Management's Tone Change, Post Earnings Announcement Drift and Accruals

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Abstract

This study explores whether the Management Discussion and Analysis (MD&A) section of Form 10-Q and 10-K has incremental information content beyond financial measures such as earnings surprises and accruals. It uses a well-established classification scheme of words into positive and negative categories to measure the *tone change* in a specific MD&A section relative to prior periodic SEC filings. Our results indicate that short window market reactions around the SEC filing are significantly associated with the tone of the MD&A section, even after controlling for accruals and earnings surprises. We also show that management's tone change adds significantly to portfolio drift returns in the window of two days after the SEC filing date through one day after the subsequent quarter's preliminary earnings announcement, beyond financial information conveyed by accruals and earnings surprises. We find that the incremental information of management's tone change is higher when the firm's information environment is weaker.

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There is a substantial body of literature in financial economics and accounting that examines the value relevance and information content of *quantitative* factors in the pricing of stocks. While economic and statistical modeling has become more sophisticated over the years, the somewhat disconcerting conclusion that seems to have emerged is that these quantitative factors inadequately explain movement of stock prices. Persuasive evidence of this is provided by Shiller (1981), Roll (1988), and Cutler et al. (1989), and others in the finance literature, who demonstrate that stock prices do not respond to change in quantitative measures of firm fundamentals as would be expected from models incorporating only quantitative variables of firm performance. In the accounting literature, Lev and Thiagarajan (1993), and Amir and Lev (1996), are two examples of research that have shown the inadequacy of conventional quantitative financial measures in pricing a firm's stock. All in all, there is a growing realization that in order to develop a "good" stock pricing model, one has to incorporate not only the conventional quantitative measures of firm performance, but also include non-conventional measures such as potential market share (Amir and Lev, 1996), and even *verbal*, *non-quantitative*, difficult to quantify, kinds of measures.[1]

This is not totally surprising from a theoretical perspective. After all, stock prices are set by investors who, by definition, compute prices as the discounted present value of

[1] Though not directly connected to the research questions in our paper, we note that Boukus and Rosenberg (2006), and Hanley and Hoberg (2008), make a strong case for incorporating verbal and textual information in asset pricing models. While qualitative studies to date (including ours) make additional contribution to the explanatory power of stock return volatility, they do not completely fill the void left after one considers the financial quantitative measures.

future cash payoffs conditional on the current information set available to them. It seems natural then to expect that the investor information set should include not only quantifiable information, but also non-quantifiable, verbal information, such as news articles. Indeed, Tetlock (2007) examines whether the general negative or pessimistic flavor of a particular daily news column from the *Wall Street Journal (WSJ)* (titled *"Abreast of the Market"*) covering the stock market activity on the previous day influences prices of market indices of stocks. The depth of article pessimism is defined as the proportion of negative words used in this column. After controlling for other variables, he finds that the depth of pessimism in this column is correlated with a significant downward (temporary) pressure on prices of the stock indices.[2]

Tetlock et al. (2008) further examines the ability of negative words used in *WSJ* and the *Dow Jones News Service* (*DJNS*) columns about S&P 500 firms to predict future earnings and stock returns on the day after the publication of these news articles. They find that the proportion of negative words in these news stories (especially, negative words about a firm's fundamentals) do provide information about future earnings even after controlling for other factors; the higher the proportion of negative words the larger are the negative shocks to future earnings. In addition, they provide evidence that potential profits could be made by trading on negative words from *DJNS*, a timely news service (but not from the one day old information published in the WSJ).[3]

[2] Following the initial impact on stock prices due to the media pessimism factor, the prices of indexes of smaller stocks reverse more slowly than those of large firms. In addition, he also provides evidence to show that pessimism is not a proxy for risk. As an additional feature, he also finds that unusually high or low pessimism among investors leads to temporarily high trading volume.

[3] The authors acknowledge that these profits could be wiped out by transactions costs from high frequency trading.

The two Tetlock papers remain among the first of their kind to assess the predictive content of non-quantitative verbal information, and are the main motivators of our work.[4] By focusing on news stories in media, their work is more concerned with pessimism expressed by outsiders (media-persons), except for press releases issued by the firms. While these papers make a strong case for the predictive value of pessimism expressed by outsiders on stock prices and future earnings, they may not completely capture the views of mangers (or insiders), who are required to express their views in Securities and Exchange (SEC) filings. It can be argued that managers are better informed than outsiders, and assuming that they truthfully report their views (under SEC scrutiny and penalty of litigation), their statements may have higher predictive ability than outsiders' reports.[5]

Our study investigates the information content of the "tone" change conveyed through Management Discussion and Analysis (MD&A) disclosures for a large sample of firms. By "tone" change, we mean the pessimism or optimism of the information embedded in non-quantifiable verbal disclosures by managers in the MD&A section of firms' periodic SEC filings as compared to prior periodic filings of the same firm. We focus on the effects of management's tone change on immediate and delayed stock returns beyond what is captured by preliminary earnings surprises and accruals, the two

[4] We note that Abrahamson and Amir (1996) perform a content analysis of over 1,300 President's Letters to shareholders for firms trading in the NYSE and written between 1986 and 1988. They show that while the relative "negative" content of the letter (measured by a proprietary computer program) reflects past performance of a firm and is priced by the market, it can also (weakly) predict future firm performance.

[5] Kothari and Short (2003) is probably the first paper to recognize this and examine the information content of MD&A disclosures in addition to the information content of analysts forecasts and media reports using a methodology similar to Tetlock (2007) and Tetlock et al. (2008). However, they focus on the effects of the MD&A's sentiment on the firm's cost of capital and risk (stock price volatility), not on their ability to predict future stock prices and earnings.

accounting variables best known to be informative about the future stock performance of the firm.[6]

We find that the change in tone of the MD&A section of the SEC filings from prior periodic filings, in fact, contains information orthogonal to accruals and earnings surprises. We show by regression analysis and by explicit construction of buy and hold portfolio strategies, that the optimism, pessimism, and especially the differential optimistic tone change measure (the change in optimism net of pessimism), yield excess average stock returns over the short window following the filing of the MD&As, but also that returns continue to drift for longer periods that extend until after the subsequent quarter's preliminary earnings announcement. As can be expected, the change in MD&A tone is incrementally more informative when the information environment surrounding the firm (as measured by size and analyst following) is weaker. The tone change is also a weaker signal for value firms, which are typically more mature and easier to understand. We also find the tone change signal to have stronger implications for firms with positive earnings surprises, probably because these are cases where investors may need additional information beyond the quantitative disclosure. The implication is that the *non-quantitative* tone change expressed in MD&As can be potentially exploited to earn significant excess returns over and above those associated with well known trading strategies based on accruals and earnings surprises alone.

Our results contribute in general to research on the information content and value relevance of SEC filings and mandated disclosures. Specifically, our paper contributes to the value relevance of disclosures in the MD&A statements. To the best of our

[6] In an earlier version, we had also controlled for operating cash flows (OCF) with similar results to those obtained here.

knowledge, we are the first to measure and show that the tone change expressed by management through non-quantifiable words in MD&A is associated with immediate market reactions and can also predict future stock prices beyond well-known measures of company performance. Our findings should be of interest to academics who are interested in such issues as market efficiency and how well public (especially non-quantitative) information is captured in security prices, and to those academics who are concerned with the effects of the information environment on the associations between public information and security returns. The results of our study are also relevant to policy-makers because it shows the incremental valuation relevance of required non-quantitative information. Since the tone change in SEC filings (which are filed regularly) can be used to improve portfolio performance beyond quantitative variables, our results should interest practitioners as well.[7]

The rest of the paper is organized as follows: The next section reviews the relevant literature and motivates our research hypotheses. Section 3 describes the sample, defines and describes the variables used in our paper. Section 4 presents our results and Section 5 concludes our paper.

2. Prior Research and Research Questions

2.1 Prior Research

Broadly speaking, there are two kinds of research relating to the valuation of corporate disclosures in the accounting literature, namely, the voluminous body of work that has examined the value relevance (or information content) of financial disclosures,[8]

[7] The set-up costs required for analyzing the tone change of qualitative disclosure may favor professional investors.

[8] We refer the interested reader to the book by Beaver (1997) for a discussion and analysis of the value relevance of financial disclosures.

and the relatively smaller set of research papers that have studied the valuation of non-financial disclosures. Within the set of studies of value relevance of non-financial data there are two major sub-sets; namely, those that focus on quantifiable data, and those that examine non-quantifiable verbal expositions that elaborate and explain quantitative disclosures. Our research examines the information content of narratives from MD&A and so is related to the latter stream of research, the value relevance of non-financial, non-quantifiable disclosures. However, in examining the incremental value relevance of MD&A disclosures, we also control for the value relevance of financial variables that have been extensively documented by prior studies.

We cite two papers that examine the incremental information content of quantifiable non-financial information.[9] Using a large sample of firms from 1974-1988, Lev and Thiagarajan (1993) show that certain non-audited but quantifiable information, such as order backlogs and the strength of their labor force, provide information for company valuation over and beyond the traditional financial accounting information. Amir and Lev (1996) further build on this theme by studying the value relevance of financial and non-financial data for a sample of wireless communication firms and find that financial data alone show very little value relevance, but if combined with quantifiable non-financial data (specifically, proxies for potential customers) the value relevance of these financial variables are considerably enhanced.

Some of the early research relating to MD&A is mostly descriptive in its content. Bagby et al. (1988) provide a historical review of MD&A and the social usefulness of non-quantitative disclosures within a broader framework of federally mandated disclosures using a critical examination of legal cases relating to mandated disclosures.

[9] These papers provide citations for the interested reader.

Dieter and Sandefur (1989) outline the MD&A requirements mandated by the SEC and suggest guidelines on drafting a MD&A that would satisfy these regulations in form and substance. Sanders and Das (2000) discuss the electronic filing rules as instituted by the Securities and Exchange Commission (SEC) and the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system in detail.

Shroeder and Gibson (1990) is among the earliest papers to try and quantify the readability quotient of the exposition in the MD&A and also the President's letter. Borrowing techniques from the Psychology literature, they construct the so-called Flesch Index scores (a presumably reliable subjective measure of reading ease) using a standard formula based on the word length and sentence length, and by also examining the general flavor of the language used (active versus passive voice in sentence constructions), they conclude that MD&A statements in general are less than readable.

One of the earliest papers in the accounting literature that use linguistic techniques to analyze narrative disclosures is Frazier et al. (1984). Using a computer program called WORDS to identify the most important words (or factors) that could be reasonably interpreted as positive or negative narrative themes for a sample of 74 annual reports of firms in 1978 they show that there are no significant differences in managerial narratives across the ownership structure of these firms. They also provide evidence to support their hypothesis that the positive and negative factors (and the associated themes) can predict the cumulative abnormal annual returns for the next year (1979).[10]

Motivated by SEC requirements that firms provide easy to read and plain disclosures, Li (September, 2006) extends this line of enquiry by examining whether the readability and the writing style of annual corporate reports of a large sample of firms

[10] The paper also discusses other applications of WORDS in finance and accounting.

during the years 1993 to 2003 can predict future firm earnings and returns. Using measures from linguistics for readability and writing styles, Li concludes that firms with poor performance put out hard to read reports, profitable firms with more complicated reports have a lower persistence of earnings, but these measures do not correlate with future stock returns.

Pava and Epstein (1993) study the MD&A disclosures of 25 randomly selected firms during 1989 and find that while the disclosures provided adequate details of historical events, they did a better job of predicting firm specific, industry specific, and economy specific good news than predicting bad news for 1990. They conclude that managers may be withholding disclosures related to bad news. While these studies are related to our work, their samples are small and limited to specific early years prior to revised SEC's guidelines on MD&A and the availability of SEC filings on EDGAR.

In 1989, the SEC issued guidelines to clarify what was expected in the MD&A disclosures in an attempt to make the MD&A more informative. Hooks and Moon (1993) attempt to measure the differences between actual and expected frequency of MD&A disclosures across a spectrum of disclosures that they classify as mandated to those that are classified as voluntary, and show that these differences have decreased for certain items after the SEC MD&A guideline release in 1989, indicating firms provide more disclosure in their MD&A post 1989.

Bryan (1997) examines if the specific accounting related narratives from MD&A have incremental information content beyond quantitative financial statement information regarding future financial variables such as the directions of changes in future sales, future earnings per share, future operating cash flows, and future capital expenditures.

Using a sample of MD&A disclosures by 250 firms in 1990 (a year after clearer guidelines were issued by the SEC), he finds that there is a strong association between MD&A disclosures and the direction of changes in the aforementioned future financial variables three years into the future. In addition, he demonstrates that MD&A disclosures, especially the disclosure relating to capital expenditures, are significantly associated with financial analyst forecasts and stock returns around the release date of MD&As. Bryan's paper differs from our work in that we are interested in the predictive ability of the overall tone change of the MD&A rather than the contents of individual MD&A disclosures. He does not examine if abnormal stock returns can be earned or study the issue of post announcement drift in stock prices. Further, the content analysis by Bryan is subjective as opposed to the more objective tone change index used here and by Tetlock (2007) and Tetlock et al. (2008). Finally, our sample size is much larger and is drawn from years when the legal and disclosure environments are substantially different.

There are few papers that examine the relationship between MD&A disclosures and analyst forecasts. One such paper is by Barron and Kile (1999). Using a large sample of firms drawn from 1987-1989 MD&A disclosures of 26 different industries, and after controlling for quantitative financial factors, they show a strong association between the accuracy of analysts' forecasts and the quality of MD&A disclosures (as measured by scores assigned by personnel at the SEC), especially disclosures relating to capital expenditures. Clarkson et al. (1997) document that MD&A disclosures are found to be useful to sell-side analysts who are members of the Toronto Society of Financial Analysts (TSFA) based on 33 responses to questionnaires. In addition, using a sample of 55 firms on the Toronto Stock Exchange (TSE) between 1991 and 1992, they show that the

levels and the changes in the quality of various sub-sections of the MD&A disclosures (where the quality of disclosures is a score provided by the members of TSFA) are generally determined by expected firm performance, financing activities (mainly increased equity financing), firm size, independent press reports, and major firm related events.

Cole and Jones (2004) use MD&A disclosures from a sample of 150 firms for the period 1996-1999 from the retail industry to show that certain types of quantifiable disclosures, (namely sales growth, store openings and closings and capital expenditures), can predict future profitability, and are associated with contemporaneous stock returns. Sun (2007) examines the MD&A disclosures explaining inventory increases between 1998 and 2002 for 568 manufacturing firms and shows that favorable explanations are associated with future profitability and sales growth, and firms in growth industries and competitive industries tend to disclose more.

Kothari and Short (2003) is perhaps the first accounting work to have used the General Inquirer program (which we use in this study) to assess the effects of the tone (as opposed to tone change used in our paper) expressed in MD&A disclosures on the firm's cost of capital.[11] They extend the work of Botosan (1997) by studying the effect of the positive and negative sentiments expressed in MD&A, analyst reports, and the financial press between 1996 and 2001 on the cost of capital and risk (stock price volatility) for a sample of 887 firms from 4 industries (Technology, Telecommunications, Pharmaceutical, and Financial). They find that aggregated (across all three sources)

[11] Since managers usually use prior MD&As as a blueprint for producing a new and incremental MD&A, there could be considerable similarities in MD&As that are close in years. This suggests that our tone change measure may be a better measure of information content than the tone level measure used by Kothari and Short (2003).

positive (favorable) disclosures decreased the cost of capital and the stock return volatility of the firm, while negative (unfavorable) disclosures had the opposite effects. However, when disclosures are analyzed by sources, they find that positive sentiments expressed in corporate MD&As do not have an effect on the cost of capital, while negative sentiments significantly increase it. They attribute this to skepticism on the part of investors regarding positive disclosures (that is they are viewed more as self serving), but find negative sentiments credible because management would not normally reveal bad news. Disclosures relating to analysts' sentiments seem to have no effect on the cost of capital, and this is attributed to the lack of credibility. They attribute this to the fact that analysts are seen to be reporting their sentiments after the market has already absorbed them. Finally, they find that positive media (press etc.) stories and disclosures seem to decrease the cost of capital and negative disclosures increase it.[12] Related to this line of enquiry, is the study by Li (April, 2006) that examines whether the risk sentiments and change in risk sentiments expressed in annual reports are associated with future firm performance and future stock returns. Using a large sample of annual reports from 1994 to 2005, Li constructs an intuitive quantitative measure of levels and changes in risk sentiments extracted from the text of these reports, and finds large increases in risk sentiments to be associated with lower future earnings and significant lower stock returns.

We note that our paper differs from Kothari and Short (2003) in that we are not interested in analyzing the effects of soft disclosures on the firm's cost of capital or the variability of stock returns. We are also different from Li (2006) who is interested in the

[12] This supports the findings of Tetlock (2007) who shows similar results for a market index (Dow Jones Index), that is when the media reports are pessimistic, the stock index price drops and market volatility increases.

incremental effects of the subjective measures of references to risk changes in annual reports (including the MD&As) on future stock prices and earnings. We are not concerned with any measure of risk, but rather with the incremental effects of general tone changes in MD&As on immediate and future stock returns.

As mentioned before, the two papers that are closest in spirit to ours are by Tetlock (2007) and Tetlcok et al. (2008). They do not focus on pessimism and predictive content of MD&As but on news columns and news releases. Tetlock (2007) uses a computer program known as the General Inquirer to assess the negative quotient of the *Wall Street Journal* daily column called "*Abreast of the Market*" from 1984 to 1999, and finds results consistent with pessimistic articles putting temporary downward pressures on market prices (*Dow Jones* stock index) and increasing trading volume in the New York Stock Exchange (*NYSE*). The increased volume of trade is consistent with microstructure theory that predicts high absolute values of pessimism should lead to a group of liquidity traders trading more, and refutes the suggestion that the pessimism factor is a proxy for transaction costs (Tetlock, 2007).[13] It is important to note that Tetlock (2007) finds higher pessimism leads to higher volatility (risk) for the *Dow Jones* portfolio of stocks. This goes against the intuition that higher pessimism should lead to lower returns, or equivalently, lower risk, suggesting that the pessimism factor captured by negative words may be distinct from risk. This is further corroborated by the fact that the effects of pessimism seem to be temporary and future stock returns reverse.[14] Continuing this line of research, Tetlock et al. (2008) examine the ability of media

[13] If the pessimism factor were a proxy for transactions costs, then higher levels of pessimism should lead to lower volumes of trading on the following periods (see Tetlock, 2007)

[14] This reversal seems to be slower for small firms' stocks relative to stocks of big firms when the tests are run on stocks other than those in the Dow Jones Index.

pessimism measured by the proportion of negative words in the real time stories news from *DJNS* and daily news stories in the *WSJ* between 1984 and 2004 relating to S&P 500 firms to predict future earnings and returns. They show that the change in the proportion of negative words (especially those relating to firm fundamentals) in these news releases do convey information about firm future earnings. They also find that the proportion of negative words in the timely news releases from *DJNS* leads to lower stock returns the following trading day and this trend persists over the next 10 days. These results remain robust even after controlling for other sources like analysts' forecasts, past stock returns, and historical accounting data. The authors show that a simple trading strategy of constructing portfolios that short stocks of firms with negative words in the *DJNS* news stories the previous day and long on the stocks with relatively few negatively worded stories produces significant abnormal returns (excluding transactions costs).

Demers and Vega (2007) extend the analysis in the Tetlock (2007) and Tetlock et al. (2008) by examining the incremental information content of sentiments expressed in "soft" or "verbal" text in voluntary, non-mandated management's quarterly press releases. Using a different linguistic program, the Diction 5.0, to extract the sentiments expressed in almost 15,000 corporate earnings announcements over the period from 1998 to 2006, they show that "unexpected" sentiment does have incremental information content in partially explaining the well known post announcement earnings drift in market prices. Further, they provide evidence suggesting that the lack of clarity in press releases seems to be associated with abnormal trading and increased trading volumes. Engelberg (2008) is another extension of the Tetlock (2007) and Tetlock et al. (2008) papers. Using a large sample of earnings announcements in the *Dow Jones Index*

obtained from the *Factiva* database for the period 1999 to 2005, he shows that "hard to understand" textual qualitative information is value relevant, and contributes uniquely to the well known post earnings announcement drift phenomenon. He further shows that the harder the textual information is to understand and process, the more slowly it diffuses into prices. Davis, Piger, and Sidor (2008) is another paper that examines the tone of 23,400 quarterly earnings press releases published on the PR Newswire between 1998 and 2003 using the linguistic program Diction.[15] They find that there is a significant positive (negative) association between increased optimism (pessimism) and future measures of firm performance (measured by the Return on Assets), and increased optimism (pessimism) is positively (negatively) associated with market returns around the announcement dates. Using a sample of firms from the telecommunications and computer services industries, and related equipment manufacturers for the period 1998 to 2002, Henry (2007) also finds that the tone and style of press releases incrementally influences short window stock prices.[16]

It should be noted that these studies examine the preliminary earnings announcements by firms, rather than the MD&A sections of periodic reports as we do. The preliminary earnings announcements were typically not filed with the SEC prior to 2003, and, therefore, not routinely scrutinized by the SEC as periodic reports were. Further, preliminary earnings announcements are voluntary, and some firms do not issue them at all, or issue them sporadically. In contrast, periodic reports must be filed with the

[15] Some of the other papers that use Diction to extract investor sentiment are Bligh and Hess (2007), Ober et al. (1999), Yuthas, Rogers, and Dillard (2002).

[16] Henry (2007) uses a metric for tone that is similar to the one used in our paper. Others, notably, Das et al. (2004), and Das and Chen (2004), examine the association between stock price movements and online discussions and news activities using their own tone (or sentiment) index based on 5 distinct natural language processing algorithms that classify such discussions as bullish, bearish, or neutral .

SEC by all firms. Finally, the MD&A sections are intended to disclose qualitative information by management, which the preliminary earnings announcements frequently do not have. Furthermore, even in cases where preliminary earnings announcements contain qualitative information, they frequently do not include information on the same items in a consistent manner, because unlike MD&A section, preliminary earnings items are voluntary and additional information about them is not required by SEC rules.

In related research, Abrahamson and Amir (1996) perform content analysis of over 1,300 President's Letters to shareholders for NYSE firms written between 1986 and 1988. They show that relative negative content of the letter (measured by a proprietary computer program) is strongly negatively associated with past and future performance as measured by accounting variables, strongly negatively associated with past and contemporaneous (yearly) returns, and weakly negatively associated with future returns.

2.2 Research Questions

Investors in stocks may be able to exploit disclosures of accruals and earnings surprises (usually constructed as a standardized measure of an abnormal earnings metric or SUE) immediately (short window) following these disclosures, and over the longer term as well. Of the two, the influence of earnings surprises on stock prices is perhaps the oldest and best documented phenomenon. It has been repeatedly shown that positive (negative) earnings surprises exert immediate upward (downward) pressure on prices and surprisingly, this trend continues to persist for a long time after the initial disclosure (the post-announcement drift anomaly). Investors can exploit this anomaly by holding differential positions of stocks with extreme positive and negative SUEs (see Livnat and

Mendenhall, 2006, for a recent comparison of SUE based on time series and analyst forecasts).

In addition to earnings surprises, the accounting and finance literature has also documented the information relevance of accruals. Sloan (1996) shows that firms with extremely low annual accruals outperform firms with extremely high accruals. His study was corroborated by many subsequent studies with annual accruals and by Livnat and Santicchia (2005) with quarterly accruals. Collins and Hribar (2000), and more recently Battalio et al. (2007), show that earnings surprises and accruals are two distinct anomalies and using each yields incremental abnormal returns beyond the other.

Our research examines if the tone change expressed in MD&A disclosures is associated with contemporaneous and future abnormal returns (short window following the MD&A disclosure and the post announcement long term drift) over and above what is associated with preliminary earnings reports (SUE) and accruals. In the spirit of Tetlock (2007) and Tetlock et al. (2008), we define a pessimistic tone change (signal) as the change in the proportion of negative words among all words in the MD&A relative to the average pessimistic signal in all periodic SEC filings made in the prior 400 days (scaled by the standard deviation of the signal in the same period). The larger this proportion, the more pessimistic is the tone change. We also define a similar measure for optimistic tone change and further define a differential optimistic tone change measure by taking the change in the difference of the positive and negative words divided by the sum of positive and negative words in the MD&A relative to the average of this measure in all periodic SEC filings made in the prior 400 days (scaled by the standard deviation of the signal in the same period).

Our control variables are SUE and accruals which we measure as in the prior literature. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* unadjusted EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter. Accruals/Average Assets equals income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.

We also investigate whether the information environment affects the associations between the tone change signals and security returns. It is expected that the tone change signal would be more effective for firms that are less heavily followed by analysts, that are smaller, and that are more growth-oriented because their information environments are weaker, leading investors to utilize other information, even the more stale information provided by management in the SEC filings after the preliminary earnings releases (and potentially the following conference calls with analysts).

We show that there are significant incremental abnormal returns around the filing date and for the long term drift by constructing buy and hold type portfolio strategies that incorporate the tone change factor in addition to the SUE and accruals, as well as by running quarterly regressions as in Fama-Macbeth (1973)[17].

[17] Short window abnormal returns surrounding MD&A disclosures are defined as buy and hold return on a stock minus the average return on a matched size-B/M portfolio over the days [-1,+1], where day 0 is the SEC filing date. The excess drift return for the longer term is the buy and hold return on a stock minus the

3. Data and Sample Selection

3.1 The Preliminary and Un-restated Compustat Quarterly Data

Data entry into the Compustat databases has been performed in a fairly structured manner over the years. When a firm releases its preliminary earnings announcement, Compustat takes as many line items as possible from the preliminary announcement and enters them into the quarterly database within 2-3 days. The preliminary data in the database are denoted by an update code of 2, until the firm files its Form 10-Q (10-K) with the SEC or releases it to the public, at which point Compustat updates all available information and uses an update code of 3. Unlike the Compustat Annual database, which is maintained as originally reported by the firm (except for restated items), the Compustat Quarterly database is further updated when a firm restates its previously reported quarterly results. For example, if a firm engages in mergers, acquisitions, or divestitures at a particular quarter and restates previously reported quarterly data to reflect these events, Compustat inserts the restated data into the database instead of the previously reported numbers. Similarly, when the annual audit is performed and the firm is required to restate its previously reported quarterly results by its auditor as part of the disclosure contained in Form 10-K, Compustat updates the quarterly database to reflect these restated data.

Charter Oak Investment Systems, Inc. (Charter Oak) has collected the weekly original CD-Rom that Compustat sent to its PC clients, which always contained updated

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value weighted average return on a matched size-B/M portfolio from two days after the SEC filing date through one day after the subsequent quarter's preliminary earnings announcement.

data as of that week. From these weekly updates, Charter Oak has constructed a database that contains three numbers for each firm for each Compustat line item in each quarter. The first number is the preliminary earnings announcement that Compustat inserted into the database when it bore the update code of 2. The second number is the "As First Reported" (AFR) figure when Compustat first changed the update code to 3 for that firm-quarter. The third number is the number that exists in the current version of Compustat, which is what most investors use. The Charter Oak database allows us to use the first-reported information in the SEC filing, so that quarterly earnings, cash flows and accruals correspond to those reported originally by the firms, which were also available to market participants at the time of the SEC filing. Using the restated Compustat Quarterly database may induce a hindsight bias into back-tests, since we may have used restated earnings, cash flows or accruals that were not known to market participants on the SEC filing dates.

3.2 Sample Selection

To reduce the potential bias that may occur by using a sample of quarterly information that became available through SEC filings before the SEC's EDGAR database and afterwards, this study concentrates on SEC filings that are available through the EDGAR database from the fourth quarter of 1993 through the second quarter of 2007. Conceptually, information in SEC filings on the SEC EDGAR database is likely available to users at a low cost immediately after the filing date indicated in the EDGAR database.[18, 19] Prior to EDGAR, information about SEC filings was available from the companies directly or from the SEC library with a lag (see, e.g., Easton and Zmijewski,

[18] The low costs should especially apply to professional investors.
[19] The interested reader can refer to Sanders and Das (2000) for guidelines regarding the filing formats for the SEC, the definition of the filing sate, other important details regarding filings and the EDGAR database.

1993). The problem with the SEC EDGAR database is that it identifies firms according to CIK codes, which are not well-mapped into other databases used in practice and academe such as Compustat or CRSP.

The Standard & Poors's (S&P) Filing Dates database seeks to fill this void.[20] It contains a match between all companies on the Compustat database (identified by GVKEY) with the CIK identifiers on the SEC EDGAR database.[21] The S&P Filing Dates database matches all Compustat firms (by GVKEY) to CIK codes on the SEC EDGAR database as they were known on the Compustat database at the time through the Charter Oak database. Thus, it is useful in constructing a universe of firms that professional investors could have actually been using at the time without survivorship bias. For each 10-K and 10-Q filing on EDGAR, the database includes not only the SEC filing date but also the balance sheet date for the quarter/year, so an accurate match with Compustat information can be made.[22]

For each firm-quarter in the S&P Filing Dates database we obtain the SEC filing dates for the period Q4/1993-Q2/2007. We include in our sample only those SEC filings made within 55 (100) days for 10-Q (10-K) forms to ensure exclusion of delayed filings. We further limit the sample to observations with SEC filing dates for initial 10-Q/10-K filings in the S&P Filing Dates database which also have a matching GVKEY on Compustat and a matching PERMNO on CRSP, so we can retrieve financial statements data from Compustat and stock return data from CRSP. We further reduce the sample to firms that are listed on NYSE, AMEX or NASDAQ and have a market value of equity

[20] The database is available through WRDS or directly from S&P.
[21] The database includes all GVKEY's where the market value of the firm's equity at quarter-end exceeded $1 million.
[22] Because companies may file their 10-Q forms late, the filing date itself cannot be a reliable indication for the specific quarter it relates to.

and average total assets at quarter end, as well as total assets during the quarter in excess of $10 million, and quarter- end price per share in excess of $5. We further delete observations if the originally reported income before extraordinary items and discontinued operations (Compustat Quarterly item No. 8) is missing; or the originally reported quarterly net operating cash flow (Compustat Quarterly item No. 108) is missing; if market value at the end of the prior quarter is unavailable; or if total assets (Compustat Quarterly item No. 44) at the end of the prior quarter or at the end of the current quarter are missing. Table 1 provides details on our sample selection.

3.3 Variable Definitions

To reduce the survival bias, we use holding periods of 90 days after the SEC filing date if the subsequent quarterly earnings announcement date is missing. If a security is de-listed from an exchange before the end of the holding period, we use the delisting return from CRSP if available, and -100% if the stock is forced to de-list by the exchange or if the delisting is due to financial difficulties. After delisting, we assume the proceeds are invested in the benchmark size and B/M portfolio. This is the procedure used by Kraft, et al. (2004). We first calculate the buy and hold return on the security during the holding period; then subtract the buy and hold return on a similar size and B/M benchmark portfolio for the same holding period. The benchmark returns are from Professor Kenneth French's data library, based on classification of the population into six (two size and three B/M) portfolios.[23, 24]

[23] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html .

[24] To make sure that our results are not driven by observations with extreme returns as argued by Kraft et al (2004), we repeated the analysis but deleted all extreme 0.5% observations with buy and hold excess returns in any of the two return periods used. The results are qualitatively similar to those reported here.

Consistent with the accruals literature, we estimate accruals as earnings minus net operating cash flows, and scale by average total assets during the quarter. Accruals are based on the first-reported data in the Charter Oak database, and are not subject to Compustat's subsequent restatement of data. We estimate the preliminary earnings surprise as IBES (unadjusted for splits) actual EPS minus mean forecasted (unadjusted for splits) EPS by all analysts with quarterly forecasts in the 90-day period prior to the preliminary earnings announcement, scaled by price per share at quarter end. If there are no analyst forecasts of earnings on IBES, we use preliminary net income (Compustat quarterly item No. 8) minus net income as reported for the same quarter in the prior year, scaled by market value of equity at the end of the previous quarter.

To eliminate the undue influence of outliers and to estimate the returns on hedge portfolios constructed according to various signals, we independently sort all firms into quintiles of various signals each quarter. We then use the scaled quintile rank as the independent variable in regression equations, where the scaling is performed by dividing the ranked quintile (0-4) by 4 and subtracting 0.5. Thus, the intercept in regressions of returns on the signal should be equal to the mean excess buy and hold returns (BHR) for the period, and the slope coefficient on the signal represents the return on the hedge portfolio that is long the highest signal quintile and is short the bottom signal quintile.

To obtain signals about the "tone" change of the MD&A section in the 10-Q or 10-K, we extract the MD&A section from the relevant SEC EDGAR filings and count the number of words in the section. The process begins by identifying all initial (rather than amended) SEC filings that contain the prefix 10-Q, 10Q, 10-K, or 10K, and which were filed in a timely manner (within 55 (100) days from the 10-Q (10-K) report date. These

filings were first matched to Compustat and CRSP to ensure data availability for our quantitative variables. We have used a PERL program to retrieve the MD&A section from each relevant SEC filing. To identify the MD&A section within a 10-Q or a 10-K filing, we use the surface patterns (item number, titles, surrounding language, and new item number to indicate end of section) in dozens of examples which were used to develop general retrieval rules that were tested on another sample, where it obtained an accuracy rate of over 99% in identifying the MD&A section. We first convert certain HTML codes into characters, such as "&amp" into "&", and eliminate all other embedded HTML codes. We proceed to process only the remaining embedded text in counting words. We eliminate cases where the total number of words in an MD&A section is less than 30. We count the number of "positive" and "negative" words as classified by the Harvard's General Inquirer, after properly handling prefixes and suffixes.[25] We define three main variables as our signals, the number of "positive" ("negative") words, POS (NEG), divided by the number of total words, and (POS-NEG)/(POS+NEG). To identify changes in the "tone" of MD&A from past filings and to scale signals properly for their variability, we subtract from each signal the mean signal in periodic SEC filings made within the preceding 400 calendar days, and divide by the standard deviation of the signal in the periodic SEC filings made within the preceding 400 calendar days. Because the MD&A sections of periodic filings are expected to vary little from one period to another, we do not use the proportion of the number of negative (positive) words, but its change from the past. When management is aware of changes that occurred during the current period from prior periods (such as declining sales, new products, additional expenses, new liquidity concerns), it is likely to discuss those

[25] See description and categories in http://www.wjh.harvard.edu/~inquirer/homecat.htm.

changes in the current MD&A, leading to tone changes from previous periodic filings. Note that the benchmark we use to standardize the proportion of positive (negative) words is the average of the signal in the MD&A sections of prior periodic (10-Q and 10-K) filings, because other filings such as immediate reports (Form 8-K), registration statements, proxies, etc. are likely to include other words and their average signal is likely to be affected by the reason for the filing. Note that we use the standard error of the signal in the periodic filings made in the prior 400 days, ensuring that we must have at least three such periodic filings to estimate the tone change used in the current study.[26] We expect high scores on the POS and (POS-NEG) signals to have higher immediate and subsequent returns than those with low scores. Conversely, we expect immediate and subsequent returns on high NEG scores to be lower than those on low NEG scores. Consistent with prior results, we expect firms with high scores on earnings surprises to have greater immediate and subsequent returns than those with low scores. The converse should hold for accruals.

Table 1 shows that, our initial sample had 382,435 SEC filings which start with 10-K, 10K, 10-Q or 10Q on the June 2008 version of the S&P SEC Filing Dates Database that are not amended filings and are not more than 100 (55) days after the fiscal year (quarter) end. Merging with the Compustat Point-In-Time File, requiring a valid CUSIP, market value of equity at quarter-end in excess of $10 million, and average total assets during the quarter in excess of $10 million, price per share at quarter-end in excess of $5.00, and an available earnings surprise reduced the sample size to 218,524 observations. Including only observations with filing date short-window excess returns

[26] We first estimate the signal for each periodic filing in a specific quarter, and then use the prior periodic filings to estimate the tone change. Thus, all means and standard errors are based on initial 10-Q and 10K forms, and not their subsequent amendments.

around the SEC filing (i.e., days [-1, +1] where day 0 is the SEC filing date), and drift returns from two days after the SEC filing through one day after the preliminary earnings announcement for the subsequent quarter, and eliminating observations before Q4/1993 and after Q2/2007 due to scarce number of observations in these quarters, yields a sample of 201,285 firm-quarters. For 192,592 observations, the MD&A section has more than 30 words and the positive, negative, and differential tone signal can be computed. However, requiring the tone change variable further reduced the final sample size to 153,820 observations (firm-quarters), with 689 in Q4/1994 (minimum per quarter in our sample) climbing to a high of 4,008 in Q1/1998 (the maximum for a quarter). Thus, there is sufficient number of observations for each of the quarters in our sample period to construct meaningful portfolios.

(Insert Table 1 about here)

Table 2 provides summary statistics about our sample. As can be seen, our sample consists of firms with a wide distribution of sizes. The sample median market value is $454 million and the mean is $3.239 billion. The median price per share is $20.97 with a mean of $42.95; recall that there is a minimum price per share of $5.00 for sample inclusion. Thus, we have a wide distribution of firm size and price per share. About 2/3 of the observations (103,569) have quarterly forecasts on IBES, with a median coverage by two analysts. Consistent with prior studies the mean and median accruals are negative, largely due to the effects of depreciation. The mean and median SUEs are roughly zero indicating that our earnings forecast models are reasonably good for the median firm. It is interesting to note that the number of positive words is usually greater than the number of negative words in MD&A disclosures, indicating a possible optimistic tone in MD&A

disclosures on average. This also requires us to adjust for "expected" number of positive/negative words by subtracting the mean signal in the prior 400 days. The positive and negative signals indicate a slight skewness, with the means slightly larger than the medians.

(Insert Table 2 about here)

4. Results

Table 3 shows the mean excess returns for three subgroups of our sample firms formed using different signals, where mean excess returns is defined as the BHR on a stock minus the average returns on a matched size-Book to Market (B/M) portfolio over the days [-1. +1], with day 0 identified as the SEC filing date. Firms are classified into three groups using the bottom 20%, middle 60%, and top 20%. Consistent with the prior literature about short window reactions around the preliminary earnings announcement, firms in the bottom (top) SUE quintile have a mean excess return of -0.6% (+0.3%) in the three-day window centered on the SEC filing, with an even stronger spread for earnings surprises calculated from analyst forecasts. The top and bottom quintiles have statistically different mean excess returns as indicated by the rightmost column. In contrast, we do not observe any such differences for the accruals signal, although the accrual anomaly is not for the short-window around the SEC filings but for subsequent returns.

(Insert Table 3 about here)

The interesting observation in this table pertains to the tone change signals in the MD&A sections. Both positive and negative sentiments are associated with significant short window mean excess returns in the expected direction. The bottom (top) negative tone change quintile has mean excess returns for the short window around the SEC filing

of 0.0% (-0.2%), with the means statistically different across the two extreme quintiles. The converse is evident for the positive and (positive-negative) signals, where the bottom quintiles have means of -0.2%, and the top quintiles mean excess returns of -0.1% and 0.0%, respectively. Thus, we see that the spread in mean excess returns between top and bottom quintile is the largest for the negative signal and the (positive-negative) signal and that the bottom and top quintiles have statistically different mean short-window returns in the expected direction for all three signals.

Table 4 provides a correlation matrix between the excess return in the three-day window centered on the SEC filing, BHR-Filing, the subsequent drift, BHR drift, the control variables, namely, Accruals, SUE, and the tone change measures. As is to be expected, the differential tone variable (Pos-Neg) is also strongly correlated with each of the other tone variables (0.520 and -0.658). Interestingly, the correlation between the two pure tone variables, (negative and positive) is very low (0.003). Consistent with the evidence in Table 3, SUE is positively and significantly correlated with the short window excess return around the SEC filing date, BHR-Filing (0.061). The differential tone signal (pos-neg) tone signal exhibits significant positive correlation (0.013) with the short window excess return around the SEC filing, the negative signal exhibits a significant negative correlation of -0.013, and the positive signal exhibits a positive but smaller correlation of 0.006.

(Insert Table 4 about here)

Consistent with the prior literature, the excess return during the period from the SEC filing through the subsequent quarter's earnings announcement, BHR-Drift, is negatively correlated with accruals (-0.040) and positively correlated with both SUE

(0.060) and SUEAF (0.043). The negative tone signal is significantly negatively correlated with BHR-drift (-0.080), whereas the positive signal is significantly positively associated with BHR-Drift (0.006). The differential tone change signal, (Pos-Neg), is strongly positively correlated with the drift, BHR-Drift, at 0.014. Note that both SUE a nd SUEAF are positively and significantly correlated with the differential (Pos-Neg) and positive tone signals, and negatively with the negative tone signal. The accruals signal is negatively correlated with the positive tone signal as would be expected, but is negatively (insignificantly) correlated with the differential tone signal, and negatively correlated with the negative tone signal. Overall this correlation patterns indicate that we need to control for SUE and accruals in our tests.

Table 5 presents the results of our Fama-Macbeth type regressions for returns around the SEC filing dates (BHR-Filing) regressed on different sets of financial and tone signals, namely accruals, SUE, and our three tone signals. Each column records the intercept and slope for the regression of the three-day excess return centered on the SEC filing date, BHR-Filing, on different combinations of these signals. Recall that the slope coefficients can be interpreted as a return on a hedge portfolio that is long in the top quintile and is short the bottom quintile for a specific signal. Note further that preliminary earnings announcements typically precede the SEC filings, so that "new" information to market participants around the SEC filing date is in the form of accruals, as well as the tone signals through the newly disclosed MD&A section. Thus, columns 1-3 in the table examine the incremental information in the tone of the MD&A section given information about accruals released in the SEC filing. The accruals signal is positively but insignificantly associated with the short window returns. Although this may seem

inconsistent with prior results about accruals, which had documented significant negative association with returns, the prior evidence is about the association of accruals with future returns instead of the contemporaneous short-window returns used in Table 5. Note that two of the tone variables, the negative and the differential tone signals are significantly (with the expected signs) associated with the short window returns around the SEC filing, even after controlling for accruals. The positive signal has the expected positive association, but its coefficient is not significantly different from zero. Finally, columns 4-6 present the associations of the tone signals with short window returns around the SEC filings, conditional on the previously disclosed earnings surprise. Note that the return on the hedge portfolio constructed according to the earnings surprise SUE is higher than the hedge return on accruals, implying that market participants get further confirmation from SEC filings about the original earnings surprise. Note further that the differential and negative tone signals are still significantly associated with short window returns beyond SUE, whereas the positive signal does not have any incremental association with short window returns beyond SUE. Thus, Table 5 results show that short-window market reactions to two of the tone signals are incremental to the widely used financial signals of SUE and accruals.

(Insert Table 5 about here)

Table 6 is the counterpart of Table 3 for drift returns instead of the short window returns around SEC filing dates used in Table 3. The table reports mean excess returns, i.e., buy and hold return on a stock minus the average return on a matched size-B/M portfolio, from two days after the SEC filing through one day after the subsequent quarter's preliminary earnings announcement (BHR-Drift). As the table shows and

consistent with the post earnings announcement drift literature, the bottom (top) quintile of SUE had a mean drift of -1.5% (2.0%). Also consistent with prior studies, the drift return on the bottom (top) accrual quintile is 1.2% (-1.1%). Of all the tone signals, the differential tone signal has the largest spread between bottom and top quintiles, -0.3% and 0.4%, respectively. The positive signal shows significant mean drift return for the top quintile which is unexpectedly negative at -0.3%, while the negative signal shows a significant mean drift return of 0.3% for the bottom quintile and -0.1% (non-significant) for the top quintile. For all the signals in Table 6, the bottom and top quintile mean excess returns are statistically different as indicated in the rightmost column. Further, accruals, SUE, SUEAF, the differential tone signal and the negative tone signal provide monotonic mean returns across the three groups in the expected direction.

(Insert Table 6 about here)

Table 7 is the counterpart of Table 5 where the dependent variable in the regression is the drift excess returns buy and hold strategy from two days after the SEC filing through one day after the subsequent earnings announcement, (BHR-Drift), and the independent variables include variables in addition to our tone change measure that are known to explain drift (including size measured by the market value of equity, price per share, the number of quarterly analyst's forecasts and turnover as measured by traded shares in the prior 60 days scaled by outstanding shares). It reports mean coefficients of cross-sectional quarterly regressions in a Fama and MacBeth (1973) manner. The hedge portfolio return on accruals is consistently negative as expected from prior studies (low accruals imply future positive returns) of about -2.6% per quarter (or roughly 10% annually), which is similar to Sloan's (1996) result. The SUE signal has the highest

quarterly hedge drift return of about 3.5%. Despite the presence of accruals, SUE, and the other control variables, the differential tone variable is significantly and strongly associated with drift returns adding 0.6% to the quarterly return. Thus, our tone measures, and the differential tone measure, in particular, not only contribute incrementally to associations of financial variables with short-window returns around SEC filings, but also to drift in returns through the following earnings announcements.

(Insert Table 7 about here)

Table 8 records the potential mean payoffs to holding calendar time monthly hedge portfolios using the extreme quintiles of the most recent signals (a strategy often followed in practice), i.e., holding long (short) positions in the top (bottom) quintile of SUE, the differential tone signal (positive minus negative) and the positive tone change signal. The converse strategy is used to construct a portfolio based on accruals and the negative tone signal. The hedge portfolio is formed on each month end based on the extreme signal quintiles available on that date. When the hedge portfolio is based on more than one signal, stocks in the portfolio have to be in the extreme quintile for both signals (independent sorts). Note that the ranking of firms into portfolios at a particular month-end may use stale information about earnings, accruals or tone change signals from as far as two months ago, i.e., we rank each month-end all firm-quarters even if the SEC filing has not occurred during that month. This tends to reduce the strength of the signals, yielding lower future returns, but is more characteristic of how large institutional investors are likely to form hedge portfolios in practice.

As can be seen in Table 8, accruals and SUE have the highest payoffs with a mean monthly return of 0.78%, or 2.4% per quarter, or about 10% annually. This is lower

than typical post-earnings-announcement returns (see survey in Livnat and Mendenhall, 2006), but this is expected given that portfolios are formed monthly and not immediately after the earnings announcements. The differential tone signal has a significant monthly payoff of 0.23%, which is equivalent to about 69 basis points per quarter or 2.8% annually. When the differential tone signal is combined with SUE, the hedge portfolio monthly return is 1.14%, which is about 3.5% per quarter and 14.6% annually. Note, however, that this combined signal hedge portfolio is less diversified with an average of 278 stocks compared to the 1,188 stocks when only one signal is used. Note also that the table reports the results of a statistical test that the mean drift return on the combined portfolio is significantly larger than that of SUE (accruals) alone. It shows that the mean monthly difference is 0.37% (0.38%) with a t-statistic of 2.85 (2.27), (0.0049 (0.0244), two-sided significance level). When SUE is paired with accruals, the hedge portfolio yields a mean monthly return of 1.61%, representing a quarterly excess return of 4.9% and 21% annually. However, when the differential tone signal is added to the combination of SUE and accruals, the hedge portfolio return now has a mean monthly drift return of 2.38%, representing quarterly mean excess return of 7.3% and 32.6% annually, although at a cost of having only 47 stocks on average. Still, the incremental monthly 0.77% to the drift SUE and accrual return due to the differential tone variable is statistically significant with a t-statistic of 2.35 (0.0201, two sided significance level). Thus, the tone signals based on the MD&A section of the 10-Q or 10-K Forms add incrementally to the financial information conveyed by earnings surprises and accruals.

(Insert Table 8 about here)

Table 9 examines the risk exposure of the monthly calendar hedge portfolios by regressing the hedge portfolio raw returns on the monthly Fama-French factors including momentum. The SUE signal contributes 0.88% per month (t-statistic 6.03), accruals 0.83% (t-statistic 5.8), and the differential tone change signal (Pos-Neg) 0.21% (t-statistic 2.14) individually to the calendar time hedge returns, after accounting for the Fama-French factors. While these are significant numbers in themselves, when the differential tone change signal is combined with SUE, the contribution to the hedge returns increases to a significant 1.24% (t-statistic 5.34), and combined with accruals the contribution is 1.27% (t-statistic 6.03). Finally, when SUE, accrual and the differential tone change measures are used together, the contribution to the monthly hedge raw returns increase even further to significant 2.28% (t-statistic 4.98). Note that there is very little evidence of a significant tilt in the hedge portfolios. There is some size and B/M tilt (towards large and value firms) in the accruals signal and some beta risk for SUE and the positive tone change signal. However, the significant intercepts show that the excess returns on the portfolios are not due to the four known Fama & French risk factors.

(Insert Table 9 about here)

The Effects of the Information Environment:

To examine the effects of the information environment on the incremental information of tone change in the MD&A section, we use three different classifications. The first is based on the number of analyst forecasts available in the IBES database for the quarter. We expect that the incremental contribution of the tone change on prices would be smaller for firms that are followed by more analysts because most of the information in tone change has already been reflected in stock prices through the

analysts' interpretations and interactions with management. We examine the effect of firm size, expecting smaller firms to have a larger incremental information content for tone change because of their poorer information environments. Finally, we classify firms according to their value-growth characteristics (Book to Market ratios), expecting the tone change to be stronger for the relatively more neglected and easy-to-understand value stocks.

Table 10 reports the results of regressing 3-day excess filing returns and drift returns on accruals, SUE, and the (Positive-Negative) tone signal. As can be seen in Table 10, the differential tone change signal is significant for firms with fewer analysts following, for value (high B/M) firms, and for small firms after controlling for the effects of accruals and earnings surprises. These are precisely the firms for which the information environments are the weakest. Table 10 also shows similar results for drift returns, although the differences are not statistically different. Thus, having a strong information environment makes the tone change signal less relevant.

(Insert Table 10 about here)

Predicting Future Surprises:

Our results show that the tone change signal is incrementally valuable to investors beyond earnings surprises and accruals. However, we have not yet shown whether the tone change measures from MD&As are associated with future returns by helping investors predict SUE at the subsequent earning announcements. In Table 11 we present Fama & MacBeth regressions of the next quarter SUE on current quarter SUE, accruals, our differential tone signals, and several control variables for 51 quarters. The table affirms that the negative and differential tone change signals are incrementally and

significantly associated with the next period SUE after controlling for current SUE, accruals and various other variables. Thus, the tone change signals enable investors to earn excess returns through (among other things) a superior ability to forecast future earnings surprises. In an untabulated analysis, we also examine whether the BHR return in the short-window around the subsequent quarter's announcement has an average daily return that is higher than the average daily return during the drift window. Bernard and Thomas (1990) show that a large proportion of the SUE drift occurs around subsequent earnings announcements. We also find that the average daily return in the three-day window centered on the subsequent earnings announcement is about 7 basis points higher than the average daily return in the drift window for the SUE portfolio (t-statistic of 6.42). However, the difference for the tone change portfolio is even larger at 10 basis points (t-statistic of 9.3), indicating the greater importance of the subsequent earnings announcement for the tone change signal.

(Insert Table 11 about here)

Confounding Versus Confirming Signals:

Another question that we have not addressed thus far concerns the consequences of signals in conflict, and also whether the tone change signal is stronger for negative or positive earnings surprises. To shed light on this question, Table 12 reports mean excess filing and drift returns for combinations of signals. The table shows that the additional short-window filing excess returns obtained from high versus low tone change signal (marked by High-Low in the table) is similar for positive and negative earnings surprises. However, the additional excess drift return obtained from the tone change signal is larger for positive earnings surprises than negative ones. This is expected, because investors are

more likely to trust management when bad news is reported, but are likely to be more skeptical when good news is reported, seeking further confirming information. Consequently, investors would attempt to obtain confirmation from other sources (tone change of the MD&A section in our case) when good news is reported. However, we see no such pattern for high versus low accruals, possibly indicating investors' ignorance of accruals.

(Insert Table 12 about here)

Robustness Checks

1. Instead of using a tone change versus the filings for the firm in the prior 400 days, we use the mean of the Fama-French industry signal in the prior 400 days as the expected tone.[27] Our results indicate that the deviation of the tone signal from the prior industry mean is insignificantly different from zero after controlling for earnings surprises and accruals. Thus, it is important to measure changes in tone relative to past filings for the same firm.

2. We use Quantile regression to assess whether the significant incremental contribution of the tone change signal is present for all levels of excess drift returns. We find that the incremental contribution of the tone change signal is present for all levels of the drift returns, except for very high levels when accruals are a very strong signal. Thus, it seems that the tone change signal is less effective when accruals are negative, earnings surprises are positive, and drift returns are the most positive. This suggests that investors tend to believe management when earnings surprises are positive in spite of low accruals, and do not look for further confirmation from tone change.

[27] We cannot use the mean tone of other firms in the same industry for the current quarter because some firms report earlier than others, and we do not wish to use information not yet available at portfolio construction date.

3. We eliminate cases where operating cash flow or current accruals are disclosed in the preliminary earnings report. The main results about the tone change signal remain the same.

4. We examine whether the incremental contribution of the tone change signal is different in the fourth fiscal quarter (10-K) from interim quarters (10-Q). We do not observe any significant differences.

5. We find the main results intact when we require firms to have released a preliminary earnings release prior to the SEC filing.

5. Conclusions

This study investigates whether non-financial information contained in the MD&A section of SEC filings is associated with excess market returns in the short window around SEC filings and with drift excess returns over the period from two days after the SEC filings through the subsequent quarter's preliminary earnings announcements. If management has private information about the firm's prospects, and if management shares a portion of this information with investors through truthful disclosures in SEC filings, then market reactions as well as delayed market reactions should be associated with the non-financial information disclosed by management in the MD&A section. However, investors need to assess whether the non-financial information has favorable or unfavorable implications for contemporaneous and future returns. As a crude measure of whether the non-financial information is favorable or unfavorable, this study compares the frequency of "positive" words, "negative" words or the difference between them to the same frequency in recent MD&A sections of the same firm. If mangers' assessments of future prospects become more negative (positive), they are

likely to use more “negative” (“positive”) words in their disclosures. This study uses an established classification of words into “positive” and “negative” categories, which has been used in many previous studies.

Our results indicate that non-financial signals based on changes in the tone of the MD&A section from the recent past are significantly correlated with short window contemporaneous returns around SEC filing dates, even after controlling for accrual information available in the SEC filings or the preliminary earnings announcements (earnings surprises). Our results also show that the non-financial tone change signals are significantly correlated with drift excess returns, even after controlling for accruals and earnings surprises.

The combined evidence in this study shows that market participants seem to behave as if they use non-financial information from MD&A disclosures (or other information that is correlated with it), in addition to the financial information provided routinely by firms. This indicates that the MD&A sections do have information content, and that the SEC requirement to provide these discussions by management seems to be justified. Our results are, of course, limited by the perfunctory manner in which we analyze the MD&A section – the mere counting of positive and negative words. Intuitively, stronger results may be obtained by using more sophisticated analytical tools that would classify better the contents of the MD&A as favorable or unfavorable.

Our study contributes to various constituencies. Academic studies that (i) are interested in assessing the effects of non-financial information on security prices, or (ii) are interested in the effects of the MD&A disclosures, or (iii) are concerned with managerial private information and the forms used to convey it to investors, or (iv) how

the information environment affects the association between non-financial information and security prices, may all benefit from our analysis. Regulators may use the results of this study to assess the benefits of mandatory non-financial disclosures. Professional investors may use procedures similar to ours to help improve portfolio selection based on publicly available information. However, we emphasize again that this study provides just one simple way of analyzing the rich set of non-financial information that is potentially available to investors. Future studies can be designed to extract finer non-financial information.

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Table 1
Sample Construction and Distribution

Number of SEC filings which start with 10-K, 10K, 10-Q or 10Q on the June 2008 version of the S&P SEC Filing Dates Database that are not amended filings and are not more than 100 (55) days after the fiscal year (quarter) end.	382,435
Merging with the Compustat Point-In-Time File, requiring a valid CUSIP, market value of equity at quarter-end in excess of $10 million, and average total assets during the quarter in excess of $10 million, price per share at quarter-end in excess of $5.00, and an available earnings surprise (see definition in notes to Table 2)	218,524
Observations with filing date short-window excess returns and drift returns from filing to next earnings announcement (see definitions in notes to Table 2)	201,586
Eliminate observations before Q4/1993 and after Q2/2007 due to a small number of observations in these quarters	201,285
Observations where the MD&A section has more than 30 words, and the (Pos-Neg) signal can be computed (see notes to Table 2)	192,592
Observations where the change in tone variables can be calculated (requiring at least three prior 10-Q or 10-K filings) from Q3/1994 to Q2/2007	153,820

Quarter	Frequency	Quarter	Frequency	Quarter	Frequency
199403	836	199901	3605	200303	2940
199404	689	199902	3606	200304	2934
199501	1170	199903	3453	200401	3170
199502	1196	199904	3287	200402	3303
199503	1364	200001	3497	200403	3283
199504	1864	200002	3403	200404	3213
199601	2201	200003	3324	200501	3250
199602	2312	200004	2967	200502	3160
199603	2304	200101	3174	200503	3128
199604	2918	200102	3135	200504	2995
199701	3713	200103	2989	200601	3122
199702	3907	200104	2977	200602	3074
199703	3939	200201	3145	200603	2985
199704	3724	200202	3121	200604	2868
199801	4008	200203	2931	200701	2953
199802	3969	200204	2826	200702	2863
199803	3713	200301	2879		
199804	3513	200302	2920		

Table 2
Summary Statistics

Variable	N	Mean	Std Dev	10th Pctl	Median	90th Pctl
(Positive-Negative) Signal	153820	0.024	4.411	-1.909	-0.023	1.896
Positive Word Signal	153820	0.093	4.966	-1.590	-0.097	1.820
Negative Word Signal	153820	0.017	3.318	-1.844	0.000	1.954
No. of Positive Words	153820	367	318	66	264	859
No. of Negative Words	153820	216	181	42	159	499
No. of All Words	153820	4747	3706	1042	3619	10807
Standardized Earnings Surprise (SUE)	153820	0.000	0.043	-0.007	0.000	0.007
Standardized Earnings Surprise, Analyst Forecasts, SUEAF	103569	0.000	0.014	-0.003	0.000	0.004
Accruals/Average Assets	128121	-0.012	0.052	-0.052	-0.010	0.030
Abnormal Buy and Hold Return - Filing	153820	-0.001	0.052	-0.049	-0.002	0.049
Abnormal Buy and Hold Return - Filing Through Next Earnings	153820	0.000	0.200	-0.201	-0.006	0.198
Market Value - Quarter-End ($million)	153820	3239	15065	58	454	5226
Price Per Share	153820	42.95	1157.80	8.00	20.97	48.88
Number of Forecasts	153820	3.8	4.9	0	2	10

Notes:

1. The sample is based on 10-Q and 10-K filings for quarters spanning Q4/1993-Q2/2007. SEC filings are retrieved from S&P's SEC Filing Dates database. Sample firms are those with available data, and passing the selection criteria described in Table 1 and the text.
2. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. Positive (Negative) signal is based on the number of positive (negative) words divided by the total number of words. For all three signals, the signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. No. of Positive (Negative All) Words is the total number of positive (negative all) words in the MD&A section of the SEC filing.
4. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter. SUEAF is based only on analyst forecasts.
5. Accruals /Average Assets equal income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.
6. BHR is the buy and hold return on a stock minus the average return on a matched size-B/M portfolio. One window spans two days after the SEC filing through one day after the subsequent quarter's preliminary earnings announcement (Filing Through Next Earnings). The Filing window spans days [-1,+1], where day 0 is the SEC filing date (Filing).

Table 3
Mean Excess Returns around SEC Filing for Various Signals

Signal	Bottom 20%	Middle 60%	Top 20%	Significance Top-Bottom
(Positive-Negative) Signal	**-0.002**	**-0.001**	0.000	**.0001**
Positive Word Signal	**-0.002**	**-0.000**	**-0.001**	**.0116**
Negative Word Signal	-0.000	**-0.000**	**-0.002**	**.0001**
Accruals	**-0.001**	**-0.001**	**-0.001**	.5383
SUE	**-0.006**	**-0.000**	**0.003**	**.0001**
SUEAF	**-0.005**	**-0.000**	**0.004**	**.0001**
N	30741	92325	30754	

Notes:

1. The table presents mean excess returns around SEC filings based on various signals. Bold entries represent mean excess returns that are statistically different from zero with a significance level below 5%.
2. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. Positive (Negative) signal is based on the number of positive (negative) words divided by the total number of words. For all three signals, the signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter. SUEAF is based on analyst forecasts only.
4. Accrual/Average Assets equals income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.
5. The excess return is the buy and hold return on a stock minus the average return on a matched size-B/M portfolio over the days [-1,+1], where day 0 is the SEC filing date.
6. Significance Top-Bottom shows the significance level of a two-sample t-statistic that tests the equality of means for the top and bottom excess returns.
7. N is the number of observations in each group for each signal. N is slightly smaller for accruals and SUEAF.

Table 4
Correlations among Regression Variables

	BHR-Drift	BHR - Filing	Accrual	SUEAF	SUE	(POS-NEG)	POS
BHR - Filing	-0.003						
Accrual	**-0.040**	0.001					
SUEAF	**0.043**	**0.053**	**0.025**				
SUE	**0.060**	**0.061**	**0.062**	**0.947**			
(POS-NEG)	**0.014**	**0.013**	-0.001	**0.059**	**0.072**		
POS	**0.006**	**0.006**	**-0.047**	**0.018**	**0.014**	**0.520**	
NEG	**-0.080**	**-0.013**	**-0.045**	**-0.060**	**-0.082**	**-0.658**	0.003

Notes:

1. The table presents Pearson correlations between regression variables, which include excess buy and hold returns (BHR) on scaled signal ranks. Each signal is assigned its quintile rank, is divided by 4, and 0.5 is subtracted to obtain the scaled signal rank. The table is based on all available observations. Bold entries represent correlations that are statistically different from zero with a significance level below 5%.
2. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. Positive (Negative) signal is based on the number of positive (negative) words divided by the total number of words. For all three signals, the signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter. SUEAF is based on analyst forecasts only.
4. Accruals/Average Assets equal income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.
5. BHR-Filing is the buy and hold return on a stock minus the average return on a matched size-B/M portfolio over the days [-1,+1], where day 0 is the SEC filing date. BHR-Drift is the excess BHR over the period from two days after SEC filing through one day after the preliminary earnings announcement in the subsequent quarter.

Table 5
Regression of SEC Filing Returns on Various Signals

Model	1	2	3	4	5	6
Intercept	**-0.0007**	**-0.0007**	**-0.0007**	**-0.0007**	**-0.0007**	**-0.0007**
Significance	**0.0037**	**0.0035**	**0.0033**	**0.0029**	**0.0027**	**0.0026**
Accruals	0.0002	0.0002	0.0001	-0.0004	-0.0004	-0.0005
Significance	0.7435	0.6986	0.8739	0.4064	0.4265	0.3373
SUE				**0.0096**	**0.0097**	**0.0096**
Significance				**0.0001**	**0.0001**	**0.0001**
(POS-NEG)	**0.0020**			**0.0013**		
Significance	**0.0001**			**0.0064**		
POS		0.0008			0.0006	
Significance		0.1206			0.2441	
NEG			**-0.0021**			**-0.0013**
Significance			**0.0002**			**0.0060**
Average R-Square	**0.0013**	**0.0012**	**0.0015**	**0.0090**	**0.0091**	**0.0092**

Notes:

1. The table presents mean coefficients from 52 quarterly regressions of the excess buy and hold return (BHR) around SEC filing dates on scaled signal ranks. Each signal is assigned its quintile rank, is divided by 4, and 0.5 is subtracted to obtain the scaled signal rank. Quarterly regressions have on average about 2,460 observations. Bold entries represent correlations that are statistically different from zero with a significance level below 5%. Significance levels are based on the standard error of the coefficient across the 52 quarterly regressions in a manner of Fama and MacBeth (1973).
2. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. Positive (Negative) signal is based on the number of positive (negative) words divided by the total number of words. For all three signals, the signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter.
4. Accruals/Average Assets equal income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.
5. BHR-Filing is the buy and hold return on a stock minus the average return on a matched size-B/M portfolio over the days [-1,+1], where day 0 is the SEC filing date.

Table 6
Mean Excess Drift Returns for Various Signals

Signal	Bottom 20%	Middle 60%	Top 20%	Significance Top-Bottom
(Positive-Negative) Signal	**-0.003**	0.000	**0.004**	**.0001**
Positive Word Signal	-0.001	0.000	**-0.003**	**.0210**
Negative Word Signal	**0.003**	0.000	-0.001	**.0164**
Accruals	**0.012**	0.001	**-0.011**	**.0001**
SUE	**-0.015**	-0.001	**0.020**	**.0001**
SUEAF	**-0.009**	**-0.002**	**0.015**	**.0001**
N	30741	92325	30754	

Notes:

1. The table presents mean excess returns from two days after the SEC filing through one day after the subsequent preliminary earnings announcement for sub-groups based on various signals. Bold entries represent mean excess returns that are statistically different from zero with a significance level below 5%.
2. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. Positive (Negative) signal is based on the number of positive (negative) words divided by the total number of words. For all three signals, the signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter. SUEAF is based on analyst forecasts only.
4. Accruals/Average Assets equal income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.
5. The excess return is the buy and hold return on a stock minus the average return on a matched size-B/M portfolio from two days after the SEC filing date through one day after the subsequent quarter's preliminary earnings announcement.
6. Significance Top-Bottom shows the significance level of a two-sample t-statistic that tests the equality of means for the top and bottom excess returns.
7. N is the number of observations in each group for each signal. N is slightly smaller for accruals and SUEAF.

Table 7
Regression of Drift Excess Returns on Various Signals

Signal	Intercept	Accruals	SUE	Tone	LOGMKT	LOGPRICE	NFORE	RVOL	RSQ
(Pos-Neg)	-0.0092	**-0.0263**	**0.0344**	**0.0060**	-0.0023	**0.0079**	0.0002	0.0005	**0.0300**
Significance	0.2029	**0.0001**	**0.0001**	**0.0020**	0.0725	**0.0329**	0.4739	0.9708	**0.0001**
Pos	-0.0092	**-0.0260**	**0.0348**	0.0043	-0.0023	**0.0080**	0.0002	0.0005	**0.0301**
Significance	0.2064	**0.0001**	**0.0001**	0.0542	0.0657	**0.0313**	0.4562	0.9565	**0.0001**
Neg	-0.0093	**-0.0264**	**0.0346**	-0.0020	-0.0022	**0.0078**	0.0002	0.0007	**0.0300**
Significance	0.2007	**0.0001**	**0.0001**	0.3154	0.0736	**0.0326**	0.4994	0.3613	**0.0001**

Notes:

1. The table presents mean coefficients from 52 quarterly regressions of the excess buy and hold drift return on scaled signal ranks. Each signal is assigned its quintile rank, is divided by 4, and 0.5 is subtracted to obtain the scaled signal rank. Quarterly regressions have on average about 2,460 observations. Bold entries represent correlations that are statistically different from zero with a significance level below 5%. Significance levels are based on the standard error of the coefficient across the 52 quarterly regressions in a manner of Fama and MacBeth (1973).
2. Tone represents the tone change signal. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. Positive (Negative) signal is based on the number of positive (negative) words divided by the total number of words. For all three signals, the signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter.
4. Accruals/Average Assets equal income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.
5. The excess drift return is the buy and hold return on a stock minus the average return on a matched size-B/M portfolio from two days after the SEC filing date through one day after the subsequent quarter's preliminary earnings announcement.
6. LOGMKT is the log of market value of equity at quarter-end.
7. LOGPRICE is the log of price per share at quarter-end.
8. NFORE is the number of quarterly analyst forecasts.
9. RVOL is the ratio of traded shares in the 60 days prior to filing, scaled by number of shares outstanding one day before filing.

Table 8
Mean Calendar Time Hedge Portfolio Returns on Various Signals

	Portfolio	Mean	t-statistic	Significance	N	Diff vs. Port	Mean	t-statistic	Significance
(POS-NEG) Signal	1	**0.0023**	2.6	0.0101	1188				
POS	2	0.0012	1.5	0.1255	1188				
NEG	3	0.0016	1.7	0.0918	1188				
Accruals	4	**0.0078**	6.1	0.0001	986				
SUE	5	**0.0078**	6.2	0.0001	986				
(POS-NEG) Signal+SUE	6	**0.0114**	5.7	0.0001	278	5	**0.0037**	2.85	0.0049
(POS-NEG) Signal+Accruals	7	**0.0116**	6.1	0.0001	200	4	**0.0038**	2.27	0.0244
SUE+Accruals	8	**0.0161**	7.1	0.0001	194				
(POS-NEG) Signal+Accruals+SUE	9	**0.0238**	5.7	0.0001	47	8	**0.0077**	2.35	0.0201

Notes:

1. The table presents mean monthly hedge returns based on 156 months. Each month, long (short) positions are held in the top (bottom) quintile, except for NEG and accruals, where quintiles are reversed. The information each month is based on the most recent signal (tone change, accruals or SUE), as long as the signal is available at least one day before the month-end and not more than 120 days before. The hedge portfolio is held for the subsequent month. When hedge portfolios are based on more than one signal, only firms falling into the most extreme quintiles of both signals are held in the portfolio. Bold entries represent hedge returns that are different from zero with significance levels below 5% (one-sided for differences in portfolios). Portfolios are numbered 1-9.
2. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. Positive (Negative) signal is based on the number of positive (negative) words divided by the total number of words. For all three signals, the signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter.
4. Accruals/Average Assets equal income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.
5. The excess drift return is the buy and hold monthly return on a stock minus the average monthly return on a matched size-B/M portfolio.
6. The t-statistics and significance levels are based on the 156 monthly hedge returns.
7. N is the average number of firms in the hedge portfolio.
8. Diff vs. Port is a comparison of the return on the row's hedge portfolio minus the return on the hedge portfolio indicated in the column. For example, the hedge return on (POS-NEG) Signal+SUE in row 6 is compared to the hedge portfolio return on SUE in row 5. It measures the incremental return obtained by using both SUE and the (POS-NEG) Signal.

Table 9
Regressions of Calendar Time Hedge Portfolio Raw Returns on Fama-French Factors

Hedge Portfolio	Intercept	Market	SMB	HML	Momentum
SUE	**0.0088**	**-0.0826**	0.0306	-0.0006	-0.009
t-statistic	**6.03**	**-2.15**	0.79	-0.01	-0.33
Accruals	**0.0083**	-0.0324	**-0.0934**	**-0.105**	-0.009
t-statistic	**5.8**	-0.85	**-2.44**	**-2.14**	-0.36
(Pos-Neg)	**0.0021**	0.0105	-0.0069	-0.03596	0.0061
t-statistic	**2.14**	0.4	-0.26	-1.07	0.33
Pos	0.0007	**0.0500**	**-0.0472**	-0.0311	0.0200
t-statistic	0.78	**2.1**	**-1.97**	-1.02	1.19
Neg	0.0017	-0.0252	0.0307	-0.0186	0.0097
t-statistic	1.55	-0.88	1.07	-0.51	0.48
SUE+(Pos-Neg)	**0.0124**	-0.0755	0.0061	-0.0326	-0.0233
t-statistic	**5.34**	-1.23	0.1	-0.42	-0.54
Accruals+(Pos-Neg)	**0.0127**	-0.0765	-0.044	**-0.159**	-0.0019
t-statistic	**6.03**	-1.38	-0.79	**-2.23**	-0.05
SUE+Accruals+(Pos-Neg)	**0.0228**	0.0587	-0.192	-0.134	0.0118
t-statistic	**4.98**	0.49	-1.58	-0.87	0.14

Notes:

1. The table presents regressions of monthly hedge raw returns on the Fama & French 3-factors plus momentum, taken from Kenneth French's Data Library for the 156 months in our calendar time tests. Each month, long (short) positions are held in the top (bottom) quintile, except for NEG and accruals, where quintiles are reversed. The information each month is based on the most recent signal (tone change, accruals or SUE), as long as the signal is available at least one day before the month-end and not more than 120 days before. The hedge portfolio is held for the subsequent month. When hedge portfolios are based on more than one signal, only firms falling into the most extreme quintiles of both signals are held in the portfolio. Bold entries represent regression coefficients that are different from zero with significance levels below 5%.
2. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. Positive (Negative) signal is based on the number of positive (negative) words divided by the total number of words. For all three signals, the signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter.
4. Accruals/Average Assets equal income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.
5. The drift return is the monthly buy and hold return on a stock.
6. Market, SMB, HML and Momentum are regression coefficients of the raw hedge portfolio returns on the Fama & French factors taken from Kenneth French's Data Library.

Table 10
Regression of SEC Filing and Drift Returns on Various Signals
Information Environment Analysis

Panel A - Filing Returns										
	Intercept	**Accrual**	**SUE**	**(Pos-Neg)**	**D**	**Acc*D**	**SUE*D**	**(Pos-Neg)*D**	**N**	**RSQ**
D=Size	**-0.0014**	-0.0006	**0.0118**	**0.0017**	**0.0013**	0.0003	**-0.0058**	-0.0010	2449	**0.0120**
Significance	**0.0002**	0.3898	**0.0001**	**0.0153**	**0.0039**	0.6805	**0.0001**	0.2919		**0.0001**
D=B/M	**-0.0008**	0.0001	**0.0089**	0.0003	0.0002	-0.0013	0.0011	**0.0022**	2449	**0.0112**
Significance	**0.0090**	0.8821	**0.0001**	0.6562	0.6989	0.1501	0.1985	**0.0095**		**0.0001**
D=Number of Analysts	**-0.0014**	0.0005	**0.0109**	**0.0023**	**0.0013**	-0.0018	**-0.0038**	**-0.0021**	2449	**0.0123**
Significance	**0.0001**	0.5118	**0.0001**	**0.0028**	**0.0200**	0.0704	**0.0009**	**0.0477**		**0.0001**
Panel B - Drift Returns										
	Intercept	**Accrual**	**SUE**	**(Pos-Neg)**	**D**	**Acc*D**	**SUE*D**	**(Pos-Neg)*D**	**N**	**RSQ**
D=Size	0.0010	**-0.0270**	**0.0456**	**0.0062**	-0.0007	0.0038	**-0.0267**	-0.0015	2449	**0.0136**
Significance	0.6881	**0.0001**	**0.0001**	**0.0336**	0.7359	0.3163	**0.0001**	0.6731		**0.0001**
D=B/M	0.0019	**-0.0265**	**0.0363**	0.0045	-0.0027	0.0040	-0.0016	0.0026	2449	**0.0123**
Significance	0.4300	**0.0001**	**0.0001**	0.0825	0.4081	0.3203	0.6906	0.4293		**0.0001**
D=Number of Analysts	0.0020	**-0.0227**	**0.0420**	**0.0059**	-0.0022	-0.0049	**-0.0185**	0.0000	2449	**0.0153**
Significance	0.4802	**0.0001**	**0.0001**	**0.0459**	0.4857	0.1834	**0.0004**	0.9965		**0.0001**

Notes:

1. The table presents mean coefficients from 52 quarterly regressions of the excess buy and hold return (BHR) around SEC filing dates and drift returns from two days after the SEC filing through the next earnings announcement on scaled signal ranks. Each signal is assigned its quintile rank, is divided by 4, and 0.5 is subtracted to obtain the scaled signal rank. Quarterly regressions have on average N observations. Bold entries represent correlations that are statistically different from zero with a significance level below 5%. Significance levels are based on the standard error of the coefficient across the 52 quarterly regressions in a manner of Fama and MacBeth (1973).
2. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. The signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter.
4. Accruals/Average Assets equal income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter.
5. D is a dummy variable which is equal to one if the partitioning variable is above its cross-sectional quarterly median. The dummy variables are size, the market value of equity at quarter-end, the book/market ratio (B/M), and the number of analysts.

Table 11
Regression of SUE at Quarter t+1 on SUE at Quarter t and Tone Signals

Signal	Intercept	SUE	Size	Accrual	B/M	NFORE	Price	Signal	N	R-Sq
SUE	0.0012	**0.0861**	0.0000	-0.0026	**-0.0035**	**0.0000**	**0.0000**		2259	**0.0358**
Significance	0.3226	**0.0001**	0.8381	0.5156	**0.0001**	**0.0315**	**0.0239**			**0.0001**
(Pos-Neg)	0.0012	**0.0857**	0.0000	-0.0025	**-0.0035**	0.0000	**0.0000**	**0.0008**	2259	**0.0366**
Significance	0.3103	**0.0001**	0.8696	0.5274	**0.0001**	0.0645	**0.0245**	**0.0001**		**0.0001**
Pos	0.0012	**0.0860**	0.0000	-0.0026	**-0.0035**	**0.0000**	**0.0000**	0.0002	2259	**0.0362**
Significance	0.3347	**0.0001**	0.8138	0.5260	**0.0001**	**0.0340**	**0.0239**	0.1323		**0.0001**
Neg	0.0012	**0.0853**	0.0000	-0.0032	**-0.0035**	0.0000	**0.0000**	**-0.0010**	2259	**0.0369**
Significance	0.3139	**0.0001**	0.8833	0.4282	**0.0002**	0.0501	**0.0245**	**0.0001**		**0.0001**

Notes:

1. The table presents mean coefficients from 51 quarterly regressions of the earnings surprise in quarter t+1 on the earnings surprise in quarter t, several control variables, and the tone change signals. Bold entries represent correlations that are statistically different from zero with a significance level below 5%. Significance levels are based on the standard error of the coefficient across the 51 quarterly regressions in a manner of Fama and MacBeth (1973).
2. (Positive-Negative) signal is based on the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. Positive (Negative) signal is based on the number of positive (negative) words divided by the total number of words. For all three signals, the signal subtracts the average signal in all periodic SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter.
4. Size is market value of equity at quarter end. Accruals/Average Assets equals income before extraordinary items and discontinued operations minus cash from operations (OCF), scaled by average total assets during the quarter. B/M is the ratio of book to market value of equity at quarter-end. NFORE is the number of quarterly earnings forecasts in the 90-day period prior to the earnings announcement. Price is price per share at quarter-end.
5. N (R-Sq) is the average number of firms (R-Square) in the quarterly cross-sectional regressions.

Table 12
Mean Excess Returns for Signal Combinations

	Filing Returns			
	Low Tone	**Medium**	**High Tone**	**High-Low**
Negative Surprise	-0.005	-0.004	-0.003	0.002
N	12414	32228	9627	
Positive Surprise	0.000	0.001	0.002	0.002
N	18327	60097	21127	
	Drift Returns			
	Low Tone	**Medium**	**High Tone**	**High-Low**
Negative Surprise	-0.014	-0.012	-0.011	0.003
N	12414	32228	9627	
Positive Surprise	0.005	0.007	0.010	0.005
N	18327	60097	21127	
Low Accruals (20%)	0.006	0.012	0.017	0.011
N	5180	15136	5284	
Medium Accruals (60%)	-0.001	0.001	0.003	0.004
N	15626	46020	15258	
High Accruals (20%)	-0.016	-0.011	-0.005	0.011
N	5207	14989	5421	

Notes:

1. The table presents mean 3-day excess returns centered on the SEC filing date (Filing Returns) and mean excess returns from two days after the SEC filing through one day after the subsequent preliminary earnings announcement (Drift returns) for combinations of signals.
2. Tone is based on the (Positive-Negative) signal, the number of positive words minus the number of negative words, scaled by the sum of positive and negative words. The signal subtracts the average signal in all SEC filings made in the prior 400 days, and divides by the standard deviation of the signal in the same period.
3. When there are no analyst forecasts for the quarter, SUE is calculated from the *Compustat* quarterly database as preliminary income (Quarterly item 8) for quarter t minus as-first-reported income for quarter t-4, scaled by the market value of equity at the end of the quarter. When there is at least one analyst forecast for quarter t on IBES, the SUE is calculated as the actual *I/B/E/S* EPS minus the mean analyst forecast during the 90-day period before the disclosure of earnings, scaled by the price per share at the end of the quarter. Positive and negative surprise is based on the sign of SUE.
4. Accruals equal income before extraordinary items and discontinued operations minus cash from operations, scaled by average total assets during the quarter.
5. The excess return is the buy and hold return on a stock minus the average return on a matched size-B/M portfolio from two days after the SEC filing date through one day after the subsequent quarter's preliminary earnings announcement.
6. High (Low) tone is the extreme high (low) 20%. High-Low represents the mean High tone return minus the mean Low tone return.
7. N is the number of observations and is provided below the mean for each table entry.