more positive tone. On the

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[18] In terms of the determinants of tone (e.g., current performance, growth opportunities, operating risks and complexity), Huang, Teoh and Zhang (2011) find that tone, as measured using Loughran and McDonald (2011) wordlist, is positively related to market-to-book and volatility of stock returns and negatively related to firm size, age and number of business segments. Our first orthogonalized tone measure (*TONE_RES1*) controls for four standard determinants of capital structure (i.e. market-to-book, size, tangibility and profitability). Our second orthogonalized tone measure (*TONE_RES2*) further controls for stock price performance and firm age.

[19] The eigenvalues of first and second components are 2.509 and 1.139 respectively.

other hand, tone can be regarded as a form of impression management or strategic choice (i.e. "abnormal tone"[20]) to manipulate investors' perception of firm performance and thus can "disinform". Such impression management can be complementary to earnings management.

Suitability of Chairman's Statement for tone analysis

We use Chairman's Statement in the UK annual report as the source of narrative for tone analysis for several reasons. First, Chairman's Statement is widely read by investors and analysts (Bartlett and Chandler, 1997). According to Clatworthy and Jones (2003), Chairman's Statement is "the most read of the UK's accounting narratives" and "the longest established". [21] Second, Chairman's Statement is largely unaudited and not heavily regulated. The language used in Chairman's Statement is much less standard than Directors' Report which is subject to regulatory requirements. Third, disclosure-related litigation is rare in the UK relative to the US. Therefore, the UK accounting narratives (e.g. Chairman's Statement) are relatively less constrained compared with the MD&A in the US 10-K report. Finally, while Chairman's Statement is signed by chairman, who is often a non-executive director in the UK, existing literature[22] seems to agree that Chairman's Statement is an organizational rather than individual communication. This means that firm's key financial decision makers (e.g. CEO and CFO) also have significant influences on the choice of language in the Chairman's Statement.

A.2. Action-based measure of overconfidence: net purchase ratio

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[20] It is abnormal in the sense that the positive tone cannot be justified by firm's fundamentals.

[21] Many previous studies on UK accounting narratives focus on Chairman's Statement (see e.g., Smith and Taffler, 2000, Clatworthy and Jones, 2003; Clatworthy and Jones, 2006). Smith and Taffler (2000) use Chairman's Statement to predict firm bankruptcy. A more recent study (Schleicher and Walker, 2010) conduct manual content analysis of the tone of forward-looking statements (i.e. outlook sections) in the UK annual report (most of which are located at the end of Chairman's Statement).

[22] For example, Clatworthy and Jones (2003) argue that accounting narratives such as UK Chairman's Statement allow "management" to describe corporate financial performance. In addition, Schleicher and Walker (2010) attribute the bias in the tone of outlook statements to "managers". In particular, they argue that "managers with a willingness to engage in impression management are likely to target forward-looking statements", while 73.5 percent of the forward-looking narratives are located in Chairman's Statement (Schleicher and Walker, 2010).

The insider trading patterns of the managers may reflect their perceptions of firms' prospects (Jenter, 2005). Overconfident managers tend to overestimate the firm value and hence are more willing to purchase their own stocks. This trading behaviour can be considered as managers' market timing in their personal portfolios. In the spirit of Jenter (2005) and Jin and Kothari (2008), we use insider trading-based measure of managerial overconfidence. In particular, following prior studies (e.g., John and Lang, 1991; Marciukaityte and Szewczyk, 2011) we construct the valued-based and volume-based net purchase ratio (NPR) using the value and volume of open market purchases and sales respectively as follows:

$$NPR\_VA_{it} = \frac{Buy\_va_{it} - Sell\_va_{it}}{Buy\_va_{it} + Sell\_va_{it}} \qquad (4)$$

$$NPR\_VOL_{it} = \frac{Buy\_vol_{it} - Sell\_vol_{it}}{Buy\_vol_{it} + Sell\_vol_{it}} \qquad (5)$$

where, NPR_VA_{it} and NPR_VOL_{it} are the value-based and volume-based NPRs respectively of CEO and CFO of firm i in fiscal year t. Buy_va_{it} and Buy_vol_{it} are the aggregate value and volume of insider purchases respectively and $Sell\_va_{it}$ and $Sell\_vol_{it}$ are the aggregate value and volume of insider sales respectively. The NPR ranges from -1 to 1 and higher NPR indicates higher managerial overconfidence.

However, alternatively, managers may trade based on their private information. In this case, higher NPR is an indicator of higher degree of information asymmetry. Our subsequent subsample analysis shows that the relationship between NPRs of CEO and leverage is stronger for smaller, intangible and younger firms[23]. This observation suggests that NPR might also capture information asymmetry.

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[23] Firm size, tangibility and firm age are all negatively associated with information asymmetry.

B. The sample

Data used in this study are from the following sources. The UK firms' financial data is obtained from *Thomson Worldscope* database. Insider trading data is from *Hemmington Scott* database. Chairman's Statements are manually collected from the company annual reports which are downloaded either through *Northcote* website or directly from company websites.

Our sample of unbalanced panel data is constructed as follows. The selection of sample period is guided by data availability. All financial and utility firms are excluded. Firm observations with missing financial data are excluded. Observations with the length of fiscal period less than 11 months or over 13 months are excluded. To conduct tone analysis, we need the digital version of the UK company annual reports, so that the Chairman Statement can be readable by the content analysis software (i.e. *LIWC 2007* and *Diction 6*)[24]. In addition, to construct insider trading-based measure of overconfidence, only those firms with insider transactions in any year during our sample period are selected. All variables are winsorized at the 1st and 99th percentile to eliminate the effect of outliers. The final sample comprises 459 firms and 2283 observations during the period 1994-2011[25].

B.1. Descriptive statistics and correlation matrix

Table 1 presents summary statistics of our main variables. The means of book and market leverage are 0.180 and 0.140 respectively. The mean of firm size (i.e. logarithm of sales) is 12.320 with a standard deviation of 2.240. Our sample seems to be representative in terms of firm size. The mean of CEOs' NPRs are lower than those of CFOs, while CEOs' NPRs are relatively more volatile. We also report the distribution of the net purchase ratio (NPR) of

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[24] In terms of the procedure of content analysis, we first extract Chairman's Statements from annual report. Next, we detect transformation errors in the combined text file using the Spelling & Grammar function in Microsoft Word 2010. Finally, various types of errors are corrected before the texts are inputted in the LIWC and Diction.
[25] Most of the observations are after 2000 because machine readable annual reports are almost not available in the 1990s.

CEO and CFO in Panel D. Over 60 percent of their NPRs are 1, indicating that insider purchases are far more often than insider sales.

Table 2 shows the pairwise Pearson correlations matrix. Surprisingly, the correlation between tone-based measures of overconfidence (*TONE* and *TONE_RES*) and insider trading-based measures of CEO and CFO overconfidence (*VA_CEO*, *VOL_CEO*, *VA_CFO* and *VOL_CFO*) are negative and statistically significant. Therefore, this suggests that these two measures might capture different aspects of overconfidence. This is because either words-based or action-based measure is subject to alternative interpretations other than managerial overconfidence, which will be discussed later.

Regarding the correlations between overconfidence measures and leverage, both *TONE* and *TONE_RES* are negatively and significantly related to book and market leverage. In contrast, NPRs of CEO and CFO are positively and significantly related to book and especially market leverage. Market-to-book ratio is negatively related to leverage, while firm size, tangibility and profitability are positively related to leverage. Finally, multicollinearity is not a major concern given that the magnitudes of the correlations between independent variables are not large[26].

[Insert Table 1 and 2 here]

IV. RESULTS AND DISCUSSION

A. Univariate leverage regression

Table 3 summarizes univariate leverage regressions. We find that both *TONE* and *TONE_RES* explain a relatively large proportion of within firm variations in leverage (especially market leverage). The coefficients on both tone measures are negative and statistically significant at 1% level. In addition, net purchases ratios (NPRs) of both CEO and CFO have positive and

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[26] We also check potential multicollinearity by looking at variance inflation factor (VIF) of all explanatory variables and interaction terms. Their VIF values are all less than 10, indicating low degree of collinearity.

significant impacts on leverage. Firm size and tangibility are positively associated with leverage and account for a significant proportion of between firm variations in leverage (especially book leverage). Market-to-book ratio has negative coefficients and helps to explain the relatively high proportion of both within and between firm variations in market leverage. The signs and statistical significance of all explanatory variables will be further tested using subsequent multivariate regressions.

[Insert Table 3 here]

B. Multivariate leverage regression

This section examines the influence of managerial overconfidence on leverage, controlling for standard capital structure determinants. In particular, we use the following model to test the impact of the level of overconfidence on both market and book leverage:

$$LEV_{it} = a + b_1 MO_{it} + B_2 X_{it} + v_i + e_{it} \tag{6}$$

where, LEV_{it} is book or market leverage ratio. X_{it} is a vector of firm-level control variables including *PDEF*, *NDEF*, market-to-book ratio, firm size, tangibility and profitability. v_i is time-invariant firm-specific effects. e_{it} is the error term. We use both fixed effects (FE) and random-effects Tobit (RE-Tobit) as the estimators. RE-Tobit estimator is superior in the sense that it accounts for the fractional nature of dependent variable (i.e. leverage ratio is bounded between zero and one).

Table 4 reports the results for leverage regressions (Equation 6). The coefficients on both *TONE* and *TONE_RES* are negative and statistically significant at 1% level in all specifications. [27], [28] This observation is consistent with the proposition that managerial

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[27] The raw tone measure, *TONE*, is subject to endogeneity problem that positive tone might be driven by high profitability and good stock price performance. In this case, the negative coefficient on *TONE* can also be attributed to the negative effects

overconfidence may cause debt conservatism (***Hypothesis 1a***). From investors' perspective, this result is also in line with the argument that moderate managerial overconfidence makes equity investors more willing to buy firms' share (because of potential positive effects of overconfidence). Furthermore, our subsequent subsample analysis (see **section E.1.**) demonstrates that the observed negative tone-leverage relationship is unlikely due to either information asymmetry or impression management.

On the other hand, both insider trading-based measures of CEO (*VOL_CEO*) and especially CFO overconfidence (*VA_CFO* and *VOL_CFO*) are positively and significantly related to leverage. This finding appears, at face value, to be consistent with the prediction that managerial overconfidence may lead to the preference for debt over equity (because overconfident managers tend to use equity more conservatively than debt) (***Hypothesis 1b***). However, given a reverse tone-insider trading pattern that NPRs are negatively related to words-based proxy for managerial overconfidence (i.e. optimistic tone), NPR may not be a clean proxy for managerial overconfidence (our subsequent analysis in **section E.2.** shows that NPR is likely to be contaminated by information asymmetry). There might be other channels through which NPRs lead to higher leverage. In fact, the positive relationship between NPRs and leverage can be explained by two well-documented patterns in standard finance including (1) insider selling prior to equity offerings (e.g., Karpoff and Lee, 1991) and (2) insider purchase prior to equity repurchases (e.g., Lee *et al*., 1992). In addition, the positive NPR-leverage relationship might also be explained by overconfident managers'

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of profitability and price performance on leverage. However, our finding that the coefficient on *TONE_RES* is also significantly negative can reduce the above endogeneity concern.

[28] One may ask whether the negative relationship between tone and leverage can be explained by reverse causality. In particular, high leverage (or overleveraged) firms, according to trade-off theory, will probably need to adjust down their leverage by issuing equity in the next fiscal year. In this case, overleveraged firms will use optimistic tone to reduce the information cost of equity. Another form of reverse causality is that overlevered firms, in order to counteract potential unfavourable analyst reports and credit rating downgrade associated with high leverage, will use optimistic tone. Both two forms of reverse causality imply that high leverage may cause more optimistic tone. However, this implication of reverse causality is not consistent with our empirical finding.

greater willingness to both buy their own shares and initiate share repurchase program relative to their rational counterparts.

Among the firm-level controls, the coefficients on tangibility and firm size are positive, while the coefficients on market-to-book ratio and profitability are negative. Tangibility is positively related to leverage, which can be explained by the fact that collateral makes debt financing easier. Firm size is also positively related to leverage, which is consistent with the notion that large firms have better reputation and lower bankruptcy risk and are therefore use more debt. However, this finding is inconsistent with pecking order prediction that firm size, as a proxy for information cost, should be positively related to equity issuance. The negative effect of market-to-book ratio on leverage is consistent with market timing argument that firms prefer equity financing when firm stock is overvalued. The negative effect of profitability on leverage can be attributed to profitable firms' pecking order preference for internal financing over debt financing. The above results are robust to alternative measures of leverage (i.e. book leverage (see panel A) vs. market leverage (see panel B)).

[Insert Table 4 here]

C. Multivariate leverage regression in first differences

Next, to examine the impacts of changes in managerial overconfidence (especially the time-varying component of optimistic tone) on the changes of leverage, we run Equation (6) in first differences[29] as follows:

$$\Delta LEV_{it} = a + b_1 \Delta MO_{it} + B_2 \Delta X_{it} + v_i + \varepsilon_{it} \tag{7}$$

where, all variables are fiscal year-on-year changes of the level variables in Equation (6).

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[29] Similarly, Frank and Goyal (2003) also run leverage regressions in first differences. However, they point out that this specification may bias the coefficient estimates towards zero and has a lower R^2.

Table 5 reports the results from leverage regression in first differences (Equation 7). The coefficients on both $\Delta TONE$ and $\Delta TONE\_RES$ are negative and significant at 1% level. This finding confirms the negative relationship between the level of tone and leverage ratio. However, the coefficients on changes of net purchase ratio (NPR) of CEO and CFO are all statistically insignificant and their signs vary across model specifications. This could be attributed to small within-firm variations of NPRs and a majority (i.e. more than 60 percent) of value and volume-based NPRs of CEO and CFO are one. We find consistent results with our previous findings (in Section IV.B.) for most of the control variables including $\Delta PDEF/NA$ (+), $\Delta NDEF/NA$ (+), ΔMB (-), Δ firm size (+) and Δ profitability (+), except Δ tangibility which becomes less stable in terms of statistical significance and signs.

[Insert Table 5 here]

D. Interaction between optimistic tone and insider trading

Section IV.B and IV.C show that optimistic tone and insider trading (i.e. net purchase ratio) have different direct impacts on leverage. This section further explores the empirical implication of the interaction between optimistic tone and insider trading for leverage.

The main purpose to examine the interaction between optimistic tone and insider trading is to empirically distinguish between "intentionally disinform" and "overconfidence (unintentionally disinform)" perspectives of tone. We follow the empirical strategies of Staw *et al*. (1983) and Abrahamson and Park (1994), in which the association between impression management and insider sales is examined. Specifically, if positive tone is associated with subsequent stock sales by firm directors, it is highly likely that positive tone is used *consciously* to manipulate investors' perception. On the other hand, the interaction between positive tone and high net purchase is an indication of managerial overconfidence, meaning that managerial overconfidence contributes to both positive tone and insider purchases. Put

differently, a combination of highly optimistic tone and high net purchase indicates overconfidence. In this case, managerial overconfidence makes managers disinform investors *unconsciously* by using optimistic tone.

In particular, to test the joint effect of optimistic tone of Chairman's Statement and insider trading, similar to Rogers, Buskirk and Zechman (2011)[30] we interact tone measures with an indicator of abnormal insider trading as follows:

$$LEV_{it} = a + b_1 TONE_{it} + b_2 NPR(-1)\_Dummy_{it} + b_3 TONE_{it} * NPR(-1)\_Dummy_{it} +$$
$$B_4 \boldsymbol{X}_{it} + v_i + e_{it} \tag{8}$$

$$LEV_{it} = a + b_1 TONE_{it} + b_2 NPR(1)\_Dummy_{it} + b_3 TONE_{it} * NPR(1)\_Dummy_{it} +$$
$$B_4 \boldsymbol{X}_{it} + v_i + e_{it} \tag{9}$$

where, $NPR(-1)\_Dummy_{it}$ is an indicator of pure insider selling that takes the value one if the net purchase ratio is -1 and zero otherwise. $NPR(1)\_Dummy_{it}$ is an indicator of pure insider purchase that takes the value one if the net purchase ratio is 1 and zero otherwise. We check variance inflation factors (VIFs) for the above regression models with interaction terms, multicollinearity is not a problem.

Table 6 reports the results for leverage regressions with interaction effects of tone and an indicator of pure insider selling (Equation 8). *CEO_NPR(-1)* and *CFO_NPR(-1)* are two dummy variables take on the value one if NPRs of CEO and CFO respectively are -1 and zero otherwise. Both *CEO_NPR(-1)* and *CFO_NPR(-1)* are negatively correlated with leverage, while only the coefficients on *CFO_NPR(-1)* are statistically significant in all specifications.

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[30] Rogers, Buskirk and Zechman (2011) examine the combined effects of optimistic tone of earnings announcements and insider trading in the context of shareholder litigation. They report that the interaction between optimism and abnormal insider selling will increase litigation risk. The reason for the increased likelihood of being sued is that insider selling contradicts optimistic disclosure tone.

In terms of the combined effects, the interaction between *CEO_NPR(-1)* and tone measures are positive and statistically significant in most of the specifications. In brief, the above findings suggest that CEO selling could weaken the negative effects of optimistic tone on leverage, while CFO selling has a direct and significantly negative impact on leverage.

Table 7 reports the results for leverage regressions with interaction effects of tone and an indicator of pure insider purchase (Equation 9). *CEO_NPR(1)* and *CFO_NPR(1)* are two dummy variables take on the value one if NPRs of CEO and CFO respectively are 1 and zero otherwise. Both *CEO_NPR(1)* and *CFO_NPR(1)* are positively correlated with leverage, while the coefficients on *CFO_NPR(1)* are statistically more significant. Regarding interaction effects, the interaction between *CEO_NPR(1)* and tone measures are negative and statistically significant in all specifications. This finding suggests that optimistic tone has more negative impacts on leverage especially when CEOs engage in pure purchase of their firm's stocks. The interaction between *CFO_NPR(1)* and tone measures are also negative but statistically insignificant.

Overall, the negative coefficients on the interaction between insider purchase dummy and tone also support the managerial overconfidence channel: high insider purchase activities suggest that optimistic tone is a strong indicator of managerial overconfidence, that is, high insider purchase is associated with enhanced debt conservatism caused by managerial overconfidence (***Hypothesis 3***). On the other hand, the positive coefficients on the interaction between insider selling dummy and tone are consistent with the managerial overconfidence story: high insider selling activities suggest that optimistic tone is a weak indicator of managerial overconfidence. Consequently, the presence of high insider selling is associated with weaker debt conservatism caused by managerial overconfidence (i.e. the negative relationship between optimistic tone and leverage) (***Hypothesis 2***). In brief, insider trading patterns indicates how strong optimistic tone is as a measure of overconfidence.

Nevertheless, one may contend that the above interaction effects may also be explained by information asymmetry and impression management channels. In particular, insider (especially CEO) selling, which contradicts optimistic tone, will make equity investors less willing to buy the firm's shares. In contrast, when high CEO purchase, as another indicator of managerial belief, confirms optimistic tone, investors are more willing to buy firm's stocks. The above two mechanisms only work when investors react to the tone. However, this is less likely given that we measure tone using contemporaneous Chairman's Statement which is only available for the readers (e.g. investors) after fiscal year end (see Section III.B.1). To further rule out the above two alternative channels, we conduct more formal analysis in the next section.

[Insert Table 6 and 7 here]

E. Subsample analysis: alternative interpretations of optimistic tone and insider trading

This section investigates whether our two measures of managerial belief are subject to alternative interpretations, especially information asymmetry, by conducting subsample analysis.

E.1. Sensitivity of tone-leverage relationship to information asymmetry

To distinguish between rational (i.e. information asymmetry and impression management) and irrational (i.e. managerial overconfidence (hubris)) interpretations of optimistic tone, we examine the extent to which the significance of tone-leverage relationship varies with proxies for information asymmetries. Firm size is an important indicator of information asymmetries. Small firms have higher information asymmetry problem and are followed by fewer analysts. Lang and Lundholm (2000) examine whether voluntary disclosure prior to equity offerings are used to reduce information asymmetry or hype the stock. For this research purpose, their

sample is limited to small firms. The reason is that small firms followed by fewer analysts are more likely to use disclosure to "influence market perceptions"[31] (Lang and Lundholm, 2000). In contrast, large firms followed by many analysts are expected to provide more transparent and high-quality disclosures (Osma and Guillamón-Saorín, 2011). This proposition is supported by Osma and Guillamón-Saorín's (2011) empirical evidences that firm size and number of analysts following the firm, as proxies for information environment, are negatively associated with impression management (e.g. manually coded disclosure tone).

In sum, small firms have more incentive to not only reduce information asymmetry but also manipulate investors' impression, using unbiased and biased reporting respectively. Therefore, if our optimistic tone influences leverage through the above two rational channels, we would expect that the negative relationship between tone and leverage will be stronger for small firms. However, our results in **Table 8** do not support this conjecture. In particular, we find that both economic and statistical significance of the negative relationship between tone and leverage are extremely similar for small (i.e. bottom quartile) and large (i.e. top quartile) firms (see Panel A in Table 11). As a robustness check, we compare small firms in bottom decile and large firms in top decile. The results are qualitatively similar. The results are also robust to alternative measures of information asymmetry, namely tangibility, firm age and market-to-book (see Panel B, C and D in **Table 8** respectively)[32]. Therefore, we may conclude that the observed tone-leverage relationship is less likely to be driven by either

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[31] Another reason why small firms are more likely to engage in impression management is related to Baker and Wurgler's (2006) proposition that smaller firms are relatively more "hard-to-value" and are therefore more influenced by investor sentiment. The implication is that investment decisions of irrational investors with high sentiment are more easily influenced by impression management. This is because irrational investors are less able to undo biased reporting, which offers small firms more scope for impression management.

[32] First, the economic and statistical significance of the coefficients on tone measures are extremely similar for intangible and tangible firms. Second, the tone-leverage relationships are also similar for young and old firms. When we compare young and old firms in bottom decile and large firms in top decile, the tone measures are only statistically significant for old firms. Third, we divide our sample into high and low growth firms. The economic and statistical significance of tone-leverage relationships are weaker for firms with high market-to-book ratio. This finding is also inconsistent with information asymmetry channel. Taken together, the above observations that the tone-leverage relationships are similar across subsamples split based on proxies for information asymmetry and information environment suggest that the significant tone-leverage relationship is less likely due to either information asymmetry or impression management.

information asymmetry or impression management. In other words, our empirical results favour managerial overconfidence channel.

[Insert Table 8 here]

E.2. Sensitivity of NPR-leverage relationship to information asymmetry

Next, to see whether NPR also captures information asymmetry as well as managerial overconfidence, we examine the sensitivity of the NPR-leverage relationship to firm characteristics (including firm size, tangibility, firm age and market-to-book) related to information asymmetry. As shown in **Table 9**[33], the coefficients on value-based NPRs of CEO are both statistically and economically more significant for smaller, intangible and younger firms which have higher information costs. This finding suggests that NPR could be more related to information asymmetry rather than managerial overconfidence. Therefore, we may conclude that the positive NPR-leverage relationship (see Section IV.B.) might reflect information asymmetry.

[Insert Table 9 here]

To sum up, the above subsample analysis shows that (1) the negative tone-leverage relationship is less likely to be driven by either information asymmetry or impression management, while (2) the positive NPR-leverage relationship could be due to information asymmetry. Put differently, optimistic tone seems to be a more reliable and cleaner proxy for managerial overconfidence, while NPR is contaminated by information asymmetry. This important observation can explain why the words-based and action-based measures of managerial beliefs have differing effects on leverage.

F. Robustness checks

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[33] We use OLS instead of fixed effect (within) estimator because the subsample analysis of NPR-leverage relationship is based on smaller samples (and shorter panels) and more importantly our key variable (i.e. NPRs) has small within variations.

We conduct several robustness checks using alternative model specifications, estimators and subsamples.

System-GMM: Our tone measures might be endogenous. We attempt to alleviate this concern using the system Generalized Method of Moments (sys-GMM) to estimate the following dynamic partial adjustment model: $LEV_{it} = a + b_1 MO_{it} + b_2 LEV_{it-1} + B_3 X_{it} + v_i + e_{it}$. We include a lagged dependent variable (i.e. LEV_{it-1}) to avoid potential "dynamic misspecification". We report the results from GMM regressions in **Table 10**. All the explanatory variables as treated as endogenous. Our main empirical results are robust to this alternative estimator[34].

[Insert Table 10 here]

Non-linear effect: We examine the non-linear effect of optimistic tone by including a quadratic term of tone in Equation (6). The relationship between optimistic tone and leverage could be non-linear if the effects of moderate overconfidence differ from extremely high overconfidence[35]. We find some evidences that support this proposition. Both *TONE*TONE* and *TONE_RES*TONE_RES* have positive and statistically significant (at 5% level) effects on market leverage using OLS estimator. However, this non-linear relationship becomes insignificant when using book leverage and fixed effects estimator. Consistent with our previous findings, both tone measures have negative and significant impacts on leverage in all specifications.

Year and industry effects: We control for year and industry effects on leverage by including year and industry dummies. The results are qualitatively similar.

V. CONCLUSIONS

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[34] We check our model specifications using autocorrelation tests and Hansen test. In particular, the null of no second order autocorrelation fails to be rejected. Hansen test fails to reject the null of instrument validity.

[35] Campbell *et al*. (2011) is the first study that examines different effects of low, moderate, and high levels of CEO optimism in the context of forced turnover. They find a non-linear (i.e. inversed-U) relationship between optimism and the probability of forced turnover.

This study contributes to the finance and accounting literature by examining the impact of disclosure tone on capital structure. In particular, we provide new evidence that managerial optimistic words, as a proxy for managerial overconfidence, may lead to conservative debt policy. This important finding provides initial empirical evidence supporting Malmendier *et al.*'s (2011) proposition that managerial overconfidence is associated with debt conservatism.

We also document that when managerial actions (i.e. insider trading) contradict their words (i.e. tone), the tone-leverage relationship is weakened. This new insight is in line with previous evidences in the accounting literature that the combined effect of optimistic tone and abnormal insider selling is associated with higher litigation risk (Rogers *et al.*, 2011). In contrast, we find that insider purchase, which confirms optimistic tone, enhances negative tone-leverage relationship. In this particular case, we may argue that *the actions of managers speak louder than their words*.

Moreover, our further analysis finds that optimistic tone is a more reliable and valid proxy for managerial overconfidence than insider trading measures. Insider trading seem to also capture information asymmetry. Overall, the major implication of this study is that time-varying managerial overconfident belief, gauged from their words, is an important determinant of leverage.

There are two major implications for future studies. First, our composite tone-based measure of overconfidence can be adopted in studies on time-varying managerial overconfidence. Second, it will be interesting to examine the joint effect of managerial "words" and "actions" on other corporate financial policies and events, especially when there is a discrepancy between their words and actions.

Appendix A. Variable definitions

Variable	Definition
Panel A: Standard dependent and independent variables	
DEF_CF	Financing deficit measured using aggregate cash flow data (i.e. $\Delta D + \Delta E$)
Net debt issues (ΔD)	Long term borrowings minus reduction in long term debt
Net equity issues (ΔE)	Net proceeds from sale/issue of common and preferred stocks minus common/preferred redeemed, retired, converted
PDEF	PDEF equals DEF if the deficit is positive and zero otherwise
NDEF	NDEF equals DEF if the deficit is negative and zero otherwise
Firm size	Natural logarithm of sales
M/B	The ratio of book value of total assets minus book value of equity plus market value of equity to book value of total assets
Profitability	Earnings before interest, taxes and depreciation divided by total assets
Tangibility	Net property, plant and equipment divided by total assets
Price performance	The difference of natural logarithm of fiscal year-end share prices
Book leverage	Total debt divided by total assets
Market leverage	Total debt divided by (total assets minus common equity plus market capitalization)
Net assets	Total assets minus current liabilities
Firm age	The natural logarithm of the number of months since the incorporation date
Panel B: Measures of managerial beliefs	
a) Optimistic tone measures (based on computational content analysis of Chairman's Statement)	
Net emotion	Positive emotion minus negative emotion including (anxiety, anger and sadness) as defined by *LIWC*
Certain1	Measure of certainty (e.g. always, never) as one aspect of cognitive processes as defined by *LIWC*
Net optimism	[praise+satisfaction+inspiration]-[blame+hardship+denial] as defined by *Diction*
Certain2	[tenacity+leveling+collectives+insistence]-[numerical terms+ambivalence+self reference+variety] as defined by *Diction*
Tone_H	(positive-negative)/(positive+negative), using Henry's (2008) word list
Tone_LM	(positive-negative)/(positive+negative), using Loughran and McDonald's (2011) word list
TONE	Composite tone index (see A.1. in Section III for more descriptions)
TONE_RES	Orthogonalized tone index (see A.1. in Section III for more descriptions)
b) Insider trading-based measures (i.e. net purchase ratio=(buy - sell)/(buy + sell))	
VA_CEO	The value-based net purchase ratio of CEO
VA_CFO	The value-based net purchase ratio of CFO
VOL_CEO	The volume-based net purchase ratio of CEO
VOL_CFO	The volume-based net purchase ratio of CFO

Table 1. Descriptive statistics

This table presents the descriptive statistics of the main dependent and independent variables.

Variable	Obs.	Mean	S.D.	Min.	Median	Max.
Panel A: standard dependent and independent variables						
Book leverage	2283	0.180	0.150	0.000	0.170	0.610
Market leverage	2283	0.140	0.130	0.000	0.110	0.520
PDEF_CF/NA	2283	0.110	0.310	0.000	0.000	2.030
NDEF_CF/NA	2283	-0.030	0.070	-0.430	0.000	0.000
MB	2283	1.760	1.260	0.560	1.400	8.790
Log(sales)	2283	12.320	2.240	6.140	12.510	16.870
Tangibility	2283	0.260	0.230	0.000	0.200	0.890
Profitability	2283	0.090	0.180	-0.880	0.120	0.390
Effective tax rate	2283	0.230	0.350	-1.620	0.280	1.640
Price performance	2283	0.000	0.530	-1.880	0.080	1.170
Firm age	2283	5.668	1.029	2.079	5.587	7.419
Panel B: words-based measures of managerial overconfidence (i.e. tone of Chairman's Statement)						
TONE	2283	-0.000	1.615	-5.693	0.150	3.676
TONE_RES	2283	-0.000	1.584	-5.034	0.165	4.988
NET_EMOTION	2283	0.740	0.170	0.220	0.760	1.000
CERTAIN1	2283	1.030	0.430	0.210	0.970	2.330
OPTIMISM	2283	53.520	2.070	49.430	53.330	60.160
CERTAIN2	2283	45.630	3.130	32.610	46.040	51.880
TONE_H	2283	0.720	0.230	-0.060	0.770	1.000
TONE_LM	2283	0.560	0.290	-0.290	0.600	1.000
Panel C: action-based measures of managerial overconfidence (i.e. net purchase ratio)						
VA_CEO	1327	0.330	0.890	-1.000	1.000	1.000
VA_CFO	1071	0.460	0.830	-1.000	1.000	1.000
VOL_CEO	1327	0.480	0.790	-1.000	1.000	1.000
VOL_CFO	1071	0.570	0.740	-1.000	1.000	1.000

Panel D: distribution of NPRs of CEO and CFO

Intervals	VA_CEO Obs.	VA_CEO Percentage	VA_CFO Obs.	VA_CFO Percentage	VOL_CEO Obs.	VOL_CEO Percentage	VOL_CFO Obs.	VOL_CFO Percentage
-1	249	18.76%	166	15.50%	249	18.76%	166	15.50%
(-1, -0.8]	104	7.84%	61	5.70%	0	0.00%	0	0.00%
(-0.8, -0.6]	34	2.56%	16	1.49%	5	0.38%	1	0.09%
(-0.6, -0.4]	24	1.81%	19	1.77%	6	0.45%	3	0.28%
(-0.4, -0.2]	22	1.66%	18	1.68%	26	1.96%	19	1.77%
(-0.2, 0]	20	1.51%	19	1.77%	84	6.33%	66	6.16%
(0, 0.2)	21	1.58%	12	1.12%	2	0.15%	3	0.28%
[0.2, 0.4)	13	0.98%	11	1.03%	48	3.62%	18	1.68%
[0.4, 0.6)	14	1.06%	14	1.31%	19	1.43%	17	1.59%
[0.6, 0.8)	9	0.68%	5	0.47%	31	2.34%	12	1.12%
[0.8, 1)	9	0.68%	7	0.65%	49	3.69%	43	4.01%
1	808	60.89%	723	67.51%	808	60.89%	723	67.51%
Total	1327	100%	1071	100%	1327	100%	1071	100%

Table 2. Correlation matrix

This table shows Pearson correlation coefficients between all pairs of our main variables, as defined in Table 1. ***, ** and * indicate that the correlation coefficient is significant at 1% 5% and 10% levels respectively.

		1	2	3	4	5	6	7	8	9	10
1.	PDEF_CF/NA	1									
2.	NDEF_CF/NA	0.176***	1								
3.	MB	0.187***	-0.040*	1							
4.	Log(sales)	-0.260***	-0.118***	-0.179***	1						
5.	Tangibility	-0.126***	-0.018	-0.118***	0.238***	1					
6.	Profitability	-0.345***	-0.169***	-0.053**	0.460***	0.203***	1				
7.	Effective tax rate	-0.029	0.002	-0.002	0.183***	0.063***	0.171***	1			
8.	Price performance	0.038*	-0.092***	0.253***	0.104***	0.071***	0.275***	0.062***	1		
9.	Book leverage	-0.006	-0.025	-0.194***	0.409***	0.394***	0.135***	0.065***	-0.045**	1	
10.	Market leverage	-0.037*	0.007	-0.380***	0.295***	0.357***	0.026	0.014	-0.209***	0.883***	1
11.	TONE	0.064***	-0.048**	0.197***	0.196***	-0.004	0.228***	0.058***	0.309***	-0.043**	-0.192***
12.	TONE_RES	0.128***	0.011	0.000	0.000	0.000	0.000	0.001	0.204***	-0.076***	-0.150***
13.	NET_EMOTION	0.025	-0.071***	0.110***	0.228***	0.013	0.261***	0.087***	0.242***	-0.021	-0.122***
14.	CERTAIN1	-0.092***	-0.059***	0.021	0.261***	0.042**	0.117***	0.032	0.035*	0.090***	0.043**
15.	OPTIMISM	0.023	-0.032	0.104***	0.229***	0.054***	0.155***	0.015	0.162***	0.051**	-0.044**
16.	CERTAIN2	0.023	-0.011	-0.005	0.006	-0.013	-0.05**	-0.039*	0.010	0.000	-0.004
17.	TONE_H	0.110***	0.012	0.227***	0.010	-0.052**	0.142***	0.035*	0.311***	-0.103***	-0.253***
18.	TONE_LM	0.083***	-0.041**	0.194***	0.086***	-0.039*	0.151***	0.039*	0.282***	-0.093***	-0.216***
19.	VA_CEO	0.058**	0.055**	-0.224***	-0.171***	-0.044	-0.182***	-0.038	-0.168***	0.017	0.120***
20.	VA_CFO	0.060**	-0.029	-0.203***	-0.178***	-0.028	-0.171***	-0.033	-0.163***	0.056*	0.139***
21.	VOL_CEO	0.040	0.065**	-0.217***	-0.058**	-0.032	-0.149***	-0.012	-0.149***	0.072***	0.140***
22.	VOL_CFO	0.051*	-0.018	-0.204***	-0.087***	-0.017	-0.14***	-0.011	-0.148***	0.083***	0.136***

		11	12	13	14	15	16	17	18	19	20	21	22
11.	TONE	1											
12.	TONE_RES	0.938***	1										
13.	NET_EMOTION	0.801***	0.740***	1									
14.	CERTAIN1	0.310***	0.235***	0.175***	1								
15.	OPTIMISM	0.721***	0.670***	0.451***	0.275***	1							
16.	CERTAIN2	0.043**	0.056***	0.000	0.128***	0.042**	1						
17.	TONE_H	0.774***	0.744***	0.503***	0.064***	0.353***	0.010	1					
18.	TONE_LM	0.865***	0.831***	0.600***	0.121***	0.505***	-0.009	0.657***	1				
19.	VA_CEO	-0.155***	-0.056**	-0.127***	-0.084***	-0.119***	0.008	-0.110***	-0.122***	1			
20.	VA_CFO	-0.141***	-0.047	-0.113***	-0.120***	-0.076**	-0.052*	-0.087***	-0.126***	0.670***	1		
21.	VOL_CEO	-0.145***	-0.071***	-0.110***	-0.073***	-0.108***	0.011	-0.098***	-0.130***	0.876***	0.644***	1	
22.	VOL_CFO	-0.142***	-0.068**	-0.108***	-0.099***	-0.078***	-0.029	-0.092***	-0.137***	0.595***	0.898***	0.723***	1

Table 3. Univariate leverage regressions

This table reports estimated coefficients and within, between and overall R-squared of univariate fixed effects (FE) regressions where the dependent variables are book (Panel A) and market (Panel B) leverage respectively. All variables are defined in Appendix A. Standard errors are adjusted for firm-level clustering. ***, **, and * indicate that coefficient is significant at 1%, 5%, and 10% levels, respectively.

| Variables | *Panel A. Dependent variable: book leverage* | | | | | *Panel B. Dependent variable: market leverage* | | | | |
	Estimated coefficients	t-stat	R^2 (within)	R^2 (between)	R^2 (overall)	Estimated coefficients	t-stat	R^2 (within)	R^2 (between)	R^2 (overall)
TONE	-0.007***	-5.79	0.020	0.001	0.002	-0.015***	-11.26	0.101	0.029	0.037
TONE_RES	-0.006***	-4.99	0.015	0.004	0.006	-0.012***	-9.47	0.068	0.015	0.023
CEO_VA	0.001	0.13	0.000	0.001	0.001	0.008**	2.50	0.007	0.020	0.015
CEO_VOL	0.003	0.97	0.001	0.006	0.005	0.011***	3.29	0.012	0.024	0.020
CFO_VA	0.007**	2.11	0.005	0.001	0.003	0.009**	2.49	0.008	0.018	0.018
CFO_VOL	0.005	1.34	0.002	0.005	0.007	0.011**	2.50	0.009	0.021	0.018
PDEF/NA	0.035***	4.26	0.020	0.008	0.000	0.010	1.37	0.002	0.015	0.001
NDEF/NA	0.176***	5.00	0.029	0.009	0.001	0.137***	5.12	0.017	0.003	0.000
MB	-0.004	-1.12	0.003	0.048	0.038	-0.023***	-6.02	0.078	0.152	0.144
Firm size	0.013*	1.70	0.007	0.171	0.168	0.025***	3.93	0.022	0.091	0.087
Tangibility	0.083	1.53	0.006	0.210	0.156	0.028	0.59	0.001	0.179	0.128
Profitability	-0.089***	-3.44	0.018	0.016	0.018	-0.152***	-5.62	0.051	0.004	0.001

Table 4. Leverage

This table presents fixed effect (FE) and random-effect Tobit (RE-Tobit) regressions with book and market leverage as dependent variables in Panel A and B respectively. All the variables are defined in Appendix A. Standard errors are adjusted for firm-level clustering. P-values are given in parentheses. ***, **, and * indicate that coefficient is significant at 1%, 5%, and 10% levels, respectively.

| | | | | | | *Panel A. Dependent variable: book leverage* | | | | | | |
Variables	(1) FE	(2) RE-Tobit	(3) FE	(4) RE-Tobit	(5) FE	(6) RE-Tobit	(7) FE	(8) RE-Tobit	(9) FE	(10) RE-Tobit	(11) FE	(12) RE-Tobit
TONE	-0.006***	-0.006***										
	(0.000)	(0.000)										
TONE_RES			-0.005***	-0.006***								
			(0.000)	(0.000)								
VA_CEO					0.000	0.001						
					(0.883)	(0.798)						
VOL_CEO							0.002	0.004				
							(0.502)	(0.229)				
VA_CFO									0.006**	0.010***		
									(0.050)	(0.005)		
VOL_CFO											0.005	0.009**
											(0.211)	(0.020)
PDEF	0.035***	0.048***	0.035***	0.048***	0.043***	0.053***	0.043***	0.053***	0.055***	0.060***	0.055***	0.060***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
NDEF	0.276***	0.246***	0.276***	0.246***	0.168***	0.149***	0.167***	0.148***	0.170***	0.155***	0.169***	0.155***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
MB	-0.002	-0.004*	-0.003	-0.006***	-0.001	-0.004	0.000	-0.004	0.000	-0.002	-0.001	-0.002
	(0.653)	(0.064)	(0.334)	(0.008)	(0.908)	(0.167)	(0.974)	(0.219)	(0.956)	(0.539)	(0.947)	(0.556)
Firm size	0.019***	0.032***	0.019**	0.031***	0.017	0.034***	0.018*	0.034***	0.009	0.031***	0.008	0.030***
	(0.009)	(0.000)	(0.012)	(0.000)	(0.111)	(0.000)	(0.093)	(0.000)	(0.481)	(0.000)	(0.529)	(0.000)
Tangibility	0.110*	0.196***	0.112**	0.198***	0.039	0.186***	0.038	0.184***	0.102	0.241***	0.106	0.243***
	(0.051)	(0.000)	(0.047)	(0.000)	(0.628)	(0.000)	(0.633)	(0.000)	(0.208)	(0.000)	(0.190)	(0.000)
Profitability	-0.069***	-0.073***	-0.077***	-0.082***	-0.106**	-0.099***	-0.105**	-0.098***	-0.165***	-0.149***	-0.165***	-0.148***
	(0.005)	(0.000)	(0.001)	(0.000)	(0.019)	(0.000)	(0.020)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Constant	-0.077	-0.262***	-0.066	-0.250***	-0.027	-0.285***	-0.039	-0.289***	0.079	-0.265***	0.091	-0.260***
	(0.405)	(0.000)	(0.481)	(0.000)	(0.844)	(0.000)	(0.775)	(0.000)	(0.617)	(0.000)	(0.561)	(0.000)
R^2 (within)	0.100		0.097		0.088		0.089		0.123		0.120	
R^2 (between)	0.303		0.303		0.173		0.177		0.095		0.090	
Log-likelihood		1800.010		1799.985		1027.310		1027.999		826.417		825.255
Obs.	2283	2283	2283	2283	1327	1327	1327	1327	1071	1071	1071	1071
Firms	459	459	459	459	377	377	377	377	340	340	340	340

Table 4. Leverage (Continued)

Variables	(1) FE	(2) RE-Tobit	(3) FE	(4) RE-Tobit	(5) FE	(6) RE-Tobit	(7) FE	(8) RE-Tobit	(9) FE	(10) RE-Tobit	(11) FE	(12) RE-Tobit
Panel B. Dependent variable: market leverage												
TONE	-0.012***	-0.012***										
	(0.000)	(0.000)										
TONE_RES			-0.011***	-0.011***								
			(0.000)	(0.000)								
VA_CEO					0.003	0.003						
					(0.235)	(0.244)						
VOL_CEO							0.005*	0.006*				
							(0.081)	(0.081)				
VA_CFO									0.009***	0.010***		
									(0.009)	(0.001)		
VOL_CFO											0.008*	0.011***
											(0.052)	(0.005)
PDEF	0.021***	0.030***	0.021***	0.030***	0.018**	0.025**	0.018**	0.025**	0.027**	0.031***	0.027**	0.031***
	(0.003)	(0.000)	(0.003)	(0.000)	(0.021)	(0.012)	(0.021)	(0.012)	(0.015)	(0.007)	(0.015)	(0.007)
NDEF	0.109***	0.092***	0.109***	0.092***	0.123***	0.101***	0.123***	0.100***	0.130***	0.108***	0.130***	0.108***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.003)	(0.001)	(0.004)	(0.002)	(0.004)	(0.003)	(0.004)
MB	-0.016***	-0.028***	-0.020***	-0.032***	-0.021***	-0.033***	-0.020***	-0.033***	-0.026***	-0.038***	-0.026***	-0.038***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm size	0.024***	0.026***	0.022***	0.024***	0.039***	0.028***	0.039***	0.028***	0.028***	0.025***	0.026***	0.025***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)	(0.005)	(0.000)
Tangibility	0.073*	0.145***	0.077*	0.149***	0.062	0.154***	0.060	0.152***	0.095	0.191***	0.100	0.193***
	(0.093)	(0.000)	(0.075)	(0.000)	(0.294)	(0.000)	(0.302)	(0.000)	(0.176)	(0.000)	(0.151)	(0.000)
Profitability	-0.096***	-0.092***	-0.113***	-0.110***	-0.171***	-0.148***	-0.171***	-0.148***	-0.247***	-0.194***	-0.247***	-0.193***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.139*	-0.170***	-0.115	-0.145***	-0.313***	-0.187***	-0.317***	-0.189***	-0.160	-0.154***	-0.147	-0.150***
	(0.100)	(0.000)	(0.175)	(0.000)	(0.002)	(0.000)	(0.001)	(0.000)	(0.210)	(0.000)	(0.250)	(0.000)
R^2 (within)	0.203		0.204		0.210		0.212		0.263		0.260	
R^2 (between)	0.274		0.275		0.218		0.218		0.226		0.230	
Log-likelihood		1983.342		1983.904		1106.644		1107.490		919.337		918.252
Obs.	2283	2283	2283	2283	1327	1327	1327	1327	1071	1071	1071	1071
Firms	459	459	459	459	377	377	377	377	340	340	340	340

Table 5. Leverage regressions in first differences

This table presents fixed effect (FE) leverage regressions in first differences with book and market leverage as dependent variables. All the variables are defined in Appendix A. Standard errors are adjusted for firm-level clustering. P-values are given in parentheses. ***, **, and * indicate that coefficient is significant at 1%, 5%, and 10% levels, respectively.

	Panel A. Dependent variable: book leverage change (model 1-6)						Panel B. Dependent variable: market leverage change (model 7-12)					
	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE	(7) FE	(8) FE	(9) FE	(10) FE	(11) FE	(12) FE
ΔTONE	-0.002***						-0.007***					
	(0.008)						(0.000)					
ΔTONE_RES		-0.002***						-0.007***				
		(0.008)						(0.000)				
ΔVA_CEO			-0.005						-0.001			
			(0.114)						(0.712)			
ΔVOL_CEO				-0.005						0.000		
				(0.309)						(0.965)		
ΔVA_CFO					0.002						0.003	
					(0.513)						(0.437)	
ΔVOL_CFO						0.002						0.004
						(0.708)						(0.463)
ΔPDEF/NA	0.034***	0.034***	0.038***	0.037***	0.042**	0.042***	0.024***	0.024***	0.022**	0.022**	0.020*	0.020*
	(0.000)	(0.000)	(0.004)	(0.005)	(0.011)	(0.009)	(0.000)	(0.000)	(0.029)	(0.029)	(0.069)	(0.070)
ΔNDEF/NA	0.191***	0.191***	0.207***	0.206***	0.143**	0.143**	0.173***	0.173***	0.151***	0.151***	0.117***	0.118***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.045)	(0.045)	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.005)
ΔMB	-0.006***	-0.007***	-0.011*	-0.010*	-0.006	-0.006	-0.019***	-0.022***	-0.033***	-0.033***	-0.027***	-0.027***
	(0.006)	(0.002)	(0.059)	(0.069)	(0.172)	(0.176)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ΔFirm size	0.021*	0.021*	0.043**	0.044**	0.043	0.044	0.039***	0.038***	0.099***	0.100***	0.104***	0.105***
	(0.058)	(0.061)	(0.026)	(0.022)	(0.157)	(0.155)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ΔTangibility	0.158**	0.159**	-0.018	-0.016	0.106	0.104	0.100**	0.103**	0.077	0.079	0.078	0.077
	(0.021)	(0.020)	(0.840)	(0.858)	(0.434)	(0.440)	(0.039)	(0.035)	(0.263)	(0.252)	(0.437)	(0.442)
ΔProfitability	-0.079***	-0.083***	-0.103***	-0.103***	-0.208***	-0.209***	-0.089***	-0.100***	-0.140***	-0.139***	-0.289***	-0.288***
	(0.000)	(0.000)	(0.004)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Constant	-0.003**	-0.003**	-0.004**	-0.004**	-0.003	-0.003	-0.004***	-0.004***	-0.007***	-0.007***	-0.007***	-0.007***
	(0.014)	(0.014)	(0.012)	(0.012)	(0.204)	(0.198)	(0.000)	(0.000)	(0.002)	(0.002)	(0.005)	(0.004)
R^2 (within)	0.173	0.173	0.196	0.193	0.196	0.195	0.233	0.233	0.243	0.242	0.284	0.284
R^2 (between)	0.132	0.132	0.115	0.113	0.142	0.139	0.139	0.139	0.141	0.142	0.088	0.087
Firms	421	421	256	256	206	206	421	421	256	256	206	206
Obs.	1645	1645	754	754	569	569	1645	1645	754	754	569	569

Table 6. Leverage regression with interaction effects of tone and insider selling

This table presents fixed effect (FE) regressions with book and market leverage as dependent variables. Interactions between indicators of pure insider selling (i.e. *CEO_NPR(-1)* and *CFO_NPR(-1)*) and tone are included in all regressions. All the variables are defined in Appendix A. Standard errors are adjusted for firm-level clustering. P-values are given in parentheses. ***, **, and * indicate that coefficient is significant at 1%, 5%, and 10% levels, respectively.

	Panel A. Dependent variable: market leverage				*Panel B. Dependent variable: book leverage*			
	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE	(7) FE	(8) FE
TONE	-0.011***		-0.011***		-0.007***		-0.006***	
	(0.000)		(0.000)		(0.000)		(0.006)	
TONE_RES		-0.011***		-0.010***		-0.007***		-0.005***
		(0.000)		(0.000)		(0.000)		(0.007)
CEO_NPR(-1)	-0.011**	-0.008*			-0.002	-0.001		
	(0.040)	(0.100)			(0.716)	(0.908)		
CEO_NPR(-1)*TONE	0.011***				0.010***			
	(0.001)				(0.008)			
CEO_NPR(-1)*TONE_RES		0.007**				0.008**		
		(0.046)				(0.038)		
CFO_NPR(-1)			-0.017**	-0.015*			-0.009	-0.008
			(0.033)	(0.051)			(0.247)	(0.331)
CFO_NPR(-1)*TONE			0.007				0.006	
			(0.148)				(0.230)	
CFO_NPR(-1)*TONE_RES				0.003				0.006
				(0.464)				(0.236)
PDEF/NA	0.023***	0.023***	0.032***	0.031***	0.046***	0.046***	0.058***	0.058***
	(0.007)	(0.007)	(0.005)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
NDEF/NA	0.138***	0.136***	0.147***	0.149***	0.177***	0.176***	0.175***	0.176***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.002)
MB	-0.017***	-0.019***	-0.022***	-0.024***	0.001	0.000	0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.841)	(0.947)	(0.894)	(0.994)
Firm size	0.033***	0.032***	0.023**	0.022**	0.015	0.014	0.005	0.005
	(0.000)	(0.000)	(0.013)	(0.018)	(0.180)	(0.201)	(0.653)	(0.675)
Tangibility	0.035	0.034	0.078	0.083	0.026	0.024	0.096	0.097
	(0.543)	(0.551)	(0.250)	(0.227)	(0.740)	(0.761)	(0.217)	(0.213)
Profitability	-0.135***	-0.151***	-0.208***	-0.224***	-0.086*	-0.095**	-0.147***	-0.155***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.081)	(0.048)	(0.007)	(0.004)
Constant	-0.241**	-0.220**	-0.103	-0.087	0.004	0.014	0.120	0.127
	(0.015)	(0.027)	(0.414)	(0.495)	(0.974)	(0.917)	(0.439)	(0.414)
R^2 (within)	0.258	0.254	0.298	0.298	0.109	0.107	0.130	0.130
R^2 (between)	0.230	0.226	0.225	0.226	0.138	0.128	0.056	0.058
Firms	377	377	340	340	377	377	340	340
Obs.	1327	1327	1071	1071	1327	1327	1071	1071

Table 7. Leverage regression with interaction effects of tone and insider purchase

This table presents fixed effect (FE) regressions with book and market leverage as dependent variables. Interactions between indicators of pure insider purchase (i.e. *CEO_NPR(1)* and *CFO_NPR(1)*) and tone are included in all regressions. All the variables are defined in Appendix A. Standard errors are adjusted for firm-level clustering. P-values are given in parentheses. ***, **, and * indicate that coefficient is significant at 1%, 5%, and 10% levels, respectively.

	Dependent variable: market leverage				*Dependent variable: book leverage*			
	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE	(7) FE	(8) FE
TONE	-0.006***		-0.008***		-0.002		-0.004	
	(0.004)		(0.003)		(0.422)		(0.239)	
TONE_RES		-0.007***		-0.009***		-0.003		-0.004
		(0.001)		(0.001)		(0.191)		(0.186)
CEO_NPR(1)	0.004	0.003			0.000	0.000		
	(0.437)	(0.538)			(0.948)	(0.927)		
CEO_NPR(1)*TONE	-0.007***				-0.006***			
	(0.004)				(0.007)			
CEO_NPR(1)*TONE_RES		-0.004*				-0.004*		
		(0.077)				(0.081)		
CFO_NPR(1)			0.010	0.010			0.011*	0.011*
			(0.120)	(0.129)			(0.069)	(0.070)
CFO_NPR(1)*TONE			-0.003				-0.001	
			(0.380)				(0.705)	
CFO_NPR(1)*TONE_RES				-0.002				-0.001
				(0.566)				(0.754)
PDEF/NA	0.024***	0.024***	0.032***	0.032***	0.046***	0.046***	0.057***	0.057***
	(0.006)	(0.006)	(0.005)	(0.005)	(0.000)	(0.000)	(0.001)	(0.001)
NDEF/NA	0.137***	0.137***	0.146***	0.146***	0.177***	0.176***	0.178***	0.178***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.002)
MB	-0.017***	-0.020***	-0.022***	-0.025***	0.001	0.000	0.002	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.852)	(0.996)	(0.848)	(0.982)
Firm size	0.034***	0.032***	0.025***	0.024**	0.015	0.014	0.008	0.008
	(0.000)	(0.000)	(0.007)	(0.011)	(0.177)	(0.209)	(0.496)	(0.530)
Tangibility	0.033	0.035	0.082	0.084	0.023	0.023	0.095	0.096
	(0.553)	(0.535)	(0.233)	(0.219)	(0.767)	(0.764)	(0.222)	(0.219)
Profitability	-0.134***	-0.151***	-0.210***	-0.226***	-0.084*	-0.094*	-0.148***	-0.156***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.089)	(0.051)	(0.006)	(0.003)
Constant	-0.252***	-0.227**	-0.141	-0.119	0.002	0.016	0.075	0.086
	(0.010)	(0.021)	(0.267)	(0.351)	(0.990)	(0.908)	(0.629)	(0.584)
R^2 (within)	0.255	0.252	0.296	0.297	0.107	0.105	0.132	0.132
R^2 (between)	0.227	0.225	0.226	0.226	0.137	0.131	0.081	0.081
Firms	377	377	340	340	377	377	340	340
Obs.	1327	1327	1071	1071	1327	1327	1071	1071

Table 8. Subsample analysis: sensitivity of tone-leverage relationship to information asymmetry

This table presents fixed effect (FE) regressions with book and market leverage as dependent variables. Subsamples split based on firm size, tangibility, firm age and market-to-book are estimated to examine the impacts of information asymmetry and information environment on the tone-leverage relationship. "Small Quartile" and "Large Quartile" consist of the smallest and largest (in terms of total assets) observations from the bottom and top quartile respectively. "Intang. Quartile" and "Tang. Quartile" consist of the most intangible and tangible observations from the bottom and top quartile respectively. "Young Quartile" and "Old Quartile" consist of the youngest and oldest observations from the bottom and top quartile respectively. "LowMB Quartile" and "HighMB Quartile" consist of observations with lowest and highest MB ratio from the bottom and top quartile respectively. Six control variables are also included but not reported to save space. All the variables are defined in Appendix A. Standard errors are adjusted for firm-level clustering. P-values are given in parentheses. ***, **, and * indicate that coefficient is significant at 1%, 5%, and 10% levels, respectively.

	Dependent variable: market leverage (column 1-4)				*Dependent variable: book leverage (column 5-8)*			
	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE	(7) FE	(8) FE
Panel A: firm size	Small Quartile	Small Quartile	Large Quartile	Large Quartile	Small Quartile	Small Quartile	Large Quartile	Large Quartile
TONE	-0.010***		-0.011***		-0.006**		-0.007**	
	(0.001)		(0.000)		(0.015)		(0.011)	
TONE_RES		-0.009***		-0.010***		-0.006**		-0.006**
		(0.001)		(0.000)		(0.015)		(0.011)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
R^2 (within), R^2 (between)	0.106, 0.179	0.106, 0.180	0.367, 0.383	0.367, 0.384	0.045, 0.027	0.044, 0.028	0.154, 0.283	0.154, 0.283
Firms	163	163	112	112	163	163	112	112
Obs.	571	571	570	570	571	571	570	570
Panel B: tangibility	Intang. Quartile	Intang. Quartile	Tang. Quartile	Tang. Quartile	Intang. Quartile	Intang. Quartile	Tang. Quartile	Tang. Quartile
TONE	-0.014***		-0.011***		-0.007***		-0.007***	
	(0.000)		(0.000)		(0.007)		(0.000)	
TONE_RES		-0.013***		-0.011***		-0.007***		-0.007***
		(0.000)		(0.000)		(0.007)		(0.000)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
R^2 (within), R^2 (between)	0.155, 0.176	0.156, 0.177	0.281, 0.295	0.282, 0.295	0.065, 0.003	0.065, 0.003	0.091, 0.204	0.091, 0.204
Firms	171	171	135	135	171	171	135	135
Obs.	570	570	570	570	570	570	570	570
Panel C: firm age	Young Quartile	Young Quartile	Old Quartile	Old Quartile	Young Quartile	Young Quartile	Old Quartile	Old Quartile
TONE	-0.008***		-0.008***		-0.006*		-0.003	
	(0.001)		(0.000)		(0.056)		(0.133)	
TONE_RES		-0.008***		-0.007***		-0.005*		-0.003
		(0.001)		(0.000)		(0.057)		(0.137)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
R^2 (within), R^2 (between)	0.156, 0.264	0.156, 0.264	0.394, 0.285	0.394, 0.285	0.105, 0.230	0.104, 0.231	0.157, 0.186	0.157, 0.187
Firms	171	171	91	91	171	171	91	91
Obs.	567	567	570	570	567	567	570	570
Panel D: market-to-book	HighMB Quartile	HighMB Quartile	LowMB Quartile	LowMB Quartile	HighMB Quartile	HighMB Quartile	LowMB Quartile	LowMB Quartile
TONE	-0.003**		-0.013***		-0.005**		-0.011***	
	(0.037)		(0.000)		(0.026)		(0.000)	
TONE_RES		-0.003**		-0.013***		-0.005**		-0.011***
		(0.037)		(0.000)		(0.028)		(0.000)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
R^2 (within), R^2 (between)	0.130, 0.321	0.130, 0.321	0.214, 0.095	0.215, 0.096	0.079, 0.274	0.079, 0.275	0.141, 0.146	0.141, 0.146
Firms	189	189	243	243	189	189	243	243
Obs.	570	570	570	570	570	570	570	570

Table 9. Subsample analysis: sensitivity of value-based NPR-leverage relationship to information asymmetry

This table presents OLS regressions with book and market leverage as dependent variables. Subsamples split based on firm size, tangibility, firm age and market-to-book are estimated to examine the impacts of information asymmetry and information environment on the NPR-leverage relationship. "Small Quartile" and "Large Quartile" consist of the smallest and largest (in terms of total assets) observations from the bottom and top quartile respectively. "Intang. Quartile" and "Tang. Quartile" consist of the most intangible and tangible observations from the bottom and top quartile respectively. "Young Quartile" and "Old Quartile" consist of the youngest and oldest observations from the bottom and top quartile respectively. "LowMB Quartile" and "HighMB Quartile" consist of observations with lowest and highest MB ratio from the bottom and top quartile respectively. Six control variables are also included but not reported to save space. All the variables are defined in Appendix A. Robust standard errors are used. P-values are given in parentheses. ***, **, and * indicate that coefficient is significant at 1%, 5%, and 10% levels, respectively.

	Dependent variable: market leverage (column 1-4)				Dependent variable: book leverage (column 5-8)			
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Panel A: firm size	Small Quartile	Small Quartile	Large Quartile	Large Quartile	Small Quartile	Small Quartile	Large Quartile	Large Quartile
VA_CEO	0.021***		0.012**		0.023***		0.005	
	(0.000)		(0.030)		(0.000)		(0.475)	
VA_CFO		0.012		0.021***		0.019**		0.018**
		(0.125)		(0.001)		(0.020)		(0.046)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.205	0.212	0.436	0.429	0.178	0.143	0.239	0.221
Obs.	271	167	429	339	271	167	429	339
Panel B: tangibility	Intang. Quartile	Intang. Quartile	Tang. Quartile	Tang. Quartile	Intang. Quartile	Intang. Quartile	Tang. Quartile	Tang. Quartile
VA_CEO	0.010*		0.010		0.006		0.005	
	(0.083)		(0.141)		(0.362)		(0.529)	
VA_CFO		0.012*		0.018**		0.011		0.023**
		(0.075)		(0.026)		(0.179)		(0.025)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.191	0.191	0.343	0.365	0.140	0.133	0.230	0.218
Obs.	316	234	364	282	316	234	364	282
Panel C: firm age	Young Quartile	Young Quartile	Old Quartile	Old Quartile	Young Quartile	Young Quartile	Old Quartile	Old Quartile
VA_CEO	0.008		0.000		0.001		-0.002	
	(0.218)		(0.976)		(0.950)		(0.795)	
VA_CFO		0.023***		0.007		0.022*		0.008
		(0.010)		(0.296)		(0.085)		(0.398)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.337	0.340	0.344	0.365	0.387	0.350	0.223	0.189
Obs.	317	228	357	295	317	228	357	295
Panel D: market-to-book	HighMB Quartile	HighMB Quartile	LowMB Quartile	LowMB Quartile	HighMB Quartile	HighMB Quartile	LowMB Quartile	LowMB Quartile
VA_CEO	0.001		0.018*		0.003		0.015	
	(0.752)		(0.097)		(0.646)		(0.127)	
VA_CFO		0.001		0.017		0.010		0.015
		(0.882)		(0.154)		(0.218)		(0.160)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.401	0.387	0.267	0.273	0.406	0.372	0.310	0.311
Obs.	327	279	334	257	327	279	334	257

Table 10. Dynamic leverage adjustment: system GMM

This table presents leverage regressions with book and market leverage as dependent variables. All the variables are defined in Appendix A. The models are estimated using two-step system GMM. All explanatory variables are treated as endogenous, which are instrumented using lags 2 or 3. Asymptotic standard errors robust to heteroscedasticity are used. P-values are given in parentheses. AR(1) and AR(2) are first and second order autocorrelation of residuals, asymptotically distributed as standard normal under the null of no serial correlation. Hansen test is a test of instrument validity. F test is a test of overall model fit. P-values of the above diagnostic tests are reported. Number of instruments is also reported. ***, **, and * indicate that coefficient is significant at 1%, 5%, and 10% levels, respectively.

	Panel A. Dependent variable: book leverage (model 1-2)		Panel B. Dependent variable: market leverage (model 3-4)	
	(1) SYS-GMM	(2) SYS-GMM	(3) SYS-GMM	(4) SYS-GMM
Lagged leverage	0.842***	0.843***	0.627***	0.627***
	(0.000)	(0.000)	(0.000)	(0.000)
TONE	-0.005**		-0.016***	
	(0.028)		(0.000)	
TONE_RES		-0.004**		-0.013***
		(0.027)		(0.000)
PDEF/NA	0.006	0.007	0.021	0.034**
	(0.565)	(0.562)	(0.121)	(0.014)
NDEF/NA	0.308***	0.308***	0.225***	0.318***
	(0.000)	(0.000)	(0.000)	(0.000)
MB	0.001	0.000	-0.017***	-0.014***
	(0.663)	(0.846)	(0.000)	(0.000)
Firm size	0.009***	0.008***	0.008***	0.015***
	(0.000)	(0.001)	(0.006)	(0.000)
Tangibility	0.060**	0.062**	0.018	0.016
	(0.021)	(0.017)	(0.524)	(0.571)
Profitability	-0.015	-0.022	-0.082***	-0.061**
	(0.537)	(0.350)	(0.002)	(0.016)
Constant	-0.092***	-0.082***	-0.036	-0.101***
	(0.001)	(0.002)	(0.274)	(0.001)
AR(1) (*p-value*)	0.000***	0.000***	0.000***	0.000***
AR(2) (*p-value*)	0.835	0.837	0.292	0.722
Hansen test (*p-value*)	0.628	0.637	0.389	0.464
F test (*p-value*)	0.000***	0.000***	0.000***	0.000***
Number of instruments	284	284	284	284
Firms	421	421	421	421
Obs.	1645	1645	1645	1645

References

Abrahamson, E. and Park, C. (1994). Concealment of negative organizational outcomes: an agency theory perspective, *Academy of Management Journal*, 37(5), pp. 1302-1334.

Adelberg, A. H. (1979). Narrative disclosures contained in financial reports: means of communication or manipulation, *Accounting and Business Research*, 9(35), pp. 179-189.

Amernic, J. H. and Craig, R. J. (2007). Guidelines for CEO-speak: editing the language of corporate leadership, *Strategy & Leadership*, 35(3), pp. 25-31.

Baginski, S. P., Hassell, J. M. and Hillison, W. A. (2000). Voluntary Causal Disclosures: Tendencies and Capital Market Reaction, *Review of Quantitative Finance and Accounting*, 15(4), pp. 371-89.

Baker, M. and Wurgler, J. (2006). Investor Sentiment and the Cross-Section of Stock Returns, *Journal of Finance*, 61(4), pp. 1645-1680.

Bartlett, S. A. and Chandler, R. A. (1997). The corporate report and the private shareholder: Lee and Tweedie twenty years on, *British Accounting Review*, 29(3), pp. 245–261

Ben-David, I., Graham, J. and Harvey, C. (2012). Managerial miscalibration, *Quarterly Journal of Economics*, Conditionally accepted.

Bertrand, M. and Schoar, A. (2003). Managing with style: The effect of managers on firm policies, *Quarterly Journal of Economics*, 118(4), pp. 1169-1208.

Brennan, N. M. and Conroy, J. P. (2013). Executive hubris: the case of a bank CEO, *Accounting, Auditing & Accountability Journal*, 26(2), pp. 172-195.

Brockman, P., Li, X. and Price, S.M. (2012). Do managers put their money where their mouths are? Evidence from insider trading after conference calls, Working Paper, Lehigh University and University of Hong Kong.

Cadenillas, A., Cvitanić, J. and Zapatero, F. (2004). Leverage decision and manager compensation with choice of effort and volatility, *Journal of Financial Economics*, 73(1), pp. 71-92.

Clatworthy, M. and Jones, M. J. (2003). Financial reporting of good news and bad news: evidence from accounting narratives, *Accounting and Business Research*, 33(3), pp. 171-185.

Clatworthy, M. A. and Jones, M. J. (2006). Differential patterns of textual characteristics and company performance in the chairman's statement, *Accounting, Auditing & Accountability Journal*, 19(4), pp. 493-511.

Campbell, T.C., Gallmeyer, M., Johnson, S.A., Rutherford, J. and Stanley, B.W. (2011). CEO optimism and forced turnover, *Journal of Financial Economics*, 101(3), pp. 695-712.

Craig, R. J. and Amernic, J. H. (2011). Detecting linguistic traces of destructive narcissism at-a-distance in a CEO's letter to shareholders, *Journal of Business Ethics*, 101(4), pp. 563-575.

Davis, A.K., Ge, W., Matsumoto, D. and Zhang, L. (2012). The effect of managerial "style" on the tone of earnings conference calls, Working Paper, University of Oregon, University of Washington and University of British Columbia.

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

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

Demers, E. and Vega, C. (2011). Soft information in earnings announcements: News or noise?, Working Paper, INSEAD.

Diamond, D. and Verrecchia, R. (1991). Disclosure, liquidity, and the cost of capital, *Journal of Finance*, 46(4), pp. 1325-1355.

Easley, D. and O'Hara, M. (2004). Information and the cost of capital, *Journal of Finance*, 59(4), pp. 1553-1583.

Eshraghi, A. and Taffler, R. (2012). Fund manager overconfidence and investment performance: evidence from mutual funds, Working Paper, University of Edinburgh and Warwick Business School.

Frank, M. Z. and Goyal, V. K. (2003). Testing the pecking order theory of capital structure, *Journal of Financial Economics*, 67(2), pp. 217-248.

Frank, M. and Goyal, V. (2007). Corporate leverage: How much do managers really matter?, Working Paper, University of Minnesota and Hong Kong University of Science and Technology.

Graham, J.R., Harvey, C.R. and Puri, M. (2013). Managerial attitudes and corporate actions, *Journal of Financial Economics*, 109(1), pp. 103-121.

Hackbarth, D. (2008). Managerial traits and capital structure decisions, *Journal of Financial and Quantitative Analysis*, 43(4), pp. 843-882.

Heaton, J.B. (2002). Managerial optimism and corporate finance, *Financial Management*, Vol. 31(2), pp. 33-45.

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

Hillary, G. and Hsu, C. (2011). Endogenous overconfidence in managerial forecasts. *Journal of Accounting and Economics*, 51(3), pp. 300-313.

Hirshleifer, D. (2001). Investor psychology and asset pricing, *Journal of Finance*, 56(4), pp. 1533-1597.

Huang, X., Teoh, S.H. and Zhang, Y. (2011). Tone management, Working Paper, California State University-Long Beach, University of California-Irvine and The Chinese University of Hong Kong.

Jenter, D. (2005). Market timing and managerial portfolio decisions, *Journal of Finance*, 60(4), pp. 1903-1949.

Jin, L. and Kothari, S.P. (2008). Effect of personal taxes on managers' decisions to sell their stock, *Journal of Accounting and Economics*, 46(1), pp. 23-46.

John, K. and Lang, L. H. P. (1991). Insider trading around dividend announcements: theory and evidence. *Journal of Finance*, 46(4), pp. 1361–1389.

Karpoff, J. and Lee, D. (1991). Insider trading before new issue announcements, *Financial Management*, 20(1), pp. 18-26.

Kothari, S.P., Li, X. and Short, J.E. (2009). The effects of disclosures by management, analysts, and business press on cost of capital, return volatility, and analyst forecasts: a study using content analysis, *Accounting Review*, 84(5), pp. 1639-1670.

Lang, M.H. and Lundholm, R.J. (2000). Voluntary disclosure and equity offerings: reducing information asymmetry or hyping the stock?, Contemporary Accounting Research, 17(4), pp. 623-662.

Lee, D. S., Mikkelson, W. H. and Partch, M. M. (1992). Managers' trading around stock repurchases, *Journal of Finance*, 47(5), pp. 1947-1962.

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

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

Liu, Y., Taffler, R. and John, K. (2009). CEO Value Destruction in M&A Deals and Beyond, Working Paper, University of Edinburgh and New York University.

Loughran, T. and McDonald, B. (2011). When Is a Liability Not a Liability? Textual Analysis, Dictionaries, and 10-Ks, *Journal of Finance*, 66(1), pp. 35-65.

Malmendier, U. and Tate, G. (2005). CEO overconfidence and corporate investment, *Journal of Finance*, 60(6), pp. 2661-2700.

Malmendier, U., Tate, G. and Yan, J. (2011). Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies, *Journal of Finance*, 66(5), pp. 1687-1733.

Malmendier, U. and Zheng, H. (2012). Managerial duties and managerial biases, Working Paper, University of California, Berkeley.

Marciukaityte, D. and Szewczyk, S.H. (2011). Financing decisions and discretionary accruals: managerial manipulation or managerial overoptimism, *Review of Behavioral Finance*, 3(2), pp. 91-114.

Merkl-Davies, D. M. and Brennan, N. M. (2007). Discretionary disclosure strategies in corporate narratives: incremental information or impression management?, *Journal of Accounting Literature*, 26, pp. 116-196.

Merkl-Davies, D.M., and Brennan, N.M. (2011). A conceptual framework of impression management: new insights from psychology, sociology and critical perspectives, *Accounting and Business Research*, 41(5), pp. 415-437.

Miller D. and Ross, M. (1975). Self-serving biases in attribution of causality: fact or fiction? *Psychological Bulletin*, 82(2), pp. 213-225.

Osma, B. G. and Guillamón-Saorín, E. (2011). Corporate governance and impression management in annual results press releases, *Accounting, Organizations and Society*, 36(4), pp. 187-208.

Price, S. M., Doran, J. S., Peterson, D. R. and Bliss, B. A. (2012). Earnings conference calls and stock returns: The incremental informativeness of textual tone, *Journal of Banking and Finance*, 36(4), pp. 992-1011.

Rogers, J. L., Van Buskirk, A. and Zechman, S. L. (2011). Disclosure tone and shareholder litigation, *Accounting Review*, 86(6), pp. 2155-2183.

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

Staw, B.M., McKechnie, P.I. and Puffer, S.M. (1983). The justification of organizational performance, *Administrative Science Quarterly*, 28(4), pp. 582-600.

Shyam-Sunder, L. and C Myers, S. (1999). Testing static tradeoff against pecking order models of capital structure, *Journal of Financial Economics*, 51(2), pp. 219-244.

Smith, M. and Taffler, R. J. (2000). The chairman's statement-A content analysis of discretionary narrative disclosures, *Accounting, Auditing & Accountability Journal*, 13(5), pp. 624-647.