

# **The Pricing of Language in Management Forecast Press Releases**

**Stephen Baginski<sup>+</sup>**  
*University of Georgia*

**Elizabeth Demers<sup>\*</sup>**  
*INSEAD*

**Chong Wang<sup>Δ</sup>**  
*Naval Postgraduate School*

**Julia Yu<sup>#</sup>**  
*Nanyang Technological University*

**April 29, 2012**

**Please do not Quote Without the Authors' Permission**

\*We thank workshop participants at Darden, ESSEC, EDHEC, the 7<sup>th</sup> Interdisciplinary Workshop on Intangibles, Intellectual Capital & Extra-Financial Information in Warsaw, the 2012 Junior Faculty Accounting Research Symposium in Singapore, conference participants at the 2011 American Accounting Association (AAA) Annual Meeting, the 2011 European Accounting Association (EAA) Annual Meeting, and the 1<sup>st</sup> Accounting Conference at Catolica-Lisbon, Ben Ayers, Stephen V. Brown (AAA discussant), John Hassell, Karol Marek Klimczak (EAA discussant), Clive Lennox, Claudine Mangen, and Eric Yeung for helpful comments. We appreciate the programming assistance provided by Rajiv Jayaraman of Knolscape as well as Rashid Ansari. We thank Mary Boldrini, Pascale Gadroy, and Cécile Maciulis for their research assistance, and Craig Carroll for processing our text files using the Diction software. Demers is grateful for the research funding provided by the INSEAD Alumni Fund.

---

<sup>+</sup> Terry College of Business, University of Georgia, Athens, GA 30602-6252, [baginski@terry.uga.edu](mailto:baginski@terry.uga.edu)

<sup>\*</sup> INSEAD, Boulevard de Constance, 77305 Fontainebleau Cedex, France, [liz.demers@insead.edu](mailto:liz.demers@insead.edu)

<sup>Δ</sup> Naval Postgraduate School, Monterey, CA 93943, [cwang@nps.edu](mailto:cwang@nps.edu)

<sup>#</sup> Nanyang Business School, Nanyang Technological University, S3-01A-07 Nanyang Avenue, Singapore 639798, [juliayu@ntu.edu.sg](mailto:juliayu@ntu.edu.sg)

## Abstract

Using a sample of 3,807 voluntarily-provided management earnings forecasts in forecast press releases during the 1997-2006 period we investigate cross-sectional differences in the pricing of linguistic tone suggested by cheap talk theories, known language biases, management incentives, institutional factors, and the unique characteristics of management earnings forecasts. We show that two biases in language recognized in cheap talk models and related to management incentives and tendencies, language inflation and hyperbole, lead to stronger price reactions to negative tone and a general discounting of extreme absolute tone, respectively. Consistent with the idea that verifiability affects the pricing of what would otherwise be cheap talk, management forecasts serve as contemporaneous verifiers of accompanying linguistic tone. When the signs of the quantitative management forecast and linguistic tone agree (especially so for good news agreement) and when management forecasting reputation is stronger, linguistic tone's pricing is enhanced. When management forecast verifiability is compromised by imprecision, linguistic tone's pricing is attenuated. We also find that litigation risk enhances the pricing of linguistic tone, linguistic tone's pricing is attenuated in richer pre-disclosure information environments and when issued with more reliable, historical earnings, and it is enhanced in long horizon forecasts in which the pre-disclosure information environment is likely weaker. In exploratory supplemental tests, we further investigate a general finding in our study, that linguistic optimism unverified by concurrent management forecast news is most likely to be discounted by investors. We document that this unverified linguistic optimism is decreasing in litigation risk, size and general uncertainty, and increasing in whether the forecast is an annual forecast, post-Regulation FD, and post-Sarbanes-Oxley.

*JEL Classifications:* G14; D82; M41

*Keywords:* Management forecasts; linguistic tone; cheap talk; management incentives

## I. Introduction

A growing body of literature seeks to understand the market price relevance of language contained in corporate filings, incremental to the simultaneously released quantitative or “hard” news. To our knowledge, extant research on the price relevance of management’s linguistic tone is limited to the context of mandatory filings, and prior empirical studies generally do not consider conditions under which the price relevance of language differs in the cross-section.<sup>1</sup> We contribute to the literature by examining the role of language in the voluntary disclosure context of management forecast press releases. Using a Factiva search, we identify a sample of 3,807 voluntarily-provided management earnings forecasts in press releases during the 1997-2006 period from which we derive a measure of *linguistic tone*. After empirically confirming two results from prior research in our unique forecast setting, the fact that linguistic tone is incrementally priced and is generally consistent with accompanying hard news, we fill a void in the literature by investigating cross-sectional differences in the pricing of linguistic tone. Guided by cheap talk theories, known language biases, management incentives, institutional factors, and the unique characteristics of management earnings forecasts, we identify a set of conditions which either enhance or attenuate the pricing of linguistic tone and provide empirical evidence consistent with our predictions. Specifically, we show that two biases in language recognized in cheap talk models and related to management incentives and tendencies, language inflation and hyperbole, lead to stronger price reactions to negative tone and a general discounting of extreme absolute tone, respectively. Also, we show that, consistent with the idea that verifiability affects the pricing of what would otherwise be cheap talk, management forecasts serve as contemporaneous verifiers of accompanying linguistic tone. When the signs of the quantitative management forecast and linguistic tone agree and when management forecasting reputation is stronger, linguistic tone’s pricing is enhanced. The effect of sign agreement is stronger when a good news quantitative forecast confirms positive linguistic tone. When management

---

<sup>1</sup> Prior financial linguistic studies have examined the price relevance of soft information in the context of mandatory filings such as earnings announcements (Davis, Piger, and Sedor 2012; Demers and Vega 2011), restatement announcements (Mangen and Durnev 2010), IPO prospectuses (Balakrishnan and Bartov 2010), and MD&A and other elements of the 10K reports (Davis and Tama-Sweet 2011; Feldman, Govindaraj, Livnat, and Segal 2010; Li 2010).

forecast verifiability is compromised by imprecision, linguistic tone pricing is attenuated. Institutional factors also affect the pricing of linguistic tone. Litigation risk disciplines management behavior, and the pricing of likely more credible linguistic tone is enhanced when firms face greater litigation risk. Finally, we document a general pre-disclosure information environment effect, attenuated pricing of linguistic tone in richer pre-disclosure information environments, and information effects unique to the management forecast environment. In long horizon forecasts in which the pre-disclosure information environment is likely weaker, linguistic tone's pricing is enhanced. However, if the management forecast is issued near or with an earnings release, linguistic tone's pricing is attenuated.

Consistent with our finding that the price impact of linguistic tone in management forecast press releases is weaker in the context where a management forecast is bundled with more reliable, historically-oriented earnings information, we also detect that some of the cross-sectional determinants of linguistic tone pricing are insignificant in the bundled forecast setting. Our findings persist in the management forecast press releases that are not bundled with earnings announcements, in separate analyses of annual and interim forecasts, and after adding controls for passage of Regulation Fair Disclosure and Sarbanes-Oxley. In exploratory supplemental tests, we further investigate a general finding in our study, that linguistic optimism unverified by concurrent management forecast news is most likely to be discounted by investors. We document that this unverified linguistic optimism is decreasing in litigation risk, size and general uncertainty, and increasing in whether the forecast is an annual forecast, post-Regulation FD, and post-Sarbanes-Oxley.

Our study extends the literature on the pricing of linguistic tone and the pricing of management forecasts in several ways. First, we provide evidence of pricing effects for linguistic tone in a purely voluntary setting. Second, we identify a number of conditions that lead to cross-sectional differences in language pricing in management forecasts. Several of these conditions are unique to the management forecast setting and establish quantitative management forecasts as contemporaneous verifiers of linguistic tone. Third, we document the consequences of two known language biases, language inflation and hyperbole, on the pricing of linguistic tone. Fourth, we show that legal liability enhances the price

consequences of linguistic tone. Fifth, we document effects of the information environment on the pricing of linguistic tone. Two of the effects, forecast horizon and bundling, are unique to the management forecast setting. Our results on the effect of hard news on supplemental linguistic tone complement that reverse finding of the effects of supplemental disclosures on the pricing of hard forecast news in Hutton, Miller, and Skinner (2003) and Baginski, Hassell, and Kimbrough (2004).

In Section II, we develop our hypotheses about the association of language and prices. In Section III, we describe our sample and language data. We present our empirical design and results in Section IV, additional tests in Section V, and conclusions in Section VI.

## **II. Theory and Hypotheses**

### **The Incremental Price-Relevance of Linguistic Tone**

The price-relevance of language is plausible if language is a sufficiently reliable signal of future earnings or dividends. However, language is relatively costless to provide, difficult to verify, and likely linked to future earnings and dividends in a fairly noisy way. The lack of verifiability, in particular, calls the informativeness of “cheap talk” into question (Crawford and Sobel 1982; Benabou and Laroque 1992; Dye and Sridhar 2004). However, prior empirical work shows that linguistic tone is incrementally informative for security prices when released with an earnings announcement (Davis et al. 2012; Demers and Vega 2011) and in other mandatory filings (e.g., IPO prospectuses and restatement announcements). These studies also document an association between linguistic tone and future earnings, and between tone and the uncertainty of future earnings, thus establishing plausible links to valuation fundamentals as the reason for the information content of language. Further, if linguistic tone predicts earnings, subsequent earnings realizations provide a degree of verifiability to tone, which also potentially enhances its information content. In addition to economic conditions, such as verifiability, that might exist in sufficient strength to induce some level of truth-telling, the information content of linguistic tone is also suggested by a general aversion to lying (Gneezy 2005; Hurkins and Kartik 2009). Models in behavioral economics (e.g., Mullainathan, Schwartzstein, and Shleifer 2008) and experimental results (e.g., Bertrand,

Karlan, Mullainathan, Shafir, and Zinman 2010) suggest that uninformative material can affect choice, while archival evidence also supports the conclusion that apparently uninformative disclosures matter (Michels 2012).

Prior literature has also established that, unlike other phenomenon, language and hard earnings news convey largely consistent information. For example, Waymire (1984) and Rogers and Van Buskirk (2011) document that the sign of forecast news disproportionately conflicts with the sign of accompanying earnings realization news, suggesting a potential strategic role for supplying multiple earnings-related signals. However, Demers and Vega (2011) document a uniformly positive correlation between linguistic tone and hard earnings news in earnings releases.

In the sections that follow, we treat these two prior research findings as maintained hypotheses. That is, we assume that, on average, linguistic tone is incrementally priced and is positively associated with hard management forecast news. We transact on cheap talk theory, these two maintained hypotheses, the disciplining institutional phenomenon of legal liability, hyperbole in language, and the role of the information environment to develop testable hypotheses of how language is differentially priced in management earnings forecast releases.<sup>2</sup>

## **Language Inflation**

Cheap talk theories suggest that “language inflation” occurs, and this phenomenon exists regardless of the costs of lying (Kartik 2009). Although a rational receiver of information is not deceived and thus discounts the language, the sender nevertheless does not remove the inflation from language because the sender fully expects the receiver to apply discounting. i Vidal (2003) modifies the model in Morgan and Stocken (2003) to establish an equilibrium in which investors react more to bad news than to good news in the presence of the optimistic cheap talk tendency.

---

<sup>2</sup> We begin our empirical work with tests designed to confirm that the two maintained hypotheses are descriptive in our sample and setting.

The receiver's presumption that language is inflated is driven by the relatively few management incentives to release bad news and numerous incentives to increase share prices. Many of managers' personal incentives are aligned with the firm's incentives via share ownership, compensation based on firm performance, and the shared benefits of a good reputation. Given the costs of lying in an opportunistic fashion (see Rogers et al. 2011 for an example of the costs of opportunistically inflated language), it is not surprising that purely opportunistic voluntary disclosures are more the exception than the rule. Li, Wasley, and Zimmerman (2012) find that 86% of management forecasts are issued to reduce cost of capital and to follow disclosure rules, while only 14% of the forecasts are issued for purely opportunistic reasons.

Even in the relatively few cases where the manager's motive for voluntary disclosure is opportunistic, only a handful of situations suggest purely self-serving incentives to downward bias disclosure news. Bad news might be strategically timed prior to the date of determining the share price for an option grant (Aboody and Kasznik 2000), prior to a management attempt to take a firm private, and, assuming symmetry of buying and selling, roughly half of the Li et al. (2012) opportunistic disclosure cases (7%) in which the manager engages in insider buying after issuing a bad news forecast. This is not to say that these events do not occur or are not economically meaningful to the parties involved, just that one would expect that in the broad cross-section, the events are not sufficiently pervasive to suggest an expectation of language deflation and are mitigated to some extent in a repeated game where the market can observe two conflicting management-provided signals that result in an increase in manager wealth. Accordingly, although linguistic tone is price-relevant on average, we predict that language inflation attenuates price response to good news relative to bad news:

*H1: The mean price response to net negative linguistic tone in a management forecast press release is, in absolute magnitude, greater than the mean price response to net positive linguistic tone.*

Evidence in favor of H1 is subject to an alternative explanation, that managers delay bad news. As discussed by Verrecchia (2001), managers have several incentives to delay bad news disclosure. For example, Hermelin and Weisbach (2007) formally model bad news delay as a function of career concerns. Kothari, Wysocki, and Shu (2009) argue that news arriving randomly to managers would result in symmetrically distributed stock returns unless managers delay the disclosure of bad news to a threshold where the costs or difficulty of further delay require bad news disclosure. They argue that evidence of a more negative price reaction for bad news management forecasts relative to good news is evidence that bad news has been delayed, not that it is differentially credible. Under either interpretation, however, evidence in favor of H1 is consistent with language inflation, either through active over-optimism or by silence/delay in the presence of private pessimistic information.

### **Verifiability**

Cheap talk theories identify verifiability as a credibility-enhancing mechanism. The language we investigate is issued in a management forecast press release. The manager releases two price relevant signals, one a quantitative forecast of earnings, the other a set of words from which linguistic tone can be ascertained, neither of which can be perfectly verified ex post. Ajinkya and Gift (1984) provide evidence that managers use forecasts to adjust market expectations by revealing their private information, and King, Pownall, and Waymire (1990) provide the economic underpinnings of the expectations adjustment hypothesis. If the intent of a management forecast press release is indeed to adjust market expectations through the revelation of private information – Li et al. (2012) estimate that 86% of forecasts are issued either to voluntarily adjust market expectations or to follow exchange rules requiring release of private information prior to insider trading – then it is less likely that the manager would issue conflicting linguistic tone and quantitative forecast news.

While verifiability of a forecast is typically expressed in terms of the ability to verify ex post, we view the quantitative management forecast as a contemporaneous verifier of the linguistic tone. If the two signals are expected to be positively correlated to enable the adjustment of security prices (and



empirically so as demonstrated in prior research) and the quantitative management forecast is more verifiable, then we expect that the price relevance of linguistic tone is enhanced by the agreement of the quantitative management forecast with the linguistic tone. This view is consistent with Jennings (1987) who documents that contemporaneous financial analyst revisions are a verifier to the market of the voracity of management forecasts and with Hutton et al. (2003) who argue that less believable news is more credible when it is issued with more verifiable information.

Although more *ex post* verifiable than language, the ability of a quantitative management forecast to serve as a contemporaneous verifier varies in the cross-section because of unique characteristics of management forecasts. First, management forecasts are often imprecise, more often expressed in ranges, in minimums or maximums, or rounded to the nearest nickel (Baginski and Hassell 1997; Bamber and Cheon 1998; Bamber, Hui, and Yeung 2010). Second, the ability of management forecasts to serve as contemporaneous verifiers depends on the management forecasting reputation of the firm, which is jointly determined by the historical *ex post* accuracy of management forecasts and a sufficient forecast history with which to assess historical forecast accuracy (Hutton and Stocken 2009). Stocken (2000) examines the credibility of a manager's disclosure of non-verifiable information in a repeated "cheap talk" game and concludes that the manager almost always truthfully reveals private information under certain sufficiency conditions, including an accounting report that can be used to assess credibility and the ability to make a longer-run assessment of management credibility.

In summary, quantitative management forecasts can contemporaneously verify linguistic tone, thus increasing its credibility and price impact. Management forecast imprecision hampers its ability to verify, thus decreasing the price impact of linguistic tone. Management forecast reputation, as measured jointly by historical forecast accuracy and forecast frequency, increases the power of quantitative management forecasts to serve as contemporaneous verifiers of linguistic tone and thus increases tone's price impact.

*H2: The price response to linguistic tone in a management forecast press release depends on characteristics of the relatively more verifiable quantitative (hard) management forecast:*

- a. Hard news confirmation of linguistic tone increases the price response to linguistic tone.*
- b. Hard news width and rounding reduce the price response to linguistic tone.*
- c. High quality forecasting reputations increase the price response to linguistic tone.*

## **Legal Liability**

Although managers have incentives to increase stock prices with optimistic disclosures, fear of litigation based on voluntary disclosures that are ex post over-optimistic tempers the tendency towards over-optimism in voluntary disclosures (Skinner 1994; Kasznik and Lev 1995; Baginski, Hassell, and Kimbrough 2002; Rogers and Stocken 2005). Rogers, Van Buskirk, and Zechman (2011) document that managers use of optimistic language increases litigation risk by showing that plaintiffs target optimistic statements in their lawsuits and that, controlling for a firm's economic conditions, sued firms have unusually linguistically optimistic earnings announcements. Accordingly, we expect that if optimistic linguistic bias can be detected, then managers will avoid increased legal costs by tempering their optimism. The discipline provided by legal liability and the cost associated with legal exposure create more credible language, resulting in a greater price response to linguistic tone.

*H3: The price response to linguistic tone in a management forecast press release increases for firms facing greater likelihood of litigation.*

## **Hyperbole**

Hyperbole is the use of language in the extreme to provide emphasis, even though the expressions are not to be taken literally. In addition to the frequent use of hyperbole in creative writing, hyperbole manifests in evaluative contexts such as online reviews of movies, products, and physicians. For example, Anderson (1998) argues that the consumer's marginal utility from word of mouth rating of a product increases with the amount of either satisfaction or dissatisfaction, yielding the expectation and

empirical finding of a U-shaped customer satisfaction distribution. Admati and Pfliederer (2004) demonstrate that if the underlying distribution is uniform, sender overconfidence always leads to a decrease in the amount of information transmitted in equilibrium because of the sender's tendency to exaggerate. More extreme messages characterize the equilibrium.

Given the existence of hyperbole bias in language, either due to the marginal utility of doing so or as a consequence of overconfidence, we expect extreme net positive and net negative tone to be discounted by investors due to lack of credibility:

*H4: The price response to linguistic tone in a management forecast press release is decreasing in the absolute magnitude of linguistic tone.*

## **Information Environment**

Finally, we predict that the information environment affects the price response to linguistic tone. In a rich pre-disclosure information environment, information is impounded in price prior to news events. Using the typical proxy for richness of the pre-disclosure information environment, firm size, Atiase (1985) and Freeman (1987) empirically document a smaller price reaction to earnings news for larger firms.

In the management press release setting, timing is an additional unique factor that determines the richness of the information environment. First, managers can issue forecasts in isolation or in close proximity to earnings releases. Atiase, Li, Supattarakul, and Tse (2005) document attenuated price reactions to management forecasts issued with earnings releases and suggest that investors place a higher weight on the more reliable actual earnings. The signal correlation between the expectations for next period's earnings embodied in management forecasts (and accompanying, positively correlated, linguistic tone) and historical actual earnings is likely to be less. In fact, Rogers and Van Buskirk (2011) document a disproportionate number of good news forecasts issued with bad news earnings.

Second, management forecast press releases are issued over different horizons. All else held equal, longer horizons are characterized by less competing information, and it is less likely that pre-

disclosure information environments are rich in the early portions of a period in which long horizon forecasts are issued. As a result, voluntary disclosures are important to resolve uncertainty, and all else held equal, the general impressions of future performance provided by linguistic tone might be viewed as a particularly credible disclosure.

In summary, we expect rich pre-disclosure environments and environments containing realized earnings to decrease the information content of linguistic tone, and we expect that language in longer horizon management forecast releases are priced more strongly given the lack of a strong pre-disclosure information environment.

*H5: The price response to linguistic tone is reduced in richer information environments.*

- a. Price response to tone is decreasing in firm size.*
- b. Price response to tone is less when bundled with an earnings release.*
- c. Price response to tone is increasing in forecast horizon.*

### **III. Sample and Language Data**

#### **Main Sample Determination**

We use the Factiva database to individually identify and download candidate management earnings forecasts. We follow Baginski et al. (2004) by using business newswires Dow Jones Business News (“DJBN”) and Press Release Newswire (“PRN”) to search for the following word strings – “expects earnings,” “expects net,” “expects income,” “expects losses,” “expects profits,” and “expects results” – in addition to three parallel lists where “expects” is replaced alternatively by “forecasts,” “predicts,” and “sees”). This search yielded 6,180 candidate earnings forecasts (3,577 for DJBN and 2,603 for PRN) for the period 1997 through 2006, downloaded in batches of 100 announcements per .txt file.

We next created individual .txt files for each candidate management forecast article (i.e., converting 62 files into 6,180 .txt files), and extracted firm identifiers for the companies underlying each respective Factiva article in order to attempt to match the candidate observations into the CRSP, Compustat, and

First Call databases. In order to be included in our initial sample, each candidate management forecast from the Factiva search and extraction process had to match up, within a three-day window surrounding the Factiva date, with a management forecast from the First Call Company Issued Guidance database. Finally, we delete observations having fewer than 100 words in the forecast announcement and observations for which the data is not available to measure all of our regression variables. This process yielded a total of 3,807 forecast observations. Additional details related to the sample determination and matching procedures are summarized in Appendix A.<sup>3</sup> Following the prior literature (e.g., Anilowski, Feng, and Skinner 2007; Rogers, Skinner, and Van Buskirk 2009), we define *bundled* management forecasts as those falling within two days of an earnings announcement date.

## Data Sources

We identify and extract text passages of the management forecasts from DJBN and PRN within the Factiva database as described above. The non-linguistic characteristics of the management forecasts (e.g., the numerical estimate, annual versus quarterly, etc.) are derived from the First Call Management Issued Guidance database. Market prices and returns data are provided by the Center for Research in Security Prices (CRSP), while the Compustat database is our source for accounting data.

## Measuring the Language Construct

Evidence from prior studies (Loughran and McDonald 2011; Demers and Vega 2011) suggests that generic linguistic algorithms such as Diction or General Inquirer may yield noisy measures of “positive” and “negative” linguistic tone in the context of financially-oriented text passages.

---

<sup>3</sup> The requirement that our press release observations match with First Call earnings forecasts results in the loss of some press releases. Chuk, Matsumoto, and Miller (2009) document that excluded observations are likely to be made by firms that: a) have less analyst forecast coverage; b) have poor prior performance; c) do not issue an accompanying earnings release; and d) do not provide an EPS forecast (e.g., provide a revenue or cash flow forecast instead). Because we require analyst forecasts for our observations, sample to avoid bundling with earnings announcements, have other data requirements that skew our sample toward larger firms, focus on earnings forecasts, and sample primarily after 1997 (which is suggested by Chuk et al. (2009) as a means of mitigating bias), we do not believe that our sample would be meaningfully different had First Call matches not been required. However, the data required by our research design does result in a larger firm sample bias, consistent with that characterizing many large sample capital markets studies.

Consequently, we adopt the Loughran and McDonald (2011) (L&M) finance-oriented dictionaries (i.e., word lists), for capturing “positivity” and “negativity” in the management forecast textual passages, measures that L&M refer to as Fin-Pos and Fin-Neg, respectively.<sup>4</sup> Also following the prior linguistic literature (e.g., Davis et al. 2012; Demers and Vega 2011), our principal measure of tone is defined as the difference between Fin-Pos and Fin-Neg (optimism and pessimism) for the L&M-based measures, a variable that we label as *NetPositivity*.<sup>5</sup>

Similar to most prior studies, our *NetPositivity* variable does not attempt to explicitly measure the “unexpected” portion of tone. Although some prior studies have examined the time-series properties of tone in earnings releases, leading them to adopt the *change* in net optimism as a proxy for the “unexpected” or “news” component of linguistic tone, we have opted not to do so for several reasons. First, as Loughran and McDonald (2011) point out, measuring “unexpected” tone in this way imposes a considerable amount of structure on the linguistic parameters; specifically, it presumes a considerable amount of processing capability on the part of investors in the cross-section. While this is conceivable in

---

<sup>4</sup> Rogers et al. (2011) argue that more general language measures such as Diction might be more relevant in the context of communications with non-financial audiences such as attorneys, judges, and others. Notwithstanding the potential noisiness of the measures derived from Diction in the context of financial text, it is a well-established language processing algorithm that has been used extensively in prior research to measure the tone in earnings announcements, corporate annual reports, Federal Reserve Board Chairmen’s speeches, and other economic and political communications. See Davis et al. (2012), Demers and Vega (2011), Davis and Tama-Sweet (2011), or the listing provided at <http://www.dictionsoftware.com/files/dictionresearch.pdf> for a more extensive summary of published academic studies using the Diction software. In a subsequent analysis, we demonstrate the relative noise level of the Diction-based linguistic tone measure in our sample by demonstrating that it has no price-relevance in our sample incremental to the L&M measure. Nonetheless, in untabulated tests, we replicated our main analysis using a combination of the two measures. The results are consistent, and thus, we rely on the less noisy and more financially oriented L&M measure in reported results.

<sup>5</sup> We also follow the “cleansing” procedure in Demers and Vega (2011). Corporate press releases on the newswire services often include several paragraphs at the end of the announcement that are not part of the body of the announcement that is of interest to our study. Specifically, the releases typically include a company-standard paragraph that describes the firm, often using very flattering language. In addition, most of the articles tend to include some form of “Safe Harbor” disclaimer paragraph related to the forward-looking information included in the press release. These latter paragraphs vary somewhat across firms, but are generally “boilerplate” in nature and are presumed to be drafted by the company’s legal advisers. Finally, the press releases typically end with company contact information such as a listing of the corporate website address, their investor relations contact names and numbers, and/or information related to upcoming conference calls. Since all of these paragraphs contain textual and numerical data that may include optimism-, pessimism-, and/or certainty-related language that do not form part of the content portion of management’s press release per se, based upon manual review and the identification of keyword strings, we developed algorithms to “cleanse” the .txt files of such non-announcement content. These cleansed .txt files are ultimately used as the basis for the linguistic characteristics extracted from the firm’s earnings forecast press releases.

the context of regularly recurring, mandated, quarterly earnings announcements, it is much less likely to hold in the context of sporadically issued, non-standardized management forecasts. Second, the primary study to take this more refined approach, Demers and Vega (2011), reports that their basic findings are unaffected by the use of net optimism rather than the change in net optimism. Finally, a sufficient time series of management forecasts is not available for the majority of our sample firms, making it impossible to model the time-series behavior of tone in the context of management forecasts. The consequences of not specifying an expectations model for our tone variable would generally be to introduce noise into the measure, thereby reducing the power of our cross-sectional tests. As we discuss below, however, the results in relation to the *NetPositivity* variable are generally quite strong and significant in conservative testing that employs clustered standard errors.

## IV. Empirical Results

In this section, we present descriptive statistics followed by the empirical research design and test results for each of our hypotheses in turn.

### Descriptive Statistics

Table 1 presents descriptive statistics for the forecasts, linguistic tone, and other regression variables used in our tests.<sup>6</sup> In Panel A, consistent with prior research, the management forecasts in our sample are, on average, not good news, as evidenced by the negative means and medians for abnormal announcement returns (*AR3*) and the near zero mean and median management forecast surprises (*FSURP*). Mean *NetPositivity* is similarly slightly negative, and the median is zero for the L&M proxy. The Diction proxy mean and median are large and positive, and the proxy has high variance relative to the mean. The management forecasts are optimistic ex post when compared to realized earnings, as captured by the variable *ExPostForecastOpimism* that is defined as the price-deflated difference between forecasted and actual EPS. Panel B shows that the majority of forecasts are interim (55.6%), bundled

---

<sup>6</sup> The distributions presented in Table 1 are after winsorizing every continuous, naturally unbounded variable at both the 1<sup>st</sup> and 99<sup>th</sup> percentiles.

(54.5%), and not rounded (71.9%). Panel C shows that the forecasts are primarily range forecasts (74.1%). Panel D shows a high dispersion of forecasts across years, with an initial increase in forecast incidence over time followed by a decrease starting around the time of Regulation Fair Disclosure (Reg FD) in late 2000 and Sarbanes-Oxley (SOX) in 2002.<sup>7</sup>

### Confirmation of Maintained Hypotheses

The purpose of Table 2 is to confirm our two maintained hypotheses that 1) linguistic tone is price relevant incremental to management forecast surprise and 3) the quantitative management forecast signal and the sign of linguistic tone tend to agree. To confirm the pricing relation, we estimate the following pooled cross-sectional, time series, ordinary least squares model:

$$AR_{jt} = \beta_0 + \beta_1 FSURP_{jt} + \beta_2 NetPositivity_{jt} + \beta_3 OtherFSURP_{jt} + \beta_4 UE_{jt} + \varepsilon_{jt} \quad (1)$$

where  $j$  is a firm subscript, and  $t$  represents a management forecast press release at date  $t$ .  $AR$  is the size- and book-to-market-adjusted 3-day announcement return ( $AR3$ ) centered on the announcement date  $t=0$ .<sup>8</sup>  $FSURP$  is the management forecast surprise measured as the management forecast minus the preceding median consensus analyst forecast, all scaled by pre-announcement ( $t=-2$ ) security price. To compute the management forecast for non-point forecasts, we use the midpoint of ranges and the disclosed upper or lower bound for maximum and minimum forecasts, respectively, all consistent with the prior management forecast literature.  $NetPositivity$  is the linguistic measure of tone derived from the management forecast press release as previously described.  $OtherFSURP$  is the value of  $FSURP$  for any other management forecast in the press release and set equal to zero if another forecast is not present.  $UE$  is the unexpected earnings announced in a bundled press release, defined as actual earnings per share minus the preceding

<sup>7</sup> In supplemental tests, we examine whether Reg FD and SOX are associated with a change in linguistic tone and whether tone is priced differently in post-Reg FD and post-SOX periods.

<sup>8</sup>Ng, Tuna, and Verdi (2011) document a delayed response to unexpected quantitative management forecast news. Although market efficiency is a maintained assumption in our analysis, given the post-announcement drift literature and the Ng et al. (2011) finding, we also discuss post-announcement results in supplemental tests described later.



median analyst forecast of earnings per share for bundled forecasts and zero for unbundled forecasts.<sup>9</sup>  $\beta_2 > 0$  provides confirmation of the findings of prior literature in our management earnings forecast press release sample.

Table 2, Panel A presents the results from estimating equation (1). Using our proxy for linguistic tone derived from the L&M word lists, we present the results for regressions on hard forecast news (*FSURP*) and linguistic tone (*NetPositivity*) separately, and then together to confirm the incremental information content of linguistic tone. The results support the incremental pricing of linguistic tone. The coefficients on *FSURP* and *NetPositivity* are both significantly positive in their individual regressions and when considered jointly.<sup>10</sup> The coefficient estimates on *UE* and *OtherFSURP* are not significant.<sup>11</sup>

In the fourth column of Table 2, Panel A, we report the multiple regression results for the alternative Diction linguistic tone proxy. Consistent with greater noise in this proxy, its t-statistic is much smaller. In the final column, both proxies enter the multiple regression, and the Diction proxy is subsumed by the L&M proxy. Accordingly, the remainder of our tests use the L&M linguistic tone proxy.

Table 2, Panel B, presents a chi-square analysis of our second maintained hypothesis, that the signs of linguistic tone and the hard management forecast news tend to agree. The hard forecast news sign is good (bad) news when  $FSURP \geq 0$  ( $< 0$ ) and the linguistic tone proxy is good (bad) when  $NetPositivity \geq 0$  ( $< 0$ ). Examination of the main diagonal reveals that 62.5% of the forecasts in our sample contain linguistic tone that is directionally consistent with the hard earnings forecast surprise. In

---

<sup>9</sup>There may be multiple management forecasts in a single press release, and the firm/date clusters may create a dependence problem. Accordingly, we cluster on a firm/date identifier when estimating our regressions and control for year fixed effects so that all reported tests are based upon independent observation clusters and very conservative standard errors (see Petersen 2009). When multiple forecasts are present, it is typically the case that one interim and one annual forecast are presented in the press release. In supplemental tests described later, we partition into annual and interim samples, which reduces observation dependence substantially. Finally, in untabulated tests, we form the sample by release instead of by forecast which results in no firm/date clustering, and our results are consistent.

<sup>10</sup> Our sample includes forecast releases occurring close to the period end, which some studies refer to as “warnings.” Our conclusions are not affected by discarding 204 management forecasts issued less than 14 days before the earnings release date. As an alternative specification check, we modify the announcement period model to include intercept and slope shifts for these warnings. The insignificant coefficients obtained on these variables indicate that the price reactions to quantitative forecast and linguistic tone do not differ for warnings.

<sup>11</sup> *OtherFSURP* is insignificant because it is largely redundant when present and not always present. When considered in isolation in a simple regression, *OtherFSURP* has a t-statistic of 3.0. *UE* is also not present in unbundled forecasts. In bundled forecasts, *UE* has a t-statistic of 3.8 in a simple regression.

other words, good news forecasts tend to be accompanied by net optimistic language, while bad news forecasts are predominantly accompanied by net pessimistic language. Chi-square tests reject the null of no association between the signs of forecast news and linguistic tone. Although these findings are consistent with the results of prior linguistic studies that have documented a uniformly positive correlation between linguistic tone and unexpected earnings in earnings press releases, they contrast sharply with a general finding in prior research of strategic bundling of good news with bad news, presumably to reduce the price consequences of bad news (e.g., Waymire 1984; Rogers and Van Buskirk 2011). Also, note that the sign association is not perfect. Signs disagree in 37.5% of the cases, and the off-diagonals are roughly equally divided between positive and negative linguistic tone.

### Differential Pricing of Linguistic Tone in the Cross-Section

To examine our main hypotheses which predict differential pricing of linguistic tone in the cross-section, we estimate the following model:

$$\begin{aligned}
 \text{Baseline result:} \quad & AR_{jt} = \gamma_0 + \gamma_1 \text{NetPositivity}_{jt} \\
 \text{Intercept shifts:} \quad & + \gamma_2 \text{NegativeTone}_{jt} + \gamma_3 \text{SignsAgree}_{jt} + \gamma_4 \text{DWidth}_{jt} + \gamma_5 \text{Round}_{jt} \\
 & + \gamma_6 \text{ForecastReputation}_{jt} + \gamma_7 \text{Litigation}_{jt} + \gamma_8 \text{Size}_{jt} \\
 & + \gamma_9 \text{Bundled}_{jt} + \gamma_{10} \text{Horizon}_{jt} \\
 \text{Language} \\
 \text{Inflation (H1):} \quad & + \gamma_{11} \text{NegativeTone}_{jt} * \text{NetPositivity}_{jt} \\
 \text{Verification/Signs (H2a):} \quad & + \gamma_{12} \text{SignsAgree}+/_+_{jt} * \text{NetPositivity}_{jt} + \gamma_{13} \text{SignsAgree}-/_-_{jt} * \text{NetPositivity}_{jt} \\
 \text{Verification/Precision (H2b):} \quad & + \gamma_{14} \text{DWidth}_{jt} * \text{NetPositivity}_{jt} + \gamma_{15} \text{Round}_{jt} * \text{NetPositivity}_{jt} \\
 \text{Verification/Reputation (H2c):} \quad & + \gamma_{16} \text{ForecastReputation}_{jt} * \text{NetPositivity}_{jt} \\
 \text{Litigation (H3):} \quad & + \gamma_{17} \text{Litigation}_{jt} * \text{NetPositivity}_{jt} \\
 \text{Hyperbole (H4):} \quad & + \gamma_{18} | \text{NetPositivity}_{jt} | * \text{NetPositivity}_{jt} \\
 \text{Information} \\
 \text{Environment/Size (H5a) :} \quad & + \gamma_{19} \text{Size}_{jt} * \text{NetPositivity}_{jt}
 \end{aligned}$$

Information

Environment/Bundling (**H5b**) :  $+ \gamma_{20} \text{Bundled}_{jt} * \text{NetPositivity}_{jt}$

Information

Environment/Horizon (**H5c**) :  $+ \gamma_{21} \text{Horizon}_{jt} * \text{NetPositivity}_{jt}$

Controls:

$$\begin{aligned}
 &+ \gamma_{22} \text{FSURP}_{jt} + \gamma_{23} \text{OtherFSURP}_{jt} + \gamma_{24} \text{UE}_{jt} + \gamma_{25} \text{Annual}_{jt} \\
 &+ \gamma_{26} \text{Certainty}_{jt} + \gamma_{27} \text{Certainty}_{jt} * \text{NetPositivity}_{jt} + \gamma_{28} \text{AnalystFollowing}_{jt} \\
 &+ \gamma_{29} \text{AnalystFollowing}_{jt} * \text{NetPositivity}_{jt} + \gamma_{30} \text{LaggedEarnInform}_{jt} \\
 &+ \gamma_{31} \text{LaggedEarnInform}_{jt} * \text{NetPositivity}_{jt} + \varepsilon_{jt} \tag{2}
 \end{aligned}$$

Our hypotheses predict shifts in the relationship between linguistic tone and prices, and thus are properly tested by examining the significance of slope shifts. Discounting of good linguistic tone due to language inflation (H1) occurs if the coefficient on  $\text{NegativeTone} * \text{NetPositivity}$  is positive ( $\gamma_{11} > 0$ ). If management forecasts serve as contemporaneous verifiers of linguistic tone (H2), then the coefficients on  $\text{SignsAgree}+/+ * \text{NetPositivity}$  and  $\text{SignsAgree-/-} * \text{NetPositivity}$  will be positive ( $\gamma_{12}, \gamma_{13} > 0$ ) as predicted by H2a.  $\text{SignsAgree}$  equals 1 if the signs of  $\text{FSURP}$  and  $\text{NetPositivity}$  agree, and 0 otherwise. Although it is not a formal hypothesis, verification of net positive linguistic tone may be more important to investors, and to examine whether this is true, we partition  $\text{SignsAgree}$  into the cases where both signals are positive ( $\text{SignsAgree}+/+$ ) and both signals are negative ( $\text{SignsAgree-/-}$ ). The verification hypothesis also predicts attenuation of price reaction to linguistic tone when forecasts are imprecise and thus more difficult to verify ex post (H2b).  $\text{DWidth}$  equals 1 when  $\text{Width}$  is greater than the sample median and 0 otherwise.  $\text{Width}$  is the high minus low endpoints of a management range forecast, divided by price. Point forecasts are set to  $\text{Width} = 0$ , and minimum and maximum forecasts are set to the highest value of  $\text{Width}$  in the sample.  $\text{Rounding}$  equals 1 if the management forecast is perfectly divisible by \$0.05, and zero otherwise. H2b predicts negative coefficients on the  $\text{DWidth} * \text{NetPositivity}$  and  $\text{Round} * \text{NetPositivity}$  interactions ( $\gamma_{14}, \gamma_{15} < 0$ ). The final verification hypothesis (H2c) predicts a positive coefficient on  $\text{ForecastReputation} * \text{NetPositivity}$  ( $\gamma_{16} > 0$ ).  $\text{ForecastReputation}$  equals the log of the count of the total number of management forecasts issued over the prior five years (maximum of one per period) times the

average management forecast usefulness computed as in Williams (1996). Average forecast usefulness is zero if the firm did not issue a management forecast in the five prior years. Thus, the proxy is increasing in the historical ability of managers to bring analysts closer to actual earnings and the length of the forecasting history available for investors to assess that ability.

If litigation risk disciplines managers and enhances the credibility of linguistic tone (H3), then the coefficient on the *Litigation\*NetPositivity* is positive ( $\gamma_{17} > 0$ ). *Litigation* equals the probability of litigation estimated as the fitted value in the model provided by Rogers and Stocken (2005). If linguistic tone suffers credibility due to the hyperbole bias (H4), then the coefficient on the product of the absolute value of linguistic tone and linguistic tone, *|NetPositivity|\*NetPositivity*, is negative ( $\gamma_{18} < 0$ ).

Finally, the information environment hypothesis (H5) predicts that a rich predisdisclosure information environment (H5a) and bundling with an earnings release (H5b) attenuate price reaction to linguistic tone, while a long disclosure horizon (H5c) enhances the price reaction to linguistic tone. We measure *Size* as the log of the firm's market value at the beginning of the forecast year. *Bundled* equals 1 if an earnings release occurs within a 2 days of the management earnings forecast press release, and 0 otherwise. *Horizon* equals the number of calendar days between the management forecast and the subsequent earnings release. H5 predicts  $\gamma_{19} < 0$  on *Size\*NetPositivity*,  $\gamma_{20} < 0$  on *Bundled\*NetPositivity*, and  $\gamma_{21} > 0$  on *Horizon\*NetPositivity*.

We control for the other information in the release (*FSURP*, *OtherFSURP*, and *UE*), the tendency for annual forecasts to be used to convey good news (*Annual* equal to 1 if an annual forecast and 0 if a quarterly forecast), and three other variables found by Demers and Vega (2011) to be modifiers of the pricing of linguistic tone in earnings releases. *Certainty* is a measure of linguistic certainty derived from the language in the management forecast press release using the Loughran and McDonald (2010) approach (multiplied by -100). *AnalystFollowing* is the log of the number of analysts providing forecasts at the management earnings forecast date. *LaggedEarnInform* is the adjusted  $R^2$  for a regression of 12-month stock returns (accumulated from the beginning of the fourth month of the fiscal year) on annual earnings and changes in earnings over the preceding 15 years.

Table 3 presents Pearson product-moment correlations among the regression variables. Some correlations are relatively high. Accordingly, we examine multi-collinearity diagnostics when estimating the regression and take appropriate actions (described later) when variance inflation factors are too large.

Our main results appear in Table 4. Confirming our earlier findings for the base model, we find significant positive coefficients on the *FSURP* control and the *NetPositivity* baseline. For econometric reasons, we include intercept shifts on the effects of interest, but our hypotheses relate to slope shifts.<sup>12</sup>

Turning attention to the coefficients of interest on the slope shifts, all of our hypotheses are supported by the data. As predicted by H1, language inflation results in a stronger reaction to more credible negative tone.<sup>13</sup> As predicted by H2, the management forecast serves as a contemporaneous verifier of linguistic tone. Agreement of the signs of the quantitative hard management forecast news and linguistic tone enhance the price reaction to linguistic tone, more so for confirmed positive tone. The slope shift coefficient involving *SignsAgree+/-* (positive tone confirmed by hard news) is nearly three times larger than the slope shift coefficient involving *SignsAgree-/-* (negative tone confirmed by hard news). This differential result is also consistent with H1. H2 is also supported by the fact that deterioration of hard forecast news verifiability, evidenced by wider forecast ranges and rounding, both attenuate the pricing of linguistic tone. As predicted by H3, litigation risk results in more credible linguistic tone with stronger associated price impacts.<sup>14</sup> As predicted by H4, language hyperbole is discounted. Finally, as predicted by H5, the information environment has a significant effect on the pricing of linguistic tone. The rich pre-disclosure information environment proxied by firm size and the

---

<sup>12</sup> We do not have a separate intercept shift for the absolute value of *NetPositivity* because doing so would create a singular matrix. This situation can be rectified by re-estimating the model with the intercept shift but with the *NegativeTone* and *NegativeTone\*NetPositivity* variables removed. We did so, and our results (not tabulated) are similar and our conclusions are not altered.

<sup>13</sup> Even though Table 3 shows a high negative correlation between *NegativeTone* and *NetPositivity*, collinearity diagnostics do not indicate a potential problem with the estimation of the slope shift for negative tone. Nonetheless, we performed a bin analysis of the hypothesis as in Hutton et al. (2003) and regression tests outlined by Kothari et al. (2009) to supplement Table 4's test of H1. Our results on H1 (not tabulated) are robust to the use of these alternative tests.

<sup>14</sup> A concurrent working paper by Bonsall, Bozanic, and Fischer (2012) finds a similar result for earnings releases.

bundling with a highly reliable, historical earnings release attenuates the price response to linguistic tone, and long-horizon disclosure enhances the price response to linguistic tone.<sup>15</sup>

The coefficients on control variables are generally insignificant, many of them for reasons described earlier. However, the results on the *Certainty*, *AnalystFollowing*, and *LaggedEarnInform* deserve further analysis because Demers and Vega (2011) find that they are determinants of cross-sectional pricing of linguistic tone in the earnings press release setting. Note that the coefficient on *Certainty* is significantly positive as documented by Demers and Vega. Also, t-statistics on *AnalystFollowing* and *LaggedEarnInform* are above one and in the direction they hypothesize and document. The non-significance of these later two variables is likely explainable by the fundamental difference in our setting. In the management forecast press release setting, the management forecast provides a contemporaneous verifier of linguistic tone, and the forecast has its own unique properties: width, rounding, forecast reputation, horizon, and disclosure venue. In this setting, it appears that these unique properties dominate.<sup>16</sup>

## V. Additional Tests

### Post-Announcement Drift

Market efficiency is a maintained assumption in our analysis. However, in a descriptive vein, we re-estimated our main regression model replacing the dependent variable *AR3* with *AR60*, an analogous 60

---

<sup>15</sup> Collinearity diagnostics indicate high variance inflation factors for some of these variables. Multicollinearity is less of a problem given that our coefficient estimates are generally highly significant and in always in the direction predicted by theory. However, we examined results using several alternative specifications of the regression. First, we dropped various combinations of the variables causing the collinearity. These variables are *|NetPositivity|* and *Size*. In the presence of multi-collinearity, coefficients remain unbiased. Dropping these variables can bias the coefficients on other variables. However, when we do so, there is little change in the coefficient on the variable and its t-statistic indicating that any potential bias is minimal. Our results are robust to all of these alternative specifications.

<sup>16</sup> To check for this possibility, we re-estimate the regression in the venue where language is likely most powerful (not bundled with an earnings release) with the intercept and slope shifts discarded. In such a regression, the effects of the *Certainty*, *AnalystFollowing*, and *LaggedEarnInform* are measured (as opposed to effects incremental to the unique management forecast conditions). We find (results not tabulated) significance on the variables in the direction found by Demers and Vega (2011). We also re-estimated the Table 4 regression with additional slope shifts on *FSURP* for each of the hypothesized variables, and our results are robust to this alternative specification.

day post-announcement drift return. In untabulated results, we do not detect price reversals, which implies that the price responses in our main tests are not temporary.

### **Annual versus Interim Forecasts**

We re-test our main hypotheses for annual and interim forecast separately for several reasons. First, because annual and interim forecasts are often packaged, splitting the sample and analyzing them separately leads to greater independence of the linguistic tone measures. Second, the annual and interim forecasts may be somewhat redundant,<sup>17</sup> an observation that is supported by the high rank correlations and sign agreements between the simultaneously released annual and interim forecasts in our sample (not tabulated). Third, several past studies have documented that annual and interim forecasts have different properties, generating, for example, different price reactions (e.g., Pownall and Waymire 1989). Of greatest importance to our study, annual forecasts have longer horizons, a characteristic that generally yields higher forecast errors and increases the likelihood that intervening events might explain the forecast errors (i.e., rather than management's lack of forecasting ability). These differences raise the possibility of different results in the two sub-samples.

Table 5 reports the results on hypotheses of interest. All controls are present but are suppressed in the table. The results are very similar but not identical. Forecast width is more important in the annual forecast sample while rounding is more important in the interim sample. Forecast reputation and forecast horizon matter in the annual sample, but not in the interim sample. Table 3 reports that in the full sample, forecast width and horizon have one of the higher correlations among regression variables (0.24) which is not surprising given the literature on forecast specificity (e.g., Baginski, Hassell, and Conrad 1993). Shorter horizons and corresponding forecast range widths likely suppress variability in these two proxies in the interim sample.

---

<sup>17</sup> One can view the annual forecast sample as potentially containing an additional interim forecast in the press release that is subsumed by the annual forecast. Likewise, one can view the interim forecast sample as potentially containing an annual forecast that is merely the implication of the interim forecast for annual earnings.

## **Bundled versus Unbundled Forecasts**

We re-test our main hypotheses for bundled and unbundled forecasts separately. Bundled forecasts have properties that distinguish them from unbundled forecasts on the dimensions of forecast tone and presence of conflicting hard earnings news (Rogers and VanBuskirk 2011) as well as incremental information content (Atiase et al. 2005). A separate analysis is further justified by the possibility that bundled management forecasts are intended as a comment on the earnings release. If so, it might not be possible to cleanly distinguish which aspects of the language in the bundled press releases pertain to the historical earnings announcement versus the forward-looking management forecast, and the properties of the historical earnings announcements have been examined at length in prior studies.

Table 6 presents the re-estimation. Consistent with our finding of less price reaction to linguistic tone in bundled forecasts, the modifiers of that reaction are also far less important. However, an examination of our results for unbundled forecasts suggests that our conclusions are robust to the discarding of bundled forecasts.

## **Regulatory Effects**

Regulation Fair Disclosure (Reg FD) was issued in October of 2000 and the Sarbanes-Oxley Act (SOX) became law in August of 2002. These two regulatory changes were intended to increase the fairness of disclosure through equal access and the credibility of disclosure. We did not incorporate variables for Reg FD and SOX in our main analysis because those tests include year fixed effects. However, given that these two major regulatory changes are potential correlated omitted variables, we re-estimated our model appending intercept and slope shift variables for the two events.

Table 7 presents the results (year fixed effects no longer included). Although weakly positive, the slope shifts for RegFD and SOX are insignificant and other results are not affected. The intercept shifts are significantly positive. If we estimate a single regression for these two effects, both are



insignificant due to their high correlation (i.e., the indicator variables take on different values in only approximately 26 months out of 120 months in the sample period).<sup>18</sup>

### **Further Exploration of Unverified Positive Linguistic Tone**

Our results suggest that unverified optimism is discounted by investors. Although we do not have a theory to suggest a set of variables to explain the phenomenon of unverified optimism, we attempt to explore the phenomenon further. We estimate a regression of following form:

$$NetPositivity_{jt} = \delta_0 + \delta_1 FSURP_{jt} + \Delta_{2i} (\text{Candidate variables}) + \varepsilon \quad (3)$$

Control for *FSURP* in equation (3) allows the candidate variables to explain the linguistic optimism not immediately verified by the management forecast news. For each candidate variable we provide a discussion of what alternative coefficient signs suggest.

*Litigation.* Although managers have incentives to increase stock prices with optimistic disclosures, fear of litigation based on voluntary disclosures that are ex post over-optimistic tempers the tendency towards over-optimism in voluntary disclosures (Skinner 1994; Kasznik and Lev 1995; Baginski et al. 2002; Rogers and Stocken 2005). Consistent with this, Rogers et al. (2011) document that managers use of optimistic language increases litigation risk by showing that plaintiffs target optimistic statements in their lawsuits and that, controlling for a firm's economic conditions, sued firms have unusually linguistically optimistic earnings announcements. If optimistic linguistic bias can be detected, then managers will avoid increased legal costs by tempering their optimism (a negative sign). Alternatively, if optimistic linguistic bias cannot be detected, then managers may not temper their optimism (no relation). *Litigation* (as previously defined) is our proxy variable.

*Financial distress.* Rogers and Stocken (2005) argue that managers whose firms are in financial distress have an incentive to bias their forecasts upwards as a means of convincing investors of their

---

<sup>18</sup> Our results are also robust to re-estimation with a small number of firms in regulated industries discarded.

ability to restore their firms to financial health. Accordingly, we expect linguistic optimism to be positively associated with financial distress if linguistic bias is not detectable (a positive sign). Alternatively, detectable bias will mitigate this tendency (no relation or possibly a negative sign given that financially distressed firms have bad news to report). *Distress* equals one when the fitted value from Ohlson's (1980) bankruptcy prediction model is in the most distressed decile and zero otherwise.

*Product market competition.* Optimism is also costly because it signals high industry profitability, which in turn may encourage entry into the industry by potential competitors. Therefore, firms in more concentrated (i.e., less competitive) industries are apt to downward bias their voluntary disclosures (Newman and Sansing 1993), leading us to expect that managers of these firms will temper their linguistic optimism (a negative sign). Alternatively, if optimistic linguistic bias cannot be detected, then managers may not temper their optimism (no relation). *Concentration* is the proxy variable. It equals the Herfindahl-Hirschman Index using sales of all firms in the same four-digit SIC code

*Political costs.* Li (2010) argues that political costs (proxied by *Size* as previously defined) temper the use of optimistic language, and he documents this effect in the Management Discussion and Analysis section of the annual report (a negative sign). If tempering optimism is not an effective way of reducing political costs, then the tendency may not be present (no relation).

*Disclosure horizon.* Managers choose their forecast horizon. A common finding in prior research is the tendency for annual (interim) forecasts to be used to convey good (bad) news (e.g., Skinner 1994). Predominately good news annual forecasts do not necessarily represent a bias, but they are consistent with Kothari et al.'s (2009) hypothesis of earlier disclosure of good news. Managers' ability to hide bias in an annual forecast is also enhanced since annual forecasts have expected lower accuracy, and any errors can be explained more readily by appeal to the length of time during which unexpected intervening events have occurred to render the manager's forecast less accurate (a positive sign). If the bias is detectable however, the tendency is unlikely to exist (no relation). *Annual* (as previously defined) is the proxy variable.

*General uncertainty.* The existence of uncertainty allows a greater opportunity for positive bias (a positive sign). However, uncertainty also leads to greater forecast errors, which are more costly in the case of optimism. To avoid these costs, the manager may avoid upward bias or may downward bias optimism (no relation or a negative sign). We proxy general uncertainty by *StdDevPrior*, which equals the standard deviation of analysts' EPS forecasts prior to the management forecast.

*Earnings usefulness.* If earnings are not strongly related to prices, managers might use linguistic tone opportunistically to convey beliefs (a positive sign). Again, if detectable, they may not (no relation). We proxy earnings usefulness using *LaggedEarnInform* as previously defined.

*Forecast reputation.* If managers have a good forecast reputation and wish to keep it, they may refrain from the typical upward-biased language (negative sign). However, a good forecast reputation presents an opportunity to bias (no relation or a positive sign). *ForecastReputation* is as previously defined.

*Regulation effects.* The primary intention of Reg FD is to prohibit the nonpublic leaking of good news through analysts which could lead to a bad news delay effect. Kothari et al. (2009) argue that post-Reg FD forecasts should exhibit a mitigated bad news delay effect, consistent with the idea that net positive tone is not being leaked early through analysts but appears in the public management forecast release post-Reg FD (positive sign). The intent of SOX is to increase the credibility of disclosures. Managers may wish to avoid the potential increased legal liability associated with SOX by either avoiding over-optimism (negative sign), or, if they believe that legal exposure to language is relatively less than hard news, then they may issue positive news in linguistic form (positive sign).

In each of the scenarios described above, detectability is likely to cause a mitigation of any real linguistic bias. Such detectability is plausible due to the existence of a contemporaneous verifier and the fact that language predicts a verifiable number, future earnings.

Table 8 presents the estimation of equation (3). The coefficient on *FSURP* is significantly positive, as expected, indicating that linguistic tone is generally consistent with the hard forecast news. Unverified linguistic optimism is decreasing in the probability of litigation, suggesting that managers pay

attention to language's potential legal exposure as documented by Rogers et al. (2011). Unverified linguistic optimism is decreasing in firm size, consistent with the argument put forth by Li (2010) that political costs dampen optimistic language. We detect more optimistic language in forecasts of annual results, consistent with the tendency for managers to use interim forecasts more often to convey bad news (e.g., Skinner 1994) and the difficulty of assessing longer-horizon forecast quality. Unverified linguistic optimism is also decreasing in the presence of general uncertainty. Finally, unverified linguistic optimism is far greater after major regulatory changes. Consistent with Kothari et al.'s (2009) argument, more public release of optimistic news, as opposed to private leakage, occurs after the passage of Reg FD. Also, potentially due to fear of legal liability for unattained good news and the belief that the legal exposure is less for language relative to hard news, managers' linguistic optimism increases post-SOX.

## **VI. Conclusion**

We contribute to the literature by examining the role of language in the voluntary disclosure context of management forecast press releases. We provide empirical evidence to confirm two results from prior research in our unique forecast setting, the facts that linguistic tone is incrementally priced and that it is generally consistent with accompanying hard news. We use the cheap talk literature, known language biases, management incentives, institutional factors, and the unique characteristics of management earnings forecasts to identify a set of conditions which either enhance or attenuate the pricing of linguistic tone. We provide empirical evidence that language inflation and hyperbole lead to stronger price reactions to negative tone and a general discounting of extreme absolute tone, respectively. Consistent with the notion that management forecasts serve as contemporaneous verifiers of accompanying linguistic tone, we find evidence that when management forecast news sign verifies the sign of linguistic tone, linguistic tone's pricing is enhanced. The effect of sign agreement is stronger when a good news quantitative forecast confirms positive linguistic tone. Management forecast reputation also enhances the verification role of hard forecasts for language. Greater forecast reputation leads to greater price reaction to linguistic tone. When management forecast verifiability is compromised by imprecision, linguistic tone

pricing is attenuated. Institutional factors also affect the pricing of linguistic tone. Litigation risk disciplines management behavior, and the pricing of likely more credible linguistic tone is enhanced when firms face greater litigation risk. The pricing of linguistic tone is attenuated in richer pre-disclosure information environments. In long horizon forecasts in which the pre-disclosure information environment is likely weaker, linguistic tone pricing is enhanced. However, if the management forecast is issued near or with an earnings release, linguistic tone's pricing is attenuated.

In exploratory supplemental tests, we further investigate a general finding in our study, that linguistic optimism unverified by concurrent management forecast news is most likely to be discounted by investors. We document that this unverified linguistic optimism is decreasing in litigation risk, size and general uncertainty, and increasing in whether the forecast is an annual forecast, post-Regulation FD, and post-Sarbanes-Oxley.

Our findings suggest potential extensions of future research in the management forecast area. For example, prior research has tested the efficiency of management forecasting by calculating the association of public information such as past accruals (Gong et al. 2000; Xu 2010) and past management forecast errors (Xu 2009) with subsequent management forecast accuracy. This prior research ignores linguistic tone, which appears to be a very credible and powerful way to communicate earnings expectations. Also, very few studies consider cross-sectional differences in the credibility and pricing of language. Because language has been linked to fundamentals such as earnings, it is worthwhile to extend our knowledge of the pricing of language through a more thorough analysis of that link. Finally, as evidence builds that apparently non-verifiable disclosure is priced, identification of how verification might occur or what costs determine the credibility of these unique disclosures is warranted.

## **Appendix A**

### **Factiva Article Matching to CRSP and First Call Databases**

The keyword search in Factiva yielded 6,180 candidate earnings forecasts (3,577 DJBN and 2,603 PRN) for the period 1997 through 2006. In order to make use of these observations and to verify whether these candidate articles are indeed management earnings forecasts, we have undertaken the following sequence of steps: first, we sorted the 6,180 observations and obtained 2,073 unique company names; second, we have attempted to map the 2,073 companies into the CRSP database in order to obtain unique firm identifiers (i.e., cusip and permno) for merging our announcement data with other standard databases; and third, we have verified for each candidate observation whether there is a corresponding management forecast included in the First Call database during the 3-day window centered on the Factiva article's date.

### **Matching from Factiva to CRSP**

Where available, the ticker symbol associated with the firm covered in the newswire article was extracted electronically from the text of the Factiva download using the Factiva ticker symbol tag where available. In many instances, particularly for the PR Newswire articles later in the sample period, there were no tagged ticker symbols included in the Factiva output. Accordingly, we developed an algorithm that used the unique Factiva codes to generate smart guesses at the firm's ticker symbol. Factiva has assigned unique ticker-symbol-like codes to each firm in its database. These codes are often similar, if not identical, to the firm's ticker symbol. Accordingly, we first tried to match the Factiva code as closely as possible to a ticker symbol in the CRSP master list using Stata. We then verified the accuracy of these guesses by using a second automated algorithm to compare a string from the Factiva tagged company name to a string from the company name in the CRSP master list. All of these automated "candidate matches" were then manually verified. Most of the incorrect matches related to companies whose names contained initials or that were characterized as having a generic first name in their corporate name (e.g.,

“General” or “National”). In over 800 cases, a Factiva code, ticker symbol, and/or company name was not extractable using standard programming techniques. For these unmatched Factiva observations as well as for those that were found to have been erroneously matched due to initialed or generic corporate names, we manually matched the Factiva article’s company details into the CRSP master list. A review of the observations we failed to match suggests that many of them relate to foreign companies, venture capital organizations, pre-IPO entities, or other firms that are appropriately excluded from our sample, or that the Factiva articles were generated by market analysts discussing a sector or firm’s prospects rather than being management forecasts.

### **Confirming the Candidate Earnings Forecasts with First Call**

Using the full candidate sample of 6,180 news articles, we attempt to match into First Call by cusip, ticker symbol, and/or company name. We consider a match to be any management forecast issued within a three-day window centered on the Factiva event day. Using this procedure we are able to match 4,312 of the candidate Factiva-based earnings forecasts with First Call management forecast data. After requiring additional data to measure management incentives proxies and other variables, our final sample is 3,807 forecasts

## References

- Aboody, D. and R. Kasznik. 2000. CEO stock option awards and the timing of corporate voluntary disclosures. *Journal of Accounting and Economics* 29: 73-100.
- Admati, A. R., and P. Pfleiderer. 2004. Broadcasting opinions with an overconfident sender. *International Economic Review* 45: 467-498.
- Ajinkya, B., and M. Gift. 1984. Corporate managers' earnings forecasts and symmetrical adjustments of market expectations. *Journal of Accounting Research* 22: 425-444.
- Anderson, E. 1998. Customer satisfaction and word of mouth. *Journal of Service Research*: 5-17.
- Anilowski, C., M. Feng, and D. Skinner. 2007. Does earnings guidance affect market returns? The nature and information content of aggregate earnings guidance. *Journal of Accounting and Economics* 44: 36-63.
- Atiase, R. 1985. Predisclosure information, firm capitalization, and security price behavior around earnings announcements. *Journal of Accounting Research* 23: 21-36.
- Atiase, R., H. Li, S. Supattarakul, and S. Tse. 2005. Market reaction to multiple contemporaneous earnings signals: Earnings announcement and future earnings guidance. *Review of Accounting Studies* 10: 497-525.
- Baginski, S., E. Conrad, and J. Hassell. 1993. The effects of management forecast precision on equity pricing and on the assessment of earnings uncertainty. *The Accounting Review* 68: 913-927.
- Baginski, S., and J. Hassell. 1997. Determinants of management forecast precision, *The Accounting Review* 72: 303.
- Baginski, S., J. Hassell, and M. Kimbrough. 2002. The effect of legal environment on voluntary disclosure: Evidence from management earnings forecasts issued in U.S. and Canadian markets. *The Accounting Review* 77 (1): 25-50.
- Baginski, S., J. Hassell, and M. Kimbrough. 2004. Why do managers explain their earnings forecasts? *Journal of Accounting Research* 42: 1-29.
- Balakrishnan, K., and E. Bartov. 2010. Analysts' use of qualitative earnings information: Evidence from the IPO prospectus' risk factors section, unpublished working paper, New York University.
- Bamber, L., and S. Cheon. 1998. Discretionary management earnings forecast disclosures: Antecedents and outcomes associated with forecast venue and forecast specificity choices. *Journal of Accounting Research* 36: 167-190.
- Bamber, L., K.Hui, and E. Yeung. 2010. Managers' EPS forecasts: Nickeling and diming the market? *The Accounting Review* 85: 63-95.
- Benabou, R., and G. Laroque. 1992. Using privileged information to manipulate markets: Insiders, gurus, and credibility. *Quarterly Journal of Economics* 107:



- Bertrand, M., D. Karlan, S. Mullainathan, E. Shafir, and J. Zinman. 2010. What's advertising content worth? Evidence from a consumer credit marketing field experiment. *The Quarterly Journal of Economics* 125 (1): 263-305.
- Bonsall, S., Bozanic, and P. Fischer 2012. When is soft talk informative? Unpublished working paper, Penn State University, The Ohio State University, and the University of Pennsylvania, *SSRN eLibrary*.
- Chuk, E., D. Matsumoto, and G. Miller. 2009. Assessing methods of identifying management forecasts: CIG vs. Researcher collected. Unpublished working paper, University of Washington and University of Michigan, *SSRN eLibrary*.
- Crawford, V., and J. Sobel. 1982. Strategic information transmission. *Econometrica* 50: 1431-1451.
- Davis, A., J. Piger, and L. Sedor. 2012. Beyond the numbers: Measuring the information content of earnings press release language. *Contemporary Accounting Research*, forthcoming.
- Davis, A., and I. Tama-Sweet. 2011. Managers' use of language across alternative disclosure outlets: Earnings press releases versus MD&A. *Contemporary Accounting Research*, forthcoming.
- Demers, E., and C. Vega. 2011. Linguistic tone in earnings press releases: News or noise? Unpublished working paper, INSEAD, *SSRN eLibrary*.
- Dye, R., and S. Sridhar. 2004. Reliability-relevance trade-offs and the efficiency of aggregation. *Journal of Accounting Research* 42: 51-88.
- Feldman, R., S. Govindaraj, J. Livnat, and B. Segal. 2010. The incremental content of tone change in management discussion and analysis. *Review of Accounting Studies* forthcoming.
- Freeman, R. 1987. The association between accounting earnings and security returns for large and small firms. *Journal of Accounting & Economics* 9: 195-228.
- Gong, G., L. Li, and H. Xie. 2009. The association between management earnings forecast errors and accruals. *The Accounting Review* 84: 497-530.
- Gneezy, U. 2005. Deception: The role of consequences. *American Economic Review* 95 (1): 384-394.
- Hermelin, B., and M. Weisbach. 2007. Transparency and corporate governance. Unpublished working paper.
- Hurkins, S., and N. Kartik. 2009. Would I lie to you? On social preferences and lying aversion. *Experimental Economics* June.
- Hutton, A., and P. Stocken. 2009. Prior forecasting accuracy and investor reaction to management earnings forecasts. Unpublished working paper, Boston College and Dartmouth. *SSRN eLibrary*.
- Hutton, A., G. Miller, and D. Skinner. 2003. The role of supplementary statements with management earnings forecasts. *Journal of Accounting Research* 41: 867-890.
- i Vidal, J. 2003. Credibility and cheap talk of security analysts: Theory and evidence. Unpublished working paper, London School of Economics, *SSRN eLibrary*

- Jennings, R. 1987. Unsystematic security price movements, management earnings forecasts, and revisions in consensus analyst earnings forecasts. *Journal of Accounting Research* 25: 90-110.
- Kartik, N. 2009. Strategic communication with lying costs. *Review of Economic Studies* 76: 1359-1395.
- Kaszniak, R., and B. Lev. 1995. To warn or not to warn: Management disclosure in the face of an earnings surprise. *The Accounting Review* 70 (1): 113-134.
- King, R., G. Pownall, and G. Waymire. 1990. Expectations adjustments via timely management forecasts: Review, synthesis, and suggestions for future research. *Journal of Accounting Literature* 9: 113-114.
- Kothari, S., S. Shu, and P. Wysocki. 2009. Do managers withhold bad news? *Journal of Accounting Research* 47: 241-276.
- Li, E., C. Wasley, and J. Zimmerman. 2012. Should management guidance be pooled? Classifying management earnings guidance into capital market, opportunistic, and disclose or abstain rationales: Implications for research. Unpublished working paper, University of Rochester. *SSRN eLibrary*.
- Li, F. 2010. The information content of forward-looking statements in corporate filings – a naïve Bayesian machine learning approach. *Journal of Accounting Research*
- Loughran, T. and B. McDonald. 2011. When is a liability not a liability? *Journal of Finance* 66: 35-55.
- Mangen, C., and A. Durnev. 2010. The real effects of disclosure tone: Evidence from restatements, *SSRN eLibrary*.
- Michels, J. 2012. Do unverifiable disclosures matter? Evidence from peer-to-peer lending. *The Accounting Review* forthcoming.
- Morgan, J., and P. Stocken. 2003. An analysis of stock recommendations. *Rand Journal of Economics* 34: 183-203.
- Mullainathan, S., J. Schwartzstein, and A. Shleifer. 2008. Coarse thinking and persuasion. *The Quarterly Journal of Economics* 123 (2): 577-619.
- Newman, P., and R. Sansing. 1993. Disclosure policies with multiple users. *Journal of Accounting Research* 31: 92-112.
- Ng, J., A. Tuna, and R. Verdi. 2011. Management forecast credibility and underreaction to news. *SSRN eLibrary*.
- Ohlson, J. 1980. Financial ratios and the probabilistic prediction of bankruptcy. *Journal of Accounting Research* 18 (1): 109-131.
- Peterson, M. 2009. Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies* 22: 435-480.

- Rogers, J., and A. Van Buskirk. 2011. Bundled forecasts and selective disclosure of good news. Unpublished working paper, University of Chicago.
- Rogers, J., A. Van Buskirk, and S. Zechman. 2011. Disclosure tone and shareholder litigation. *The Accounting Review* 86 (6):
- Rogers, J., and P. Stocken. 2005. Credibility of management forecasts. *The Accounting Review* 80: 1233-1260.
- Pownall, G., and G. Waymire. 1989. Voluntary disclosure and security prices: Evidence from management earnings forecasts, 1969-1973. *Journal of Accounting Research* 27: 227-245.
- Skinner, D. 1994. Why firms voluntarily disclose bad news. *Journal of Accounting Research* 32 (1): 38-60.
- Stocken, P. 2000. Credibility of voluntary disclosure. *The RAND Journal of Economics* 32 (2): 359-374.
- Verrecchia, R. 2001. Essays on disclosure. *Journal of Accounting and Economics* 32: 97-180.
- Waymire, G. 1984. Additional evidence on the information content on management earnings forecasts. *Journal of Accounting Research* 22: 703-718.
- Xu, W. 2009. Evidence that management earnings forecasts do not fully incorporate information in prior forecast errors. *Journal of Business, Finance, and Accounting* 36: 822-837.
- Xu, W. 2010. Do management earnings forecast incorporate information in accruals? *Journal of Accounting and Economics* 49: 227-246.

**TABLE 1**  
**Descriptive Statistics**

**Panel A: Variable Distributions for Continuous Variables**

	<b>N</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>25<sup>th</sup> percentile</b>	<b>Median</b>	<b>75<sup>th</sup> percentile</b>
<i>AR3</i>	3,807	-0.0337	0.1180	-0.0714	-0.0126	0.0323
<i>ExPostForecastOptimism</i>	3,799	0.0176	0.0338	-0.0004	0.0048	0.0360
<i> ExPostForecastOptimism </i>	3,799	0.0298	0.0296	0.0013	0.0095	0.0391
<i>NetPositivity (L&amp;M proxy)</i>	3,807	-0.0020	0.0099	-0.0086	0.0000	0.0044
<i>NetPositivity (Diction proxy)</i>	3,807	0.4585	1.5482	-0.4000	0.2000	0.8700
<i>FSURP</i>	3,807	0.0021	0.0208	-0.0029	0.0000	0.0038
<i>Size</i>	3,807	7.6231	1.7792	6.2826	7.5069	8.9469
<i>ForecastReputation</i>	3,807	-0.0041	0.0200	-0.0051	0.0000	0.0023
<i>Horizon</i>	3,807	158.02	140.56	44.00	99.00	244.00
<i>Width</i>	3,807	0.0168	0.0515	0.0005	0.0015	0.0037
<i>UE</i>	3,807	-0.0008	0.0121	0.0000	0.0000	0.0001
<i>Certainty</i>	3,807	-0.3863	0.3474	-0.5681	-0.3260	-0.1141
<i>Litigation</i>	3,807	0.2407	0.3431	0.0078	0.0459	0.3523
<i>Concentration</i>	3,807	0.2255	0.1691	0.1025	0.1802	0.2956
<i>AnalystFollowing</i>	3,807	2.1371	0.8312	1.6094	2.3025	2.7725
<i>LaggedEarnInform</i>	3,807	0.0307	0.0728	-0.0036	0.0066	0.0356
<i>StdDevPrior</i>	3,807	0.0359	0.0512	0.0100	0.0200	0.0400

**Panel B: Variable Distributions for Dichotomous Categorical Variables**

	<b>N</b>	<b>Yes = 1 (%)</b>	<b>No = 0 (%)</b>
<i>NegativeTone</i>	3,807	1,761 (46.2%)	2,046 (53.8%)
<i>SignsAgree</i>	3,807	2,379 (62.5%)	1,428 (37.5%)
<i>Bundled</i>	3,807	1,733 (45.5%)	2,074 (54.5%)
<i>Distress</i>	3,693	436 (11.8%)	3,257 (88.2%)
<i>Annual</i>	3,807	1,692 (44.4%)	2,115 (55.6%)
<i>Round</i>	3,807	1,071 (28.1%)	2,736 (71.9%)

**Panel C: Form Distribution**

	<b>N (%)</b>
Point	708 (18.6%)
Range	2,822 (74.1%)
Minimum	165 (4.3 %)
Maximum	112 (3.0%)

**Panel D: Year Distribution**

<b>Year</b>	<b>N (%)</b>
1997	131 (3.4%)
1998	215 (5.7%)
1999	314 (8.3%)
2000	361 (9.5%)
2001	525 (13.8%)
2002	546 (14.3%)
2003	489 (12.8%)
2004	447 (11.7%)
2005	416 (10.9%)
2006	363 (9.6%)

**TABLE 1 continued**

*AR3* is the size and book-to-market adjusted 3-day announcement period.

*ExPostForecastOptimism* equals the management EPS forecast minus actual EPS, divided by price.

$|ExPostForecastOptimism|$  equals the absolute forecast error.

*NetPositivity* are the language metrics derived from the management forecast as described in the text using a) the Loughran and McDonald (2010) approach (L&M proxy), the Diction approach (Diction proxy).

*FSURP* is the management forecast surprise measured as the point (or midpoint of the range or disclosed minimum or maximum) forecast minus the preceding median consensus analyst forecast, scaled by price.

*Size* is the log of the firm's market value at the beginning of the forecast year.

*ForecastReputation* equals the log of the count of the total number of management forecasts issued over the prior five years (maximum of one per period) times the average management forecast usefulness computed as in Williams (1996). Average forecast usefulness is zero if the firm did not issue a management forecast in the five prior years.

*Horizon* equals the number of calendar days between the management forecast and subsequent earnings release.

*Width* equals the high minus low endpoints of the management range forecast, divided by price (point forecasts are set to  $Width = 0$ , minimum and maximum forecasts are set to the highest value of *Width* in the sample).

*UE* is the unexpected earnings announced in the bundled press releases, defined as actual earnings per share minus the preceding median analyst forecast of earnings per share for bundled forecasts and zero for unbundled forecasts.

*Certainty* is a measure of linguistic certainty derived from the language in the management forecast press release using the Loughran and McDonald (2010) approach (multiplied by -100).

*Litigation* equals probability of litigation estimated as the fitted value in the model in Rogers and Stocken (2005).

*Concentration* equals the Herfindahl-Hirschman Index using sales.

*AnalystFollowing* is the log of the number of analysts providing forecasts at the management earnings forecast date.

*StdDevPrior* equals the standard deviation of analysts' EPS forecasts prior to the management forecast.

*LaggedEarnInform* is the adjusted  $R^2$  for a regression of 12-month stock returns (accumulated from the beginning of the fourth month of the fiscal year) on annual earnings and changes in earnings over the preceding 15 years.

*NegativeTone* equals 1 if *NetPositivity* < 0, and 0 otherwise.

*SignsAgree* equals 1 if the signs of *FSURP* and *NetPositivity* agree, and 0 otherwise.

*Bundled* equals 1 if an earnings release occurs within 2 days of the management earnings forecast press release date, and 0 otherwise.

*Distress* equals 1 when fitted value is in the most distressed decile using Ohlson's (1980) bankruptcy model, and 0 otherwise.

*Round* equals 1 if the management forecast is perfectly divisible by \$0.05, and zero otherwise.

*Annual* equals 1 if an annual forecast and 0 if a quarterly forecast.

**TABLE 2**  
**Confirmation of Prior Literature's Findings in Management Forecast Press Releases**

**Panel A: Is the Linguistic Tone in Management Forecast Press-Releases Incrementally Priced? (AR3 is the dependent variable.)**

	L&M Proxy			Diction Proxy	Relative Pricing of Both Proxies
	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
<i>Intercept</i>	-0.0517 (-5.31)***	-0.0278 (-2.80)***	-0.0291 (-2.99)***	-0.0505 (-5.17)***	-0.0290 (-2.98)***
<i>FSURP</i>	1.2610 (9.51)***		1.0229 (8.29)***	1.2230 (9.61)***	1.0234 (8.30)***
<i>NetPositivity (L&amp;M)</i>		3.4408 (11.87)***	3.0229 (10.59)***		3.0318 (10.33)***
<i>NetPositivity (Diction)</i>				0.0074 (4.94)***	-0.0001 (-0.09)
<i>OtherFSURP</i>			-0.0343 (-0.69)	-0.0414 (-0.69)	-0.0344 (-0.68)
<i>UE</i>			-0.0251 (-0.14)	-0.0307 (-0.19)	-0.0247 (-0.14)
N	3,807	3,807	3,807	3,807	3,807
R <sup>2</sup>	12.6%	15.4%	18.3%	13.5%	18.3%
Firm/Date Clustered, Year Effects	Yes	Yes	Yes	Yes	Yes

**Panel B: Do the Signs of Linguistic Tone and Hard Management Forecast News Tend to Agree?**

	Sign of Linguistic Tone	
	Positive (%)	Negative (%)
<b>Hard Forecast News:</b>		
Good News (%)	1,305 (34.3%)	687 (18.0%)
Bad News (%)	741 (19.5%)	1,074 (28.2%)
$\chi^2$ test of independence	= 232.7 ( $p < 0.0001$ )	

\*\*\*/\*\*/\* indicates significance at the 0.01/0.05/0.10 levels in a one-tailed test.

Good (bad) news is defined as  $FSURP \geq 0$  ( $FSURP < 0$ ), where  $FSURP$  is the management earnings forecast surprise as defined in Table 1.

Positive (Negative) tone is defined as  $NetPositivity \geq 0$  ( $NetPositivity < 0$ ), where  $NetPositivity$  is the linguistic tone as defined in Table 1 for the L&M proxy.

**TABLE 3**  
**Correlations among Regression Variables**

		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)
1)	<i>AR3</i>																		
2)	<i>NetPositivity</i>	0.33*																	
3)	<i>NegativeTone</i>	-0.31*	-0.79*																
4)	<i>SignsAgree</i>	-0.01	-0.01	-0.02															
5)	<i>DWidth</i>	0.00	-0.04	0.05*	-0.02														
6)	<i>Round</i>	0.01	-0.04*	0.05*	0.00	0.20*													
7)	<i>ForecastReputation</i>	-0.08*	-0.05*	0.07*	-0.02	-0.01	-0.11*												
8)	<i>Litigation</i>	-0.05*	-0.02	0.01	0.02	-0.08*	-0.02	-0.027											
9)	<i> NetPositivity </i>	-0.22*	-0.45*	0.39*	0.12*	0.02	0.02	0.04*	-0.01										
10)	<i>Size</i>	0.12*	-0.02	0.02	-0.01	-0.20*	0.03	-0.21*	-0.04*	-0.05*									
11)	<i>Bundled</i>	0.26*	0.19*	-0.19*	-0.07*	0.03	0.06*	-0.09*	0.01	-0.27*	0.24*								
12)	<i>Horizon</i>	0.07*	0.11*	-0.08*	-0.03	0.24*	0.26*	-0.14*	0.00	-0.10*	0.11*	0.27*							
13)	<i>FSURP</i>	0.23*	0.20*	-0.16*	0.00	-0.00	0.07*	-0.19*	0.01	-0.11*	0.05*	0.15*	0.12*						
14)	<i>OtherFSURP</i>	0.06*	0.07*	-0.03	0.03	-0.00	0.01	0.13*	0.02	-0.03	-0.01	0.08*	-0.00	0.36*					
15)	<i>UE</i>	0.01	0.01	-0.01	0.03	-0.05*	-0.08*	-0.05*	0.04*	0.00	0.03	-0.07*	-0.05*	0.03	0.00				
16)	<i>Annual</i>	0.09*	0.98*	-0.07*	-0.01	0.24*	0.28	-0.23*	-0.05*	-0.09*	0.12*	0.18*	0.61*	0.14*	-0.01	0.00			
17)	<i>Certainty</i>	0.09*	0.34	-0.05*	0.03	-0.01	-0.01	-0.04	0.02	-0.04*	0.10*	0.25*	0.08*	0.08*	0.03	-0.01	0.05*		
18)	<i>AnalystFollowing</i>	0.09*	0.00	-0.01	-0.00	-0.11*	0.00	-0.16*	0.11*	-0.08*	0.59*	0.18*	0.06*	0.00	0.00	0.06*	0.15*	0.09*	
19)	<i>LaggedEarnInform</i>	-0.02	-0.02	0.02	0.01	0.06*	0.05*	-0.07*	-0.09*	0.03	-0.07*	-0.03	0.32	-0.06*	-0.08*	-0.02	0.04*	0.02	-0.08*

\* indicates significant Pearson correlation at the 0.01 level. See Table 1 for variable definitions.

**TABLE 4**  
**Pricing of Linguistic Tone in Management Forecast Press Releases**

<b>Dependent variable: AR3</b>	<b>Predicted Sign</b>	<b>Coefficient</b>	<b>t-statistic</b>
Intercept		-0.0274	-1.17
<i>NetPositivity</i> ( <b>Baseline</b> )	+	6.7137	3.52***
<b>Intercept Shifts:</b>			
<i>NegativeTone</i>		0.0061	0.57
<i>SignsAgree</i>		0.0003	0.06
<i>DWidth</i>		0.0046	1.10
<i>Round</i>		0.0024	0.06
<i>ForecastReputation</i>		-0.0659	-0.64
<i>Litigation</i>		-0.0087	-2.21**
<i>Size</i>		0.0033	1.79*
<i>Bundled</i>		0.0201	3.81***
<i>Horizon</i>		-0.0001	-2.09**
<b>Slope Shifts (Hypotheses):</b>			
<i>NegativeTone</i> * <i>NetPositivity</i> ( <b>H1</b> )	+	5.9563	4.21***
<i>SignsAgree</i> +/* <i>NetPositivity</i> ( <b>H2a</b> )	+	6.1602	5.77***
<i>SignsAgree</i> -/* <i>NetPositivity</i> ( <b>H2a</b> )	+	2.1437	2.78***
<i>DWidth</i> * <i>NetPositivity</i> ( <b>H2b</b> )	-	-0.9305	-2.04**
<i>Round</i> * <i>NetPositivity</i> ( <b>H2b</b> )	-	-1.0324	-2.29**
<i>ForecastReputation</i> * <i>NetPositivity</i> ( <b>H2c</b> )	+	19.8366	1.65**
<i>Litigation</i> * <i>NetPositivity</i> ( <b>H3</b> )	+	2.3017	2.65***
<i> NetPositivity </i> * <i>NetPositivity</i> ( <b>H4</b> )	-	-246.4464	-4.63***
<i>Size</i> * <i>NetPositivity</i> ( <b>H5a</b> )	-	-0.7222	-4.02***
<i>Bundled</i> * <i>NetPositivity</i> ( <b>H5b</b> )	-	-2.9755	-4.89***
<i>Horizon</i> * <i>NetPositivity</i> ( <b>H5c</b> )	+	0.0030	1.83**
<b>Controls:</b>			
<i>FSURP</i>		0.5484	4.26***
<i>OtherFSURP</i>		-0.0257	-0.59
<i>UE</i>		0.1248	0.75
<i>Annual</i>		0.0035	0.84
<i>Certainty</i>		0.0127	1.81*
<i>Certainty</i> * <i>NetPositivity</i>		0.1150	0.17
<i>AnalystFollowing</i>		0.0007	0.17
<i>AnalystFollowing</i> * <i>NetPositivity</i>		0.4742	1.27
<i>LaggedEarnInform</i>		-0.0141	-0.36
<i>LaggedEarnInform</i> * <i>NetPositivity</i>		-4.3947	-1.00
<b>R<sup>2</sup></b>		26.6%	
<b>N</b>		3,807	
<b>Firm/Date Clustering, Year Effects</b>		Yes	

\*\*\*/\*\*/\* indicates significance at the 0.01/0.05/0.10 levels in a two-tailed test (one-tailed for specific sign predictions). See Table 1 for variable definitions.



**TABLE 5**  
**Pricing of Linguistic Tone in Management Forecast Press Releases: Annual/Interim Forecast Partition**

Dependent variable: <i>AR3</i>	Predicted Sign	Annual Forecasts		Interim Forecasts	
		Coefficient	t-statistic	Coefficient	t-statistic
<i>NetPositivity</i> (Baseline)	+	8.7381	3.62***		
<b>Slope Shifts (Hypotheses):</b>					
<i>NegativeTone</i> * <i>NetPositivity</i> (H1)	+	5.1586	2.98***	5.9436	3.49***
<i>SignsAgree</i> +/* <i>NetPositivity</i> (H2a)	+	3.9525	3.10***	7.4388	5.61***
<i>SignsAgree</i> -/* <i>NetPositivity</i> (H2a)	+	2.4259	2.23***	1.6553	1.82**
<i>DWidth</i> * <i>NetPositivity</i> (H2b)	-	-1.8117	-2.84**	-0.1320	-0.23
<i>Round</i> * <i>NetPositivity</i> (H2c)	-	-0.1239	-0.19	-1.8429	-3.08***
<i>ForecastReputation</i> * <i>NetPositivity</i> (H2d)	+	20.1710	1.55*	17.5863	0.66
<i>Litigation</i> * <i>NetPositivity</i> (H3a)	+	2.0093	1.74**	2.5234	2.66***
<i> NetPositivity </i> * <i>NetPositivity</i> (H4)	-	-268.9757	-3.61***	-199.3557	-3.40***
<i>Size</i> * <i>NetPositivity</i> (H5a)	-	-0.7789	-3.17***	-0.5513	-2.69***
<i>Bundled</i> * <i>NetPositivity</i> (H5b)	-	-3.0405	-4.04***	-2.343	-3.91***
<i>Horizon</i> * <i>NetPositivity</i> (H5c)	+	0.0041	1.85**	0.0037	0.91
R <sup>2</sup>		25.3%		28.5%	
Observations		1,692		2,115	
Firm/Date Clustering, Year Effects		Yes		Yes	
Intercept and Table 3 Intercept Shifts		Yes		Yes	
Table 3 Control Variables		Yes		Yes	

\*\*\*/\*\*/\* indicates significance at the 0.01/0.05/0.10 levels in a one-tailed test. See Table 1 for variable definitions.

**TABLE 6**  
**Pricing of Linguistic Tone in Management Forecast Press Releases: Bundled/Unbundled Forecast Partition**

Dependent variable: <i>AR3</i>	Predicted Sign	Bundled Forecasts		Unbundled Forecasts	
		Coefficient	t-statistic	Coefficient	t-statistic
<i>NetPositivity</i> (Baseline)	+	1.9605	0.70	4.7838	1.91**
<b>Slope Shifts (Hypotheses):</b>					
<i>NegativeTone</i> * <i>NetPositivity</i> (H1)	+	4.5205	2.70***	4.9266	2.39***
<i>SignsAgree</i> +/+* <i>NetPositivity</i> (H2a)	+	3.0879	2.05**	7.0569	4.86***
<i>SignsAgree</i> -/* <i>NetPositivity</i> (H2a)	+	4.0393	3.68***	2.2433	2.08**
<i>DWidth</i> * <i>NetPositivity</i> (H2b)	-	-0.9990	-1.71**	-0.7646	-1.36*
<i>Round</i> * <i>NetPositivity</i> (H2c)	-	-0.0669	-0.11	-1.5424	-2.66***
<i>ForecastReputation</i> * <i>NetPositivity</i> (H2d)	+	10.0480	0.75	31.1581	1.71**
<i>Litigation</i> * <i>NetPositivity</i> (H3a)	+	0.7881	0.61	2.9468	2.82***
<i> NetPositivity </i> * <i>NetPositivity</i> (H4)	-	-87.0563	-1.03	-206.724	-3.00***
<i>Size</i> * <i>NetPositivity</i> (H5a)	-	-0.3576	-1.43*	-0.7269	-3.45***
<i>Bundled</i> * <i>NetPositivity</i> (H5b)	-	N/A	N/A	N/A	N/A
<i>Horizon</i> * <i>NetPositivity</i> (H5c)	+	0.0004	0.17	0.0043	2.06**
R <sup>2</sup>		10.5%		26.5%	
Observations		1,733		2,074	
Firm/Date Clustering, Year Effects		Yes		Yes	
Intercept and Table 3 Intercept Shifts		Yes		Yes	
Table 3 Control Variables		Yes		Yes	

\*\*\*/\*\*/\* indicates significance at the 0.01/0.05/0.10 levels in a one-tailed test. See Table 1 for variable definitions.

**TABLE 7**  
**Pricing of Linguistic Tone in Management Forecast Press Releases: Regulatory Effects**

Dependent variable: <i>AR3</i>	Predicted Sign	Effects of Regulation FD		Effects of SOX	
		Coefficient	t-statistic	Coefficient	t-statistic
<i>NetPositivity</i> (Baseline)	+	6.0696	3.19***	6.4831	3.43***
<b>Slope Shifts (Hypotheses):</b>					
<i>NegativeTone</i> * <i>NetPositivity</i> (H1)	+	6.3723	4.48***	6.2758	4.47***
<i>SignsAgree</i> +/+* <i>NetPositivity</i> (H2a)	+	6.2153	5.77***	6.0955	5.80***
<i>SignsAgree</i> -/* <i>NetPositivity</i> (H2a)	+	2.0343	2.60***	2.1339	2.73***
<i>DWidth</i> * <i>NetPositivity</i> (H2b)	-	-0.9471	-2.05**	-0.9536	-2.09**
<i>Round</i> * <i>NetPositivity</i> (H2c)	-	-1.0186	-2.297*	-1.0894	-2.41**
<i>ForecastReputation</i> * <i>NetPositivity</i> (H2d)	+	18.5161	1.51*	20.6228	1.67**
<i>Litigation</i> * <i>NetPositivity</i> (H3a)	+	1.9902	2.16**	2.1038	2.31**
<i> NetPositivity </i> * <i>NetPositivity</i> (H4)	-	-242.953	-4.57***	-248.481	-4.70***
<i>Size</i> * <i>NetPositivity</i> (H5a)	-	-0.7417	-4.01***	-0.6910	-3.85***
<i>Bundled</i> * <i>NetPositivity</i> (H5b)	-	-3.2086	-5.13***	-3.2269	-5.14***
<i>Horizon</i> * <i>NetPositivity</i> (H5c)	+	0.0030	1.83**	0.0033	2.01**
<i>PostFD</i>		0.0267	3.78***		
<i>PostFD</i> * <i>NetPositivity</i>		0.8854	1.41		
<i>PostSOX</i>				0.0204	3.82***
<i>PostSOX</i> * <i>NetPositivity</i>				0.6037	1.08
$R^2$		25.7%		25.7%	
Observations		3,807		3,807	
Firm/Date Clustering		Yes		Yes	
Year Effects		No		No	
Intercept and Table 3 Intercept Shifts		Yes		Yes	
Table 3 Control Variables		Yes		Yes	

\*\*\*/\*\*/\* indicates significance at the 0.01/0.05/0.10 levels in a one-tailed test. See Table 1 for variable definitions.

*PostFD* equals 1 for each management forecast observation issue after passage of Regulation Fair Disclosure, and 0 otherwise.

*PostSOX* equals 1 for each management forecast observation issue after passage of Sarbanes-Oxley, and 0 otherwise.

**TABLE 8**  
**Further Exploration of Unverified Linguistic Optimism**

<b>Dependent variable: <i>NetPositivity</i></b>	<b>Coefficient</b>	<b>t-statistic</b>
Intercept	-0.0016	-1.60
<i>FSURP</i>	0.0822	7.78***
<i>Litigation</i>	-0.0016	-2.67***
<i>Distress</i>	-0.0005	-0.82
<i>Concentration</i>	0.0016	1.36
<i>Size</i>	-0.0006	-5.43***
<i>Annual</i>	0.0011	3.96***
<i>StdDevPrior</i>	-0.0121	-2.90***
<i>LaggedEarnInform</i>	-0.0014	-0.46
<i>ForecastReputation</i>	-0.0146	-1.35
<i>PostFD</i>	0.0032	4.15***
<i>PostSOX</i>	0.0033	6.50***
R <sup>2</sup>	12.4%	
Firm/Date Clustering	Yes	
Year Effects	No	

\*\*\*/\*\*/\* indicates significance at the 0.01/0.05/0.10 levels in a two-tailed test. See Table 1 for variable definitions.