

Forward-Looking Disclosures in the MD&A and the Financial Information Environment

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Abstract

We use computer-intensive techniques to study the informational properties of forward-looking disclosures in the MD&A sections of 10-K filings made with the SEC between 1994 and 2007. We find that firms make more forward-looking MD&A disclosures when their stock prices have poor informational efficiency, i.e., poorly reflect future earnings information. The greater levels of forward-looking MD&A disclosures improve but are unable to completely mitigate the poor informational efficiency of stock prices for such firms. These findings are driven by *dark* firms for whom investors lack timelier alternative information sources other than the statutory filings.

Forward-Looking Disclosures in the MD&A and the Financial Information Environment

1. Introduction

The Management Discussion and Analysis (MD&A) is an important part of the annual report that provides a commentary about a firm's performance and prospects from the management's perspective. However, regulators and users have been critical of the quantity and quality of forward-looking information in the MD&A (Tavcar 1998; SEC 2003, 2005). Also, despite the MD&A's importance, the academic literature examining the characteristics of MD&A disclosures is limited. Accordingly, in this paper we examine the association between forward-looking disclosure in the MD&A and the firm's information environment. In particular, we investigate (1) whether firms with poor information environments provide more forward-looking disclosures in the MD&A, and (2) whether more forward-looking disclosures improve the firms' information environments. We characterize information environments in terms of the informational efficiency of stock prices, measured as the ability of current stock returns to predict future earnings.

We use computer-intensive techniques to examine the MD&A sections of all 10-Ks electronically filed with the SEC between the years 1994 and 2007. Employing criteria from computer-science linguistics, we use a comprehensive list of forward-looking phrases and keywords to identify forward-looking disclosures contained in the MD&A sections. We examine the *quantity* of forward-looking disclosures in the MD&A, rather than the nature of the news (i.e., bad news versus good news) or the tone of the disclosures (optimistic versus pessimistic). Our focus on the quantity of forward-looking MD&A information is predicated on the SEC's

premise that firms do not provide adequate forward-looking information in the MD&A and that the provision of such information will help improve firms' information environments.

To test our research questions, we employ the methodology developed by Collins, Kothari, Shanken, and Sloan (1994), in which current-year stock returns are regressed on future year earnings after controlling for past/current earnings and future returns. This methodology has frequently been used in prior studies in various contexts (e.g., Lundholm and Myers 2002; Gelb and Zarowin 2002).¹ Using this methodology, we investigate how the ability of stock-returns to predict future earnings (which we refer to as the informational efficiency of stock prices) is associated with the *abnormal* level of forward-looking MD&A information, over two separate return windows—during the 11 months prior to the 10-K filing (the pre-filing period) and during the one-month starting with the 10-K filing date (filing period).² We use the pre-filing period to examine whether poor information environments motivate forward-looking MD&A disclosures and the filing period to examine whether such disclosures improve information environments.

We find the following evidence. First, during the pre-filing period, stock returns of firms with high abnormal forward-looking disclosure levels more poorly reflect information about future earnings, i.e., exhibit lower informational efficiency. Second, during the filing period, firms with high abnormal forward-looking disclosure levels more strongly reflect future-earnings information in stock returns, i.e., informational efficiency improves. Third, even after such improvements, the full-year stock returns of firms with high abnormal forward-looking disclosure levels more poorly reflect information about future earnings, i.e., exhibit lower

¹ Lundholm and Myers (2002) and Gelb and Zarowin (2002) examine whether high quality company disclosures as proxied by AIMR ratings 'bring the future forward'; Tucker and Zarowin (2006) examine whether income smoothing increases informativeness of earnings; and Hanlon, Myers and Shevlin (2007) examine whether contemporaneous dividends are informative about the future earnings.

² Empirically, we use a measure of *abnormal* forward-looking disclosure, i.e., the level of such disclosures net of the predicted level given the company's size, performance, growth options, operational uncertainty, industry, and year.

informational efficiency. Our results are consistent with the following thesis: firms provide forward-looking disclosures in part to mitigate their poor information environments; such disclosures improve but do not fully mitigate the informational disadvantage of firms with high abnormal forward-looking disclosure levels. Our results are consistent with the general notion of the “second-best” embedded in analytical models, i.e., information asymmetry can be mitigated but it cannot be completely eliminated through various mechanisms (Bens and Monahan 2004).

We also examine how forward-looking disclosures affect informational efficiency of stock prices for dark versus non-dark firms. We define *dark firms* as those with neither analyst coverage nor voluntary disclosure. We hypothesize and find that forward-looking disclosures are more useful for dark firms—yet they are still unable to mitigate the poorer information environments for such firms. In contrast, non-dark firms have better information environments during the pre-filing period and forward-looking disclosures do not appear to significantly improve information environments, probably because such information is preempted by more timely information from alternative channels. Our results underscore the relatively greater importance of forward-looking disclosures for dark firms but suggest that statutory disclosures do not adequately compensate for the absence of alternative sources of information for dark firms.

Our primary contribution to the literature is that we conduct a large-sample study that examines the informational characteristics of forward-looking MD&A disclosures. MD&A disclosures have been rarely studied by researchers despite repeated statements about their importance by regulators and users. Our study is one of the first to use computer-intensive techniques to examine the properties of company disclosures in a large sample setting, enabling us to draw general inferences about the usefulness of such disclosures. We find that forward-

looking MD&A disclosures are associated with poor information environments and provide useful information to the capital markets, thereby partly mitigating the poor information environments. Overall, our results should be of interest to the SEC, which has frequently expressed concerns about the limited amount of forward-looking disclosures in the MD&A.

Recently, two other studies use computer intensive techniques to examine the properties of MD&A disclosures. Li (2008) uses a naïve Bayesian machine-learning approach to identify the tone of forward-looking statements in MD&A's, and finds that tone changes (changes in pessimistic or optimistic weight of the narratives) are informative about future earnings. Feldman, Govindaraj, Livnat, and Segal (2009) apply the methodology of Tetlock (2007) and find a positive association between the tone of the MD&A disclosures and market reaction around the 10-K (and 10-Q) filings. Our findings complement the insights from these two studies.³ Unlike these papers that study the *tone* of MD&A disclosures, we focus on the *quantity* of forward-looking disclosures (regardless of the tone), and examine whether and for what types of firms such disclosures are useful to investors. Our results suggest that ameliorating poor information environments could be one potential motivation for the provision of forward-looking MD&A disclosures, and that the quantity of forward-looking disclosures *per se* helps mitigate poor information environments. Thus, our paper makes an important contribution to the emerging literature that uses computer-intensive methods to examine the properties of MD&A disclosures.

Our study also documents the particular importance of forward-looking MD&A disclosures for dark firms, for whom the capital markets lack alternative sources of information.

³ In addition to these studies, Li (2008) examines the lexical properties of 10-K filings for a large sample of firms and finds that companies use complex language to obfuscate poor performance, consistent with the opportunistic motive for voluntary disclosures. In contrast, we show that forward-looking MD&A disclosures provide useful information to the capital markets. Our findings complement Li's findings and suggest that incentives to both improve and deteriorate information environment can coexist in the cross-section of companies.

We show that MD&A disclosures are extremely important for dark firms; alternative channels of communication appear to provide timely information for other firms. The existence of dark firms and the importance of *quasi-mandatory* forward-looking MD&A disclosures for such firms should be of particular interest to regulators such as the SEC, by highlighting the types of firms for whom such disclosures are most useful.

2. Motivation

Importance of MD&A Research

For the past twenty-five years, public companies are required to file Management, Discussion and Analysis sections (MD&A) with the SEC as an integral part of their annual reports or 10-K filings (SEC 1980). The SEC intends that the MD&A provide investors an opportunity to see the company through the eyes of the management by providing both short- and long-term analysis of the business of the company (SEC 1987). The SEC has provided periodic guidance about the basic content of the MD&A (Garmong 2007). Even though Regulation S-K and the SEC's guidelines make MD&A sections mandatory, the content of the MD&A is largely voluntary; in other words, the MD&A is a *quasi-mandatory* (or *quasi-voluntary*) disclosure setting.

The SEC has continually emphasized the need for forward-looking disclosures—versus disclosures about past events—and has encouraged companies to make MD&A disclosures about managerial projections such as trends, demands, events, commitments, plans and uncertainties that are likely to materially affect company liquidity, capital resources or future operations (SEC 1989, 2003). However, the SEC's examinations of company MD&A's at several points in time

find them to be “generally” deficient (Garmong 2007).⁴ Particularly, the SEC alleges that MD&A’s typically include boilerplate statements and immaterial detail but little information of substance. Consistent with this notion, Pava and Epstein (1993) find that the MD&A’s of 25 randomly selected companies mostly describe past performance. Overall, this criticism of the MD&A’s centers on the (un)informativeness of forward-looking disclosures (SEC 2003). This criticism motivates us to examine the informativeness of forward-looking statements using a large-sample of company filings.⁵

Prior Research and Incremental Contribution

A limited number of small-sample studies have examined the consequences of the content and quality of MD&A disclosures. Bryan (1997) examines seven topics that the SEC requires firms to discuss in their MD&A’s for a sample of 250 firms during 1990. Out of the seven, three topics—namely liquidity, capital expenditures and known trends on sales and costs—pertain to forward-looking disclosures. Bryan (1997) finds that some combination of the seven MD&A disclosures is associated with future financial variables, analyst forecast revisions and current stock returns. However, the associations of the three forward-looking topics with future financial variables, analyst forecast revisions and current stock returns are mixed. For instance, only disclosures about capital expenditures are associated with stock returns and none of the forward-looking disclosures is associated with changes in future cash flows. This result is likely to be due to either the statistical power of the small sample or the un informativeness of forward-looking MD&A disclosures.

⁴ The SEC examined Fortune 500 companies’ filings in 2002. The SEC also conducted a targeted review of 359 companies representing 24 industries in 1988 and found 345 MD&A’s to be deficient (SEC 1989). More recently, in their general review of MD&A’s, the SEC found several deficiencies (SEC 2003).

⁵ Even though a large body of research (both examining mandatory and voluntary disclosures) has focused on quantitative variables such as earnings, sales or book value of equity, there has been a dearth of research examining MD&A disclosures despite their importance to the users. Noting this, Core (2001), in his review of the voluntary disclosure literature, emphasizes the importance of conducting research based on detailed content of disclosures.

Other prior studies using limited samples have examined the quality score of MD&A sections. Barron, Kile, and O’Keefe (1999) examine MD&A quality scores assigned by a 1987 SEC study for a small sample of firms, and find that MD&A quality is associated with lower analysts’ forecast error and dispersion. Clarkson, Kao, and Richardson (1999) show that quality ratings of MD&A’s by analysts for a sample of Toronto Stock Exchange firms are associated with various firm factors related to voluntary disclosure identified by Lang and Lundholm (1993). These studies do not directly examine the content/amount of forward-looking disclosure in the MD&As.

Two recent studies use computer-intensive techniques to study a large sample of MD&A’s. Li (2008) uses a Bayesian machine-learning algorithm to assess the “tone” of forward-looking disclosures in the MD&A’s between 1994 and 2007. Li finds that the optimistic (pessimistic) tone of forward-looking sentences in MD&A’s is positively (negatively) associated with future earnings after controlling for extant financial information, such as current earnings. Feldman et al. (2009) use keywords and phrases suggested by Tetlock (2007) to assess the “tone” of all MD&A disclosures and find the tone change in a specific MD&A as compared to those of prior years is positively associated with market reaction around the 10-K (and 10-Q) filings for quarters spanning Q4/1995 and Q2/1996 . In addition, Li (2008) studies lexical properties of annual reports for a large sample of firms. Using popular techniques from linguistics, Li finds that firms opportunistically hide poor performance by obfuscating the content of annual reports, i.e., annual reports’ “readability” is lower when firm’s current earnings are negative, or positive but less persistent.

Our objective is to add to this nascent stream of research by studying the informational properties of forward-looking disclosures in a large sample of MD&A’s. Specifically, we ask (i)

whether companies are motivated to make up for poor information environments by making more forward-looking disclosures, and (ii) whether more forward-looking MD&A disclosures—irrespective of the tone—improve the company information environment. These research questions are complementary and different from those of concurrent studies that focus on the tone of MD&A disclosures (Li 2008; Feldman et al. 2009).⁶ In particular, our research question provides insights into the potential benefits of the SEC’s call for more forward-looking MD&A disclosures—with no specificity about the tone or nature of the disclosures—both for the whole sample and in a particular subsample of companies lacking alternative channels of communication, i.e., companies that are neither covered by analysts nor provide voluntary management disclosures. We also provide complementary evidence about which types of forward-looking disclosures (in terms of content, quantitative, and horizon features) are more pronounced in our empirical results.

Theoretical Considerations

In this study we examine whether forward-looking MD&A disclosures are informative, i.e., whether they provide useful information to the capital markets. On the surface, such an exercise may seem superfluous in light of evidence that voluntary disclosure quality is associated with informative stock prices (Lang and Lundholm 1996; Lundholm and Myers 2002; Gelb and

⁶ Empirically, our analysis of identifying the quantity of forward-looking disclosures arguably avoids the harder task of identifying tone of statements. Consider a typical prospective statement like “We project our earnings per share to be \$1.0 in the next year.” This statement alone can be easily captured as forward-looking in our analysis. However, whether the tone is positive or negative is remarkably harder to assess, and depends on many factors such as past performance of the company and its competitors, analyst forecasts, company’s investments, projected ROI among others. Even, the use of seemingly positive (negative) keywords such as “We project our EPS to increase (decrease) to \$1.0 in the next year” does not necessarily convey the positive (negative) tone in the absence of complementary information. This conjecture we develop while manually reading the prospective statements in our sample is corroborated by contemporaneous literature. For instance, Li (2008) manually assigns “uncertain” and “neutral” ratings to 22.6% (40.0%) of the prospective sentences in his sample and effectively excludes them from his analysis.

Zarowin 2002). However, it is not obvious that forward-looking MD&A disclosures will be informative for several reasons, thereby generating tension in our predictions.⁷

First, while the MD&A provides firms with an opportunity to discuss company business, past events and future prospects, it is not a timely channel of communication. Other sources of information such as press releases, conference calls, and one-to-one communication with analysts (prior to Regulation FD) are timelier and could therefore pre-empt information communicated through the MD&A. Our analysis relating to dark firms is particularly crucial in this context. Second, investors may rely less on MD&A than other parts of the 10-K because the MD&A section is only reviewed by auditors for consistency with the other parts of the annual report (Hufner 2007). Finally, it is not clear that managers will disclose value-relevant prospective information in the MD&A based on both prior evidence (see above for SEC's criticisms and lack of evidence on MD&A usefulness) and voluntary disclosure theories. We elaborate on this last point below.

As noted earlier, the institutional evidence suggests that managers may not be forthcoming about prospective disclosures in the MD&A. The SEC has been concerned about the MD&A disclosures. In particular, the SEC finds too much discussion about analyzing past performance and too little emphasis forward-looking information, and even when companies make prospective statements, there is a notion that a large part of these statements tend to be "boilerplate" and meaningless (SEC 2003). Thus, it is hardly clear whether MD&A disclosures have information content.

⁷ In a recent review of the voluntary disclosure literature, Hirst et al. (2008) write: "Managers often issue earnings forecasts to correct information asymmetry problems and, thus, influence their stock price (e.g., Nagar et al. 2003). The idea that earnings forecasts are value relevant was not always obvious, however. Indeed, early research questions whether market participants rely on a forecast from management (i.e., a subjective and unaudited projection of future events)."

Voluntary disclosure theories are ambivalent about whether managers disclose value relevant information. The *informativeness perspective* suggests that managers disclose value relevant information for various reasons. Early signaling models argued that firms disclose *all* value-relevant information to mitigate the adverse selection problem (see Grossman and Hart 1980; Grossman 1981; Milgrom 1981). Subsequent models imposed costs and derived more selective disclosure strategies where managers generally disclose *good* news (e.g., Verrecchia 1983; Dye 1985). In particular, Verrecchia (1983) shows that managers may not disclose private information because of proprietary cost concerns. In contrast to the predictions of signaling models, the litigation risk hypothesis purports that firms will voluntarily disclose *bad* news (Skinner 1994; Trueman 1997). Finally, an independent strand of literature argues that managers disclose—either good or bad news—to meet the capital markets’ demand for information (Lang and Lundholm 1996; McNichols 1989; Hutton and Stocken 2007).⁸ Overall, irrespective of the manager’s motive and whether the benefits accrue to the manager or the firm, the informativeness perspective argues that voluntary disclosures will be informative.

In contrast, the *opportunistic perspective* suggests that managers disclose good earnings news to the market to “hype” the stock, especially prior to raising capital or extract rents (Lang and Lundholm 2000; Aboody and Kazsnik 2000). Consistent with this perspective, Li (2008) argues that managers opportunistically use narrative disclosures in the MD&A to obfuscate poor performance. More recently, Kothari et al. (2009) show that managers ‘leak’ good news in a timely fashion but withhold bad news based on managerial career concerns.

To summarize, the informativeness perspective suggests forward-looking MD&A disclosures communicate information about future firm performance, which contemporaneous

⁸ Ajinkya and Gift’s (1984) expectations adjustment hypothesis, where managers voluntarily disclose information to align market’s expectations with their own, falls into this category.

stock prices are likely to incorporate. The opportunistic perspective suggests forward-looking MD&A disclosures are not likely to be associated with future performance, even though they may move stock prices in the short term. Finally, forward-looking MD&A disclosures may also be pure noise (as suggested by the SEC) so that they neither move stock prices nor reflect future earnings information. Whether forward-looking MD&A disclosures communicate value relevant information to the capital markets is therefore an empirical question.

3. Data and Preliminary Analyses

Identifying Forward-Looking Disclosures

We develop a UNIX Perl code that, in sequence, (1) downloads all 10-K filings from the SEC *Edgar* database between years 1994 and 2007, (2) extracts the Management Discussion and Analysis (MD&A) sections from the 10-K filings, (3) extracts forward-looking statements from the MD&A sections, and (4) analyzes content, quantitative and horizon features of the forward-looking statements. For brevity, we describe key aspects of our methodology in this section. Appendix A describes our procedure in detail.

We use sentence as the unit of analysis (instead of text lines or words) because it is the smallest integral unit of text that conveys an idea or message (Ivers 1991).⁹ Accordingly, we first parse the MD&A into sentences. We identify an MD&A sentence as forward-looking if the sentence includes either: (a) keywords that imply future (such as “...*next year*”); (b) conjugation of verbs that imply future (such as “*the company plans to...*”); and (c) numerical reference to future years relative to the year of filing (such as “... *in 2006*” in a 2004 filing). We tag a sentence as forward-looking if it fits any of the above criteria (we do not differentiate based on number of forward-looking hits in a sentence). The criteria and keyword lists are recursively

⁹ Our results are qualitatively unchanged when we use the number of words as our unit of analysis.

developed based both on computer-science-based linguistics for identifying future-related sentences (Wang and Lin 2004) and on our reading of 100 randomly selected 10-K filings.

Finally, we validate our methodology by comparing the computer output of 50 randomly selected 10-Ks with that from MBA students' readings. Overall, we find that our routine is well specified and powerful. We report details of this validation check in Appendix B.

Descriptive Statistics

Table 1 Panel A presents descriptive statistics for our final sample, which consists of 37,199 10-K filings between the years 1994 and 2007 from 4,982 unique firms. On average, a 10-K filing has 1,544 sentences, 276 of which belong to the MD&A section. The MD&A intensity, which is computed as the number of MD&A sentences divided by the total number of sentences in the annual report, has a mean (median) of 19.5% (18.6%).

Turning to our variable of interest, we find that on average there are 35 forward-looking sentences out of 276 sentences in the MD&A section. We plot the average number of forward-looking sentences in the MD&A over the sample period in Figure 1. The average number of forward-looking sentences is around 14 sentences until 1997 and increases steadily thereafter to 50 in 2005. This increase is consistent with the SEC's efforts to increase forward-looking disclosures in the 10-K filings.¹⁰

We find that the number of sentences in the MD&A section also exhibits a similar pattern over the years. As such, to account for the effect of the number of MD&A sentences, we define forward-looking intensity (*fwlintensity*) as the number of forward-looking sentences divided by the total number of sentences in the MD&A. The *fwlintensity* ranges from 0% to 72%, indicating

¹⁰ The number of forward-looking sentences spikes in 1999. Reading some annual reports of 1999, we find that the spike is largely attributable to references to year 2000 regarding Y2K preparedness. We choose not to filter out this effect, because discussions about Y2K preparedness are arguably forward-looking disclosures. Our empirical results are unaffected if we drop observations from year 1999.

considerable variation across companies and years. The mean (median) *fwlintensity* is 12.5% (12.1%). Figure 1 shows that the average *fwlintensity* increases over time from around 10% in 1994 to 13% in 2007. The smaller increase in forward-looking intensity over the sample period (30%) relative to that of forward-looking sentences (400%) suggests that the number of sentences in the MD&A and the number of forward-looking sentences increase in consonance. Thus, in our empirical analyses, we measure forward-looking disclosure levels using both the number of forward-looking sentences and forward-looking intensity.

We further group the forward-looking disclosure sentences based on three dimensions: content, quantitative and horizon. The content of a forward-looking sentence is classified into seven groups: performance (with keywords such as “income” or “margin”), business (“product” or “backlog”), investment (“acquire” or “subsidiary”), finance (“bank credit” or “hedge”), employee (“salary” or “pension”), macroeconomy (“inflation” or “population”), and accounting (“SFAS” or “record”). If a sentence includes keywords from two or more groups, the sentence is labeled as belonging to all relevant groups.¹¹ The forward-looking intensities for each category is then computed by dividing the number of sentences by the total number of MD&A sentences. Panel A of Table 1 shows that the number of sentences (intensities) of performance, business, investment, finance, employee, macroeconomy, and accounting forward-looking categories are 14.5 (5.1%), 16.8 (5.9%), 7.7 (2.8%), 11.8 (4.2%), 1.8 (0.6%), 1.6 (0.6%), and 2.7 (1.0%), respectively.

For the quantitative grouping, we identify all alphanumeric words (such as “3”, “three” or “triple”) in the forward-looking sentences. For the horizon grouping, we count the number of numerical references to a following year (such as “2002” in a 1996 filing) as well as horizon

¹¹ As with forward-looking sentences, the key word list for these groupings are recursively checked for validity by reading 100 randomly selected MD&As.

keywords (such as “following year”). Similarly, we identify whether the references are short-horizon, i.e., within one year of the filing date (such as “next quarter” or “upcoming month”) or long horizon, i.e., after one year of the filing date (such as “decade” or “foreseeable future”). Step 4 described in Appendix A provides the complete list of keywords and detailed explanation for our grouping methodology. Panel A of Table 1 shows that there are 10.1 (3.8%) forward-looking sentences (quantitative *fwlintensity*) with numerical references, 10.2 (4.0%) forward-looking sentences (horizon *fwlintensity*) with horizon references, 4.3 (1.8%) forward-looking sentences (short-horizon *fwlintensity*) with short-horizon references, and 5.8 (2.1%) forward-looking sentences (long-horizon *fwlintensity*) with long-horizon references.

Panel B of Table 1 provides average number of forward-looking sentences and intensities across the 48 Fama-French industries. There is moderate variation across industries. Pharmaceuticals (17.3%), precious metals (15.3%), and electronic equipment (14.5%) industries exhibit the highest forward-looking intensities, whereas printing and publishing (10.2%), insurance (9.7%), and banking (7.2%) report the lowest forward-looking intensities. We control for industry effects in our analyses.

Measuring Abnormal Forward-Looking Disclosure Levels

Table 2, Panel A reports mean and median values of various firm characteristics across *fwlintensity* terciles.¹² We find that forward-looking disclosures increase with firm size. Moreover, firms with high forward-looking disclosures have poorer performance, i.e., lower earnings, higher incidence of losses, and marginally lower stock returns.¹³ Firms with higher forward-looking disclosures also have more volatile operating environments, i.e., greater

¹² The results with forward-looking sentences are qualitatively similar.

¹³ This result is corroborated by the Altman-z statistic (unreported). Also, unreported tests show that much of the negative correlation between forward-looking intensity and earnings results from the negative correlation of forward-looking intensity with cash flow from operations rather than that with accruals.

volatility in earnings and stock returns as well as higher frequency of reported special items and M&A activities. Finally, forward-looking disclosures increase with growth opportunities proxied (inversely) by book-to-market ratio and company age. Table 2 Panel B reports Pearson and Spearman correlations between *fwlintensity*, *fwlsentences*, and the firm characteristics. The correlations are qualitatively consistent with the results reported in Panel A.

Our descriptive analyses suggest that forward-looking disclosure levels are correlated with various firm characteristics, in particular, size, performance, and operating volatility. It is likely that these firm characteristics may also be correlated with the firm's information environment. For example, smaller firms and firms with greater operating volatility may have poorer information environments. Since our primary tests examine the association between forward-looking disclosure levels and the firms' information environments, we need to control for these firm characteristics to ensure that our results are not driven by the association of these characteristics with the firms' information environments. Accordingly, in our primary empirical analyses we use a measure of *abnormal* forward-looking disclosure level that controls for various firm characteristics.¹⁴

We control for the following firm characteristics that have been shown to be related to the firms' information environment in prior literature: firm size, performance, volatility of the operating environment, growth options, industry and year of filing. Larger firms are likely to provide more forward-looking information; we measure firm size by the market value of equity. Poorly performing firms are likely to have greater uncertainty and thus are likely to provide more

¹⁴ Untabulated analyses show significant persistence in forward-looking disclosures. However, persistent forward-looking disclosures do not necessarily imply 'stale' information. This is because while the sentence is repeated every year, the information content is likely to be different. For instance, Microsoft Inc. reports "We estimate worldwide PC shipments will grow between 8% and 10%." in their 2007 FY filing on August 25, 2006. One year later, the company uses a similar phrase but changes its content "We estimate worldwide PC shipments will grow between 9% and 11%." in their 2008 FY filing on August 3, 2007. The new numbers clearly provide the company's updated projections on the filing date. Our construct of abnormal forward-looking disclosures is not one of 'new information,' but a control for the innate information environment of firms.

forward-looking information to assure investors about future prospects (Hayn 1995; Cosimano, Jorgensen, and Ramanan 2004) or for mitigating litigation risk (Skinner 1994); we measure firm performance by the level of earnings, an indicator of negative earnings (loss), and stock returns. A volatile operating environment is associated with greater uncertainty and information asymmetry between firms and investors (Andersen 1996), which should induce managers to provide more forward-looking disclosure; we measure the volatility of operating environment with volatility of past earnings, volatility of stock returns, incidence of special items and incidence of M&A activity. Young and growing firms have uncertain operating environments as well as less informative earnings (Anthony and Ramesh 1992); we measure growth options by the book-to-market ratio (Smith and Watts 1992) and firm age. Specifically, we estimate the following models:

$$\begin{aligned}
 fwlintensity_t = & \alpha_0 + \alpha_1 \text{Log}(size)_t + \alpha_2 \text{Earnings}_t + \alpha_3 \text{Loss} + \alpha_4 \text{Return}_t \\
 & + \alpha_5 \text{Earnings volatility}_t + \alpha_6 \text{Return volatility}_t + \alpha_7 \text{Special items}_t \\
 & + \alpha_8 \text{M\&A}_t + \alpha_9 \text{Book-to-market}_t + \alpha_{10} \text{Age}_t + \alpha_{11} \text{MDA intensity}_t \\
 & + \sum \theta \text{Industry} + \sum \lambda \text{Year}_t + \varepsilon_t
 \end{aligned} \tag{1a}$$

$$\begin{aligned}
 fwlsentences_t = & \alpha_0 + \alpha_1 \text{Log}(size)_t + \alpha_2 \text{Earnings}_t + \alpha_3 \text{Loss} + \alpha_4 \text{Return}_t \\
 & + \alpha_5 \text{Earnings volatility}_t + \alpha_6 \text{Return volatility}_t + \alpha_7 \text{Special items}_t \\
 & + \alpha_8 \text{M\&A}_t + \alpha_9 \text{Book-to-market}_t + \alpha_{10} \text{Age}_t + \alpha_{11} \text{MDAsentences}_t \\
 & + \alpha_{12} \text{10Ksentences}_t + \sum \theta \text{Industry} + \sum \lambda \text{Year}_t + \varepsilon_t
 \end{aligned} \tag{1b}$$

where *fwlintensity* is the ratio of forward-looking sentences in the MD&A (*fwlsentences*) to total number of sentences in the MD&A; *Log(size)* is the natural logarithm of market value of equity in millions of dollars; *Earnings* is earnings before extraordinary items deflated by total assets; *Loss* is an indicator variable that takes the value of 1 if *Earnings* is negative and 0 otherwise; *Return* is stock return over the fiscal year; *Earnings volatility* is the coefficient of variation of earnings measured over the sample period (from year 1994 to 2007 using available data for each company); *Return volatility* is the standard deviation of monthly stock returns over the fiscal

year; *Special items* is an indicator variable that takes the value of 1 if the absolute value of special items is greater than 5% of total assets, and 0 otherwise; *M&A* is an indicator variable that takes the value of 1 if the “Acquisition – Sale contribution” data item is greater than 0, and 0 otherwise; *Book-to-market* is book value of total assets divided by market value of firm (i.e., equity plus debt) assets; *Age* is the number of years between the current fiscal year and the year of the company’s first appearance in CRSP database. We also include year and Fama-French industry indicators.

Our estimates of abnormal forward-looking intensity (sentences) are residuals from the regression specified in equation *1a* (*1b*). We estimate pooled regressions using a Generalized Least Squares (GLS) method that takes into account multiple company-specific observations. The GLS regression uses company fixed-effects and the standard errors are corrected using the Huber-White method. The GLS model therefore allows us to control for the effects of both heteroskedasticity and serial/cross correlations in the sample. We use a similar GLS method for all regressions in our study.

The regression results (reported in Table 2 Panel C) largely corroborate the univariate associations between *fwlintensity* and firm characteristics reported Panels A and B of Table 2. First, forward-looking intensity is positively associated with firm size. Second, forward-looking intensity is negatively associated with performance: the coefficients on earnings (stock returns, losses) are negative (negative, positive). Third, forward-looking intensity is positively associated with the uncertainty of the operating environment measured by return volatility, while the coefficient on earnings volatility is not significant. Fourth, special items are negatively associated with forward-looking intensity (contrary to prediction), while the coefficient on M&A is positive but insignificant. Finally, forward-looking intensity is positively associated with

growth options: the coefficients on age and book-to-market ratio are negative and significant.¹⁵ Finally, forward-looking intensity positively relates to the MD&A intensity. The within, between, and overall R²s of the GLS regression are 34.2%, 39.5%, and 38.0%, respectively. The R²'s suggest that the independent variables capture a significant variation in *fwlintensity*, but more of the cross-sectional than time-series variation. The results are similar for Equation (1b), which uses forward-looking sentences as the dependent variable.

4. Forward-Looking Disclosures and the Financial Information Environment

In this section, we empirically examine our research question of how forward-looking disclosures in the MD&A relate to the company's information environment for (a) the full sample, (b) partitioning the sample into dark and non-dark firm-years, and (c) summarizing additional analyses for the categories of forward-looking disclosures.

Forward-Looking Disclosures and the Informational Efficiency of Stock Prices

To examine the research question we use the methodology developed by Collins et al. (1994). Collins et al. regress current returns on current and future earnings and show that stock returns anticipate information contained in future earnings (hereafter the CKSS model). We augment the CKSS model by including proxies for abnormal MD&A disclosure levels as *AFWLI* (residual from Equation 1(a) and proxy for abnormal intensity) and *AFWLS* (residual from Equation 1(b) and proxy for abnormal intensity). To provide insights into the information environment and forward-looking disclosures, we estimate the CKSS model over two separate windows: (1) the eleven-month period *prior* to the 10-K filing (the *pre-filing* period) and (2) the

¹⁵ In sensitivity analyses, we also include the following variables in Equation (1): (1) absolute earnings surprise, measured as the difference between earnings and last year's earnings deflated by last year's stock price; (2) earnings persistence, measured as the coefficient from an AR(1) model that regresses current earnings on last year's earnings; and (3) estimated litigation costs from Skinner (1997), which estimates shareholder losses as the product of the firm's market capitalization, stock price decline, and an estimate of the proportion of shares bought/sold during the year. None of these variables is significant in the regression. We therefore omit these variables.

one-month period starting from the date of the 10-K filing (the *filing* period). The pre-filing period provides a ‘benchmark’ on the information environment existing prior to the 10-K filing, as measured by the informational efficiency of stock prices to incorporate the future earnings information, and the filing period provides evidence on the ability of the abnormal forward-looking disclosure levels to improve the information environment by enabling the stock prices to incorporate information on future earnings. Thus, the two windows are selected to provide insights into whether abnormal forward-looking MD&A disclosure levels are motivated by and improve poor information environments. We predict that the informational efficiency of stock prices in the pre-filing period will be lower for high abnormal forward-looking disclosure firms. We also predict that the information efficiency of stock prices for such firms will improve during the filing period. However, we do not make predictions on whether the improvement for such firms will completely mitigate the poorer informational efficiency in the pre-filing period. In particular, we estimate the following regression:

$$\begin{aligned}
R_t = & b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t+1} + b_4 R_{t+1} + b_5 AFWL_t \\
& + b_6 AFWL_t * X_{t-1} + b_7 AFWL_t * X_t + b_8 AFWL_t * X_{t+1} + b_9 AFWL_t * R_{t+1} \\
& + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t
\end{aligned} \tag{2}$$

where R_t is alternatively measured as (1) $R_{Pre-filing}$, the 11-month buy-and-hold stock return ending two days prior to the 10-K filing; (2) R_{Filing} , the one-month buy-and-hold stock return around the 10-K filing (starting one day before and ending 30 days after the 10-K filing); and (3) R_{Full} , the buy-and-hold stock return for the 12 months ending 30 days after the 10-K filing. X_t is the earnings before extraordinary items in year t deflated by market value of equity at the beginning of the fiscal year. R_{t+1} is the buy-and-hold return for the year $t+1$. Finally, $AFWL$ denotes $AFWLI$ or $AFWLS$ as the case may be.

The sample for this analysis drops from 37,199 to 27,164 because of data constraints, in particular non-availability of stock returns, one-year-before earnings and one-year-ahead earnings. Panel A of Table 3 presents descriptive statistics for the forward-looking intensity measures, stock returns and earnings. The mean and median *AFWLI* is not different from zero. The mean and median *AFWLS* are -0.0168 and 0.0195, respectively, indicating that the residuals from equation (1b) have a left-skewed distribution. R_{Filing} has a mean of 1.69%, and the 11-month $R_{Pre-filing}$ has a mean of 10.77%.

Panel B of Table 3 presents the GLS results of Equation (2) with $R_{Pre-filing}$, R_{Filing} , and R_{Full} as dependent variables in their respective columns with *AFWLI*. The key variable of interest, $AFWLI_t * X_{t+1}$ reflects the extent to which forward-looking disclosures help current stock returns incorporate information about one-year-ahead earnings. When $R_{Pre-filing}$ is the dependent variable (Column 1), the coefficient estimates on X_{t+1} and $AFWLI_t * X_{t+1}$ are 0.4042 (p-value=0.00) and -2.1054 (p-value=0.00), respectively. The negative sign on $AFWLI_t * X_{t+1}$ shows that companies with high forward-looking intensity are those whose pre-filing returns are less informative about one-year-ahead earnings. This translates to an impact of -0.34% ($= -2.1054 \times 0.0531 \times 0.0284 \times (12/11)$) and 0.34% ($= -2.1054 \times 0.0531 \times -0.0279 \times (12/11)$) for the third and first quartiles of *AFWLI*. This indicates that for the high/third quartile (low/first quartile) of abnormal forward-looking disclosures there is on average less (more) information on future earnings embedded in stock prices.

When R_{Filing} is the dependent variable (Column 2), the coefficient estimates on X_{t+1} and $PAFWL_t * X_{t+1}$ are 0.0482 (p-value=0.00) and 0.1593 (p-value=0.00), respectively. The positive sign on $AFWLI_t * X_{t+1}$ indicates that the filing-period returns of high forward-looking intensity companies better reflect one-year-ahead earnings. These results suggest that forward-looking

MD&A disclosures convey future-earnings related information to the stock markets. This translates to an impact of 0.28% ($=0.1593 \times 0.0531 \times 0.0284 \times 12$) and -0.28% ($=0.1593 \times 0.0531 \times -0.0279 \times 12$) for the third and first quartiles of *AFWLI*. This indicates that for the high/third quartile (low/first quartile) of abnormal forward-looking disclosures there is on average more (less) information on future earnings embedded in stock prices. Comparing the average annualized returns make it appear as if the poor information environment is completely mitigated by the abnormal forward-looking disclosure levels in the MD&A, the R_{Full} analysis as the dependent variable provides insights into this.

When R_{Full} is the dependent variable (Column 3), the coefficient estimates on X_{t+1} and $AFWLI_t * X_{t+1}$ are 0.4917 (p-value=0.00) and -1.9048 (p-value=0.00), respectively. The negative $AFWLI_t * X_{t+1}$ suggests that annual stock returns (including filing returns) of companies with high forward-looking intensity are still less informative about one-year-ahead earnings. This translates to an impact of -0.29% ($=-1.9048 \times 0.0531 \times 0.0284$) and 0.28% ($=-1.9048 \times 0.0531 \times -0.0279$) for the third and first quartiles of *AFWLI*. This indicates that on an annualized basis there is an improvement in information environment of roughly 15% ($=[0.34 - 0.29]/0.34$) for the for third quartile of *AFWLI* and 13.33% for the third quartile of *AFWLS*.

Table 3, Panel C provides the results of estimating the CKSS model with $AFWLS_t$ instead of $AFWLI_t$. The results are qualitatively similar to those discussed in Table 4, Panel B. The impacts in the pre-filing period for the third and first quartiles of *AFWLS* are -0.30% and 0.28% in terms of annualized returns. Similarly, the impacts in the filing period for *AFWLS* are 0.41% and -0.38% for the third and first quartiles, respectively; and the impacts in the full period are -0.26% and 0.24% for the third and first quartiles, respectively. This indicates that on an

annualized basis there is an improvement in information environment of roughly 13.33% ($= [0.30 - 0.26]/0.30$) for the third quartile of *AFWLS*.

Overall, the evidence suggests that firms with higher forward-looking intensity have poorer informational efficiency, i.e., the current stock returns incorporate less information on future earnings. Forward-looking MD&A disclosures do improve the ability of returns to reflect future earnings. However, this improvement does not fully mitigate the lower informational efficiency of higher forward-looking intensity firms' stock prices.¹⁶

Dark and Non-Dark Firms

The *quasi-mandatory* nature of the MD&A makes forward-looking statements in the MD&A section different from other voluntary disclosures examined in prior literature (notably, managerial earnings forecasts). To highlight this differential nature of forward-looking MD&A disclosures, we examine the informational efficiency of stock prices for *dark firms* that are defined as firms with no analyst coverage or voluntary managerial disclosure.¹⁷ The primary source of public financial information for dark firms is the statutory financial statements. Therefore, we expect forward-looking MD&A disclosures to be more useful for dark firms as compared to non-dark firms, where much of the information is likely to be available through voluntary disclosures and/or analysts' forecasts.

¹⁶ We estimate Equation (2) by also including the normal (predicted) forward-looking MD&A disclosures obtained from equations (1a) and (1b), i.e., by separately including the predicted values and residuals from 1a and 1b—appropriately interacted with various earnings/returns variables as specified in Equation 2. As such, whether the normal forward-looking information provides information is an empirical question. The inclusion of predicted values does not qualitatively alter the results with respect to the abnormal measures. The coefficient estimates on the interaction between the predicted intensity and X_{t+j} are -5.1842, -0.1196 and -4.8202 (p-values = 0.00, 0.33, 0.00) for the pre-filing, filing and full periods, respectively; and between the predicted sentences and X_{t+j} are -5.1956, -0.0864 and -4.9460 (p-values = 0.00, 0.48, 0.00) for the pre-filing, filing and full periods, respectively. This indicates that the normal (predicted) forward-looking disclosures are indicative of poor information environment, but on average do not help in improving the information environment.

¹⁷ We consider a firm-year as dark if the I/B/E/S consensus file does not include an analyst earnings forecast during the fiscal year, and the First Call database does not include any managerial guidance during the fiscal year. If the I/B/E/S or First Call coverage is not comprehensive, then we would potentially classify a non-dark firm as a dark firm, therefore reducing the power in our ability to identify differences between dark and non-dark firms.

To test our prediction, we partition our sample on two dimensions: (1) dark versus non-dark firm-years and (2) high versus low forward-looking intensity firm-years. For identifying high or low forward-looking intensity firm-years, we use an indicator variable, *PAFLW*, which takes the value of one when *AFWLI* is positive and zero otherwise.¹⁸ Table 4 reports the results. Panel A shows that out of our sample of 27,164 firm-years, 14,055 (52%) are negative *AFWLI_t* and 13,109 (48%) are positive *AFWLI_t* firm-years; 5,320 (20%) are dark and 21,844 (80%) are non-dark¹⁹. We find that a considerable proportion of dark firm-years (46%) have positive *AFWLI_t*, indicating that many dark firms use the MD&A to communicate forward-looking information otherwise unavailable to investors. Panel A also reports the average *AFWLI_t* for each partition. While dark companies on average have a statistically lower forward-looking intensity (mean *AFWLI_t* of 0.0001 for dark versus 0.0023 for non-dark), the difference is economically insignificant. The distribution of *AFWLI_t* across the partitions reinforces the point that the dark companies provide significant forward-looking information in their MD&A.

We modify Equation (2) to include the two-by-two partitions of the sign of abnormal forward-looking intensity and dark status as follows:

$$\begin{aligned}
R_t = & b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t+1} + b_4 R_{t+1} + b_5 PAFWL_t + b_6 Dark + b_7 PAFWL_t * Dark \\
& + b_8 X_{t-1} * PAFWL_t + b_9 X_{t-1} * Dark + b_{10} X_{t-1} * PAFWL_t * Dark \\
& + b_{11} X_t * PAFWL_t + b_{12} X_t * Dark + b_{13} X_t * PAFWL_t * Dark \\
& + b_{14} X_{t+1} * PAFWL_t + b_{15} X_{t+1} * Dark + b_{16} X_{t+1} * PAFWL_t * Dark \\
& + b_{17} R_{t+1} * PAFWL_t + b_{18} R_{t+1} * Dark + b_{19} R_{t+1} * PAFWL_t * Dark \\
& + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t
\end{aligned} \tag{3}$$

where *Dark* is an indicator variable equal to 1 if the firm has neither an analyst following nor voluntary management forecasts and 0 otherwise; *PAFWL_t* is an indicator variable equal to 1 for

¹⁸ We perform similar analysis using abnormal disclosure sentences and find qualitatively similar results. We use the indicator variable to enable interpretation of the coefficient estimates.

¹⁹ We find 19,568 firm-years without voluntary disclosure (72%) and 7,066 firms without analyst coverage (26%). The intersection of the two, 5,320 firm-years, constitutes our sample of dark firm-years.

positive $AFWLL_t$ and 0 otherwise; and all other variables are as defined earlier. We estimate GLS regression of Equation (3) for the full sample. As in Equation (2), R_t alternatively denotes $R_{pre-filing}$, R_{Filing} , and R_{Full} . We are particularly interested in the aggregate coefficient on future earnings, X_{t+1} , which is a different combination of b_3 , b_{14} , b_{15} , b_{16} across the partitions. For brevity, we only report the aggregate levels of the coefficient estimates on X_{t+1} for each partition.

Panel B of Table 4 presents the aggregate GLS coefficient estimates on X_{t+1} when $R_{pre-filing}$ is the dependent variable in Equation (3). The right-most column reports the coefficients for partitions based only on the sign of $AFWLL_t$. The coefficients are consistent with those in Table 3: the coefficient is significantly lower for positive $AFWLL_t$ firms, suggesting that pre-filing stock prices are less informative about one-year-ahead earnings for high forward-looking intensity firms (0.3192 versus 0.4769). The last row reports coefficients for partitions based only on dark status. We observe that the coefficient is significantly lower for dark firms (0.3034 versus 0.5151), suggesting that pre-filing stock prices are less informative for dark firms. The levels of the coefficients for the two-way interaction and their differences are reported in the three top (left) rows (columns). We find the coefficients for dark firms are lower than those of non-dark firms. Also, coefficient differences across $AFWLL_t$ partitions are both economically and statistically larger for dark firms (0.3344 versus 0.1787, $p=0.07$) than for non-dark firms (0.6540 versus 0.4333, $p=0.23$). The pattern of results is consistent with poor informational efficiency being a significant motivation to provide forward-looking MD&A disclosures for dark firms.

Panel C of Table 4 presents the aggregate GLS coefficient estimates on X_{t+1} when Equation (3) uses R_{Filing} as the dependent variable. The coefficients in the right-most column are consistent with those in Table 4: the coefficient is significantly higher for positive $AFWLL_t$ firms, suggesting that filing stock prices are more informative about one-year-ahead earnings when the

filings include more prospective information (0.0630 versus 0.0414). The main effects with respect to dark status suggest that filing returns are more associated with future earnings for non-dark firms than for dark firms. The most interesting results relate to the two-by-two interaction effects. For dark firms-years, the coefficient on positive $AFWLL_t$ is significantly higher than that on negative $AFWLL_t$ (0.0498 versus 0.0316, $p=0.03$). In contrast, for non-dark firm-years, the difference in the coefficients across the forward-looking partitions is both statistically and economically insignificant (0.0691 versus 0.0665, $p=0.74$). The coefficients suggest that forward-looking disclosures convey valuable information for dark firms, but they do not appear to be as useful for non-dark firms. Overall, this result underscores the importance of forward-looking information in the MD&A for dark firms.

Finally, Panel D of Table 4 presents aggregate GLS coefficient estimates on X_{t+1} , when Equation (3) uses R_{Full} as the dependent variable. The coefficients in the right-most column are consistent with those in Table 3: the coefficient is significantly higher for positive $AFWLL_t$ firms, suggesting that full-year stock prices are still less informative about one-year-ahead earnings when the filings include more prospective information (0.5535 versus 0.4101). Similarly, dark firm stock prices are less informative even after the 10-K filings. Overall, these results are consistent with forward-looking MD&A disclosures somewhat narrowing the stock market's informational disadvantage for dark firms.

Overall, the coefficients on the interaction between abnormal forward-looking intensity and future earnings are significantly different across forward-looking partitions for dark firms, yet there are no significant differences for non-dark firms. In other words, forward-looking MD&A disclosures appear to be useful only for dark firms. These results highlight the unique

nature of the *quasi-voluntary* forward-looking MD&A disclosures, which distinguishes them from other forms of voluntary disclosures studied in the literature (such as earnings forecasts).²⁰

Additional analyses

The content, and quantitative and horizon features of forward-looking disclosures

We examine the effect of abnormal forward-looking disclosure levels when they differ on dimensions of content, quantitative and horizon (see Table 1, Panel A). We estimate the CKSS model (Equation 2) using abnormal forward-looking disclosure levels for each category separately, i.e., estimating Equation (1). Unreported tests show that the coefficients on the interaction between abnormal forward-looking disclosure levels and future earnings are significantly negative in the pre-filing period and significantly positive in the filing month for the following forward-looking categories: performance, business, investment, macroeconomy, and short-horizon. The coefficients on quantitative intensity are marginally significant. The coefficients are not significant for the following forward-looking categories: finance, employee, accounting, horizon, and long-horizon. The results indicate that company information environment is poor, but improves significantly when companies provide prospective information about their performances, businesses, investments, macroeconomic environment. These dimensions relate to the fundamental business model of the enterprise, while forward-looking disclosures relating to functional categories such as employees, finance, and accounting do not help to improve the information environment.

Forward-looking disclosures and analyst forecasts

²⁰ We find that the dark/non-dark firm classification is highly correlated to size. Specifically, the median market value of dark (non-dark) firms is \$ 46 million (\$448 million) and 82% of dark firms have market capitalization below \$150 million. Thus, the results in this section could be attributed to firm size. We control for this by partitioning the sample by firm size (below and above \$ 150 million) and find qualitatively similar results for the subsample of small size. In order to ascertain whether the dark/non-dark firm results hold after controlling for firm size, we perform a double sort based on both size and dark/non-dark status. We find that dark/non-dark differences in our results apply to the smaller firms but not to larger firms. This suggests that forward-looking MD&A disclosures are particularly important for small firms that remain dark.

Prior research has used analyst forecast accuracy as a proxy for company information quality with respect to future earnings (e.g., Heflin, Subramanyam, and Zhang 2003). A complement to our research question is whether the forward-looking MD&A disclosures help improve the information environment through analyst forecasts. Empirically, we regress absolute forecast errors of one-year-ahead consensus forecasts on abnormal forward-looking intensity and industry and year fixed effects at two points in time: (1) on the day prior to the 10-K filing and (2) one month after the 10-K filing. In a separate model, we regress the change in the absolute errors of analysts' one-year ahead consensus forecasts between the filing date and one month after the filing date on abnormal forward-looking disclosure levels and industry and year fixed effects. We note that this analysis is possible only for non-dark firms with non-missing data (15,655 observations). Therefore, given our CKSS results indicating that forward-looking MD&A disclosures help mitigate the poor information environment primarily for dark firms, we may not find that forecast errors are associated with forward-looking MD&A disclosures. Unreported results show that the absolute forecast errors both before and after the 10-K filings are positively and significantly associated with *AFWLI* and *AFWLS*. The change in absolute forecast errors is negatively and significantly associated with *AFWLI* and *AFWLS*.²¹ Overall, the results suggest that even among non-dark firms, firms with poor information environments provide forward-looking MD&A disclosures; and while such disclosures help to improve the information quality, it does not completely mitigate the poor information environment.

5. Conclusion

²¹ Analysts' consensus forecasts can be stale (Brown 1991). Accordingly, we replicate our analysis by replacing the consensus forecast from the I/B/E/S summary file with either (i) the most recent or (ii) the average of recent forecasts issued in the last 30 days. All results are qualitatively similar to those using the consensus forecasts.

In this paper, we examine the properties of the quantity of forward-looking disclosures in the MD&A for a large sample of 10-K filings filed with the SEC between years 1994 and 2007. Our findings suggest that managers provide prospective information in the MD&A to mitigate poor information environments in the stock market. Furthermore, we find that forward-looking disclosures provide useful information to the stock market as they increase the association of current stock returns with future earnings. However, such disclosures are unable to completely mitigate the poor information environments for high forward-looking intensity firms. Overall, our results are consistent with SEC's call for more forward-looking disclosures in the MD&A.

We note the following limitations. First, our evidence does not explain why firms choose a particular channel of communication, i.e., forward-looking disclosures in the MD&A, as opposed to other voluntary disclosures. Second, similar to other studies that use computer-intensive techniques to measure information characteristics, our study is a joint test of the appropriateness of the measure and our hypotheses. Therefore, while we have included veracity checks on the measures, the validity of the empirical evidence relies on the reliability of our measures. Finally, the 10-K filings provide a host of other information which is controlled for with the firm characteristics. However, our inferences may be inappropriate if other information in the 10-K filings correlate with abnormal forward-looking disclosure levels.

Appendix A Identifying forward-looking disclosures

Step 1: Obtaining electronic 10-K filings

We download 10-K filings (annual reports) for fiscal years between 1994 and 2007 from the *SEC Edgar* website. Prior to 2002, companies filed their 10-K filings to the SEC Edgar system in the ASCII-code text format. After 2002, companies post their annual reports in various formats, such as text, html, or pdf formats. Since the Perl code handles only ASCII-code text files most accurately, we supplement our post-2002 sample annual reports obtained from the *10-K Wizard* database in rich text format. We use the TextPipe Software to convert the rich text formatted files from *10-K Wizard* to the ASCII-code text formatted files. We then match the CIK of the Edgar filings with the GVKEY identifier in WRDS to obtain the required financial and stock market related data.²²

Step 2: Extracting the MD&A sections from the 10-K filings

For each 10-K filing, we identify and extract the Management's Discussion and Analysis (MD&A) section using two iterations. In the first iteration, our program searches for a sub-text starting with the phrase (or a variation of) "Item 7 Management" as the beginning of a line and ending with the phrase (or a variation of) "Item 8" as the beginning of another line. The variations used for this iteration are provided below:

The first iteration:

- 1) Identify a line starting with "I(i)tem 7(.) M(m)anagement" with tabs or spaces between the words,
- 2) Identify a following line starting with "I(i)tem 8(.)" with tabs or spaces between the words,
- 3) If the number of lines between identified "Item 7 Management" and "Item 8" pair are fewer than 60, then the algorithm keeps searching for another pair.

We impose the 60-line restriction, because in our audit of our test sample of 100 10-K filings, we found that in some occasions the Perl code extracted the "Table of Contents" or only executive summary of the MD&A sections.²³ The first iteration extracts the MD&A sections for 87% of our sample.

Our perusal of the 10-K filings that did not parse the MD&A section using the first iteration reveals that the ending phrase of "Item 8" did not appear in these cases. For these 10-K filings, we thus use a second iteration, which searches for a sub-text starting with the phrase (or a variation of) "Management's Discussion and Analysis" as the beginning of a line and ending

²² Li (2008) considers MD&A's from both 10-Q and 10-K filings. We restrict our attention to 10-K filings for three reasons. First, the annual reporting frequency is a more suitable frequency for the Lundholm and Myers (2002) tests. Second, internal audit committees are required to review the 10-K MD&A filings, rendering them more reliable. Third, our reading of forward-looking statements indicates that forward-looking statements in 10-K filings are more comprehensive both qualitatively and quantitatively than those in 10-Q filings. As such, our results and conclusions extend only the MD&A's in 10-K filings.

²³ Even though the 60-line requirement is *ad hoc*, having no such requirement is clearly not appropriate. This requirement may filter out the genuine MD&A's with fewer than 60 lines. However, such 10-K filings with very short or non-existent MD&A sections are atypical.

with phrases (or a variation of) “Financial Statements” or “(Consolidated) Statement of Cash Flows” as the beginning of another line:

The second iteration:

- 1) Identify a line starting with “M(m)anagement(’s) D(d)iscussion” with tabs or spaces between the words,
- 2) Identify a following line starting with “S(s)tatement of C(c)ash F(f)lows” with tabs or spaces between the words, or “C(c)onsolidated S(s)tatement of C(c)ash F(f)lows” with tabs or spaces between the words,
- 3) If the number of lines between the identified “Management’s Discussion” and “Statement of Cash Flows” or “Consolidated Statement of Cash Flows” are fewer than 60, then the algorithm keeps searching for another pair.

The second iteration keeps the 60-line requirement between the starting and ending phrases. The second iteration extracts MD&A sections for an additional 5% of the sample. An out-of-sample check of 100 random 10-K filings shows that the MD&A sections were extracted appropriately. Our subsequent analyses exclude 10-K filings whose MD&A sections are not extracted by the two iterations (8% of the sample). A perusal of some of these annual reports shows that their MD&A content are presented in other sections of the annual report such as “Company Background” or “Results of Operations”.

Step 3: Extracting forward-looking disclosures from the MD&A section

We tag a sentence in the MD&A as “*forward-looking*” using three searches:

- 1) The first search tags an MD&A sentence as forward-looking if the sentence includes any of the following: (1) keywords “will” or “future”, both which connote the future; (2) one-to-one word combinations of the following adjectives: “next”, “subsequent”, “following”, “upcoming”, “incoming”, and “coming” with the following time indicators: “month”, “quarter”, “year”, “fiscal”, and “period”. Overall, the first search tags a sentence as forward-looking, if the sentence includes one or more of the following keywords: “will”, “future”, “next fiscal”, “next month”, “next period”, “next quarter”, “next year”, “incoming fiscal”, “incoming month”, “incoming period”, “incoming quarter”, “incoming year”, “coming fiscal”, “coming month”, “coming period”, “coming quarter”, “coming year”, “upcoming fiscal”, “upcoming month”, “upcoming period”, “upcoming quarter”, “upcoming year”, “subsequent fiscal”, “subsequent month”, “subsequent period”, “subsequent quarter”, “subsequent year”, “following fiscal”, “following month”, “following period”, “following quarter”, and “following year”. For instance: “*This will result in the Company expensing \$13,043 in fiscal 2006, which would previously have been presented in a proforma footnote disclosure.*” from CostCo Inc. FY 2005 AR.

Additionally, sentences with keywords “shall”, “should”, “can”, “could”, “may”, or “might” are not tagged as forward-looking, even though they imply the future. The reason is that these keywords are frequently associated with legal language and uninformative boilerplate disclosures that may not have any real forward-looking connotations. Our excluding such boilerplate language from being classified as forward-looking is consistent with the SEC’s concern that firms often provide non-informative boilerplate disclosures and immaterial information in their MD&A (SEC 2003; Li 2008).

2) The second search tags a sentence as forward-looking if the sentence includes any conjugations of the following verbs: “aim”, “anticipate”, “assume”, “commit”, “estimate”, “expect”, “forecast”, “foresee”, “hope”, “intend”, “plan”, “project”, “seek”, and “target”. For each verb, we use the following list of the conjugations (the verb “expect” is used as template for brevity): "we expect", " and expect ", " but expect ", " do not expect ", "company expects", "corporation expects", " firm expects", "management expects", " and expects", " but expects", "does not expect", " is expected", " are expected", " not expected", " is expecting", " are expecting", " not expecting", "normally expect ", "normally expects", "currently expect ", "currently expects", " also expect ", " also expects". As in the first criterion, the use of such an extensive list of conjugations, versus a simple keyword search of verbs alone, helps reduce the likelihood of erroneously capturing noun forms of some verbs (particularly those of “plan”, “project”, and “estimate”), which frequently have no forward-looking connotation. For instance, “...*In addition, our pharmacy departments accept payments for prescription drugs through our customers’ health benefit plans...*” from Wal-Mart Stores Inc. FY 2005 AR.

3) The third search tags a sentence as forward-looking if the sentence includes a reference to a year that comes after the year of filing (such as “2002” in a company’s 10-K filing in year prior to 2002). The program avoids tagging as forward-looking phrases the genuine use of numbers or percentages, whose nominal value occasionally falls within the search range. Any use of characters in-between or before or after the digits (such as “\$”, “%”, “,”) disqualifies the number to be tagged as year.

Example of keyword versus sentence based intensity measure

Consider the following sentence from Lehman Brothers FY 2005 annual report:

“We expect that corporate profitability will remain resilient, and we are looking for corporate earnings to increase by 8% to 10% in 2006.”

A keyword-based algorithm would report three hits for “*expect*”, “*will*” and “*2006*”, whereas our sentence-based algorithm treats this sentence as one forward-looking sentence. The reasoning of our algorithm is that (a) there is a single message in the sentence, and (b) the sentence could be rewritten without any loss of content as “*We expect to keep a resilient profitability...*”

Nevertheless, the sentence-based approach leaves out the intensity of forward-looking information within the sentence. The keyword “*2006*” in the above sentence arguably provides incremental information, which the sentence-based approach does not capture. A sensitivity analysis shows that our results are qualitatively similar if we use the keyword-based algorithm.

Step 4: Analyzing the content, quantitative and horizon features of the forward-looking disclosures

Content of forward-looking disclosures

A forward-looking sentence is identified as *performance-related* if it includes one or more of the following keywords and their variations: “performance”, “perform”, “sales”, “revenue”, “earnings”, “income”, “profit”, “loss”, “expense”, “EBT”, “EBIT”, “EBITDA”, “depreciation”, “amortization”, “administrative”, “research”, “develop”, “R&D”, “cost of sales”, “cost of goods sold”, “COGS”, “tax”, “impairment”, “margin”, “goodwill”, “working capital”, “receivable”, “payable”, “inventory”, “materials”, “supplies”, “bad debt”, “doubtful account”, “allowance”,

“collect”, “accrual”, “operating cash flow”, “cash flow from operations”, “cash flow from operating”, “free cash flow”, “bankruptcy”, “Chapter 7”, and “Chapter 11”.

A forward-looking sentence is identified as *operation-related* if it includes one or more of the following keywords and their variations: “operations”, “operating”, “operational”, “product”, “service”, “technology”, “project”, “contract”, “overhead”, “vendor”, “supplier”, “consumer”, “customer”, “client”, “marketing”, “order”, “backlog”, “advertising”, “commission”, “import”, “export”, “freight”, “transportation”, “utilities”, “energy”, “power”, “compete”, “competitive”, “demand”, “supply”, “market”, “business”, “segment”, “unit”, “subsidy”, “industry”, “license”, “patent”, “outsource”, and “promotion”.

A forward-looking sentence is identified as *investment-related* if it includes one or more of the following keywords and their variations: “invest”, “expand”, “dispose”, “asset sale”, “asset purchase”, “spend”, “capital expenditure”, “acquire”, “develop”, “construct”, “install”, “capacity”, “relocate”, “remodel”, “refresh”, “overhaul”, “upgrade”, “maintain”, “repair”, “open”, “close”, “write-off”, “PP&E”, “subsidiary”, “joint venture”, “JV”, and “partner”.

A forward-looking sentence is identified as *finance-related* if it includes one or more of the following keywords and their variations: “finance”, “financing”, “financial”, “liquid”, “borrow”, “covenant”, “debt”, “debenture”, “principal”, “creditor”, “liability”, “equity”, “capital resource”, “loan”, “line of credit”, “leverage”, “fund”, “repurchase”, “stock purchase”, “share purchase”, “commercial paper”, “bank credit”, “pay interest”, “principal”, “swap”, “lease”, “hedge”, “dividend”, and “interest”.

A forward-looking sentence is identified as *employee-related* if it includes one or more of the following keywords and their variations: “compensation”, “salary”, “bonus”, “grant”, “award”, “pension”, “retirement”, “health care”, “employee”, “labor”, “union”, “director”, “chairman”, “president”, “director”, “CEO”, “CFO”, “COO”, “CIO”, “manager”, “executive”, and “worker”.

A forward-looking sentence is identified as *macroeconomy-related* if it includes one or more of the following keywords and their variations: “economic”, “world”, “country”, “population”, “environment”, “government”, and “inflation”.

A forward-looking sentence is identified as *accounting-related* if it includes one or more of the following keywords and their variations: “accounting”, “GAAP”, “FAS”, “SFAS”, “FASB”, “SEC”, “contingency”, “record”, “impairment test”, and “financial statement”.

Quantitative and horizon features of forward-looking disclosures

Quantitative fwl keywords are alphanumeric words (both in numerical characters and writing) in the forward-looking sentences. The alphanumeric words in writing are rankings from “first” to “twentieth”, and number-related keywords such as “half”, “quarter”, “double”, “triple”, and “quadruple”.

Horizon fwl keywords are references to a future year and horizon keywords in the forward-looking sentences. The references to a future year are determined with respect to the year of filing. For instance, “2002” in a company’s year 1996 filing is considered a future year reference, where “1995” is not. Horizon keywords are: from “2 years” and “two years” to “20 years” and

“twenty years”, “decade”, “century”, “short term”, “short-term”, “long-term”, “long term”, “foreseeable future”, “current fiscal”, “current quarter”, “current year”, “coming fiscal”, “coming month”, “coming period”, “coming quarter”, “coming year”, “following fiscal”, “following month”, “following period”, “following quarter”, “following year”, “incoming fiscal”, “incoming month”, “incoming period”, “incoming quarter”, “incoming year”, “next fiscal”, “next month”, “next period”, “next quarter”, “next year”, “subsequent fiscal”, “subsequent month”, “subsequent period”, “subsequent quarter”, “subsequent year”, “upcoming fiscal”, “upcoming month”, “upcoming period”, “upcoming quarter”, and “upcoming year”.

Short-horizon fwl keywords are references to the year ahead of the filing and short-horizon keywords in the forward-looking sentences. Short-horizon keywords are: “short term”, “short-term”, “current fiscal”, “current quarter”, “current year”, “months”, “coming month”, “coming period”, “coming quarter”, “following month”, “following period”, “following quarter”, “incoming month”, “incoming period”, “incoming quarter”, “next month”, “next period”, “next quarter”, “subsequent month”, “subsequent period”, “subsequent quarter”, “upcoming month”, “upcoming period”, and “upcoming quarter”.

Long-horizon fwl keywords are references to farther than one year ahead of the filing and long-horizon keywords in the forward-looking sentences. Long-horizon keywords are: “2 years” and “two years” to “20 years” and “twenty years”, “century”, “decade”, “foreseeable future”, “long term”, “long term”, “coming year”, “following year”, “incoming year”, “next year”, “subsequent year”, and “upcoming year”.

Appendix B Validating the Computer Methodology

In order to check the validity of the procedure detailed in Appendix A, we extract 50 MD&A sections from the sample randomly and manually identify forward-looking sentences. For this purpose, we ask four MBA students to read the MD&As, roughly 12 per student and to identify forward-looking sentences, which—based on their judgment—provide current and potential investors with useful prospective information. Independently, we also identify forward-looking sentences from the same 50 MD&As. In our reading, we attempted to identify the sentences based only on the information content—not on what we think the Perl code will generate. The output of the students, who have no knowledge of the Perl algorithm, provides the most unbiased verification. Yet, their output is subject to human processing errors such as the time and effort spent, and fatigue among others. Accordingly, we observe considerable variation on the average level of errors of individual students. In contrast, our output may be biased despite our efforts of being objective because of our prior knowledge of the Perl algorithm, yet our output is arguably less subject to human processing errors because of our extensive experience with the company annual reports.

On average, the Perl program identifies an average of 25.5 forward-looking sentences per MD&A in this sample. In comparison, the students (we) identify 22.2 (23.8) sentences as forward-looking. To examine the effectiveness of the Perl code, we compare the output of the Perl program, students, and our manual reading on a sentence-by-sentence basis. On average, 18.1 sentences of the students’ output are identical to those identified by the Perl output; 4.1 sentences are identified by students as forward-looking but not by the Perl code (which we denote Type 1 errors); and 7.4 sentences are identified by Perl code as forward-looking but not by the students (which we denote Type 2 errors). Similarly, 21.7 sentences of our output are identical to those in the Perl output; 2.1 sentences identified by us as forward-looking but not by the Perl code (Type 1); and 3.7 sentences are identified by Perl code as forward-looking but not by us (Type 2). Below are descriptive statistics of Type 1 and Type 2 errors about the readings of MBA students and us.

	Mean	Q1	Q2	Q3
MBA reading				
% Type 1	22.0%	7.4%	12.3%	27.2%
% Type 2	25.2%	10.0%	22.6%	36.7%
Our reading				
% Type 1	11.1%	0.0%	6.3%	15.3%
% Type 2	14.9%	8.3%	13.5%	21.4%

%Type 1 is defined as the number of Type 1 error sentences (i.e., sentences identified by us, but not by Perl) divided by the number of sentences in the Perl output, and %Type 2 is defined as the number of Type 2 error sentences (i.e., sentences identified by Perl, but not by us) divided by the number of sentences in the Perl output. The error rates show that the computer program and human reading of forward-looking sentences overlap significantly. Moreover, both Type 1 and Type 2 errors are symmetrically distributed, which indicates that computer program

potentially is noisy and is reasonably unbiased: that is, the computer program does not have only Type 1 or only Type 2 errors.

A closer examination of Type 1 and 2 errors show that most of the errors are due to our objective of having both a well-specified and powerful sample by balancing potential Type 1 and 2 errors. Examples of representative Type 1 errors include the following cases:

i) Even if a sentence includes forward-looking information about the year of filing, the Perl program omits the sentence (in order to reduce Type 2 errors, i.e., in order not to erroneously include cases where past information about the filing year is disclosed): “...*cash on hand, funds generated from operations and other available debt facilities are sufficient to fund operating cash requirements and capital expenditures through fiscal 2002.*” *FY 2001 annual report filed in year 2002.*

ii) We require the forward-looking keyword “will” to be preceded and succeeded by space character “ “. This requirement is because we would like to reduce Type 2 errors (i.e., to exclude the common use of “goodwill” and other possible combinations as forward-looking phrases.) If “will” appears at the start of the text line, Perl program observes no preceding space character, and thus misses the sentence

iii) Typos, double spaces, and tabs between the words in the specified forward-looking phrases result in omission of the forward-looking sentence.

The most frequent Type 2 errors include sentences with forward-looking keywords that readers do not usually assess as providing value-relevant prospective information. For example: “*When used herein, including this Management's Discussion and Analysis, the words "believes," "anticipates," "plans," "expects" and similar expressions are intended to identify forward-looking statements.*”

“*We undertake no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.*”

“*This results in a deferred future tax benefit.*”

Most importantly, the errors do not appear to be systematic. The fundamental characteristics (total assets, sales, B/M) of companies with low Type 1 and 2 errors are not significantly different from those with high Type 1 and 2 errors. We conclude that the Perl algorithm is well specified and powerful, and the measurement errors are unlikely to change our results.

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Table 1
Forward-looking disclosures

Panel A. Summary statistics

	N	Mean	Min	Q1	Q2	Q3	Max
<i>Forward-looking disclosures</i>							
Annual report sentences	37,199	1,544	77	948	1,322	1,853	62,748
MD&A sentences	37,199	276	23	150	238	351	2,914
Forward-looking sentences	37,199	35	0	15	28	47	422
MD&A intensity (%)	37,199	19.5	0.3	12.8	18.6	25.1	86.1
Forward-looking intensity (%)	37,199	12.5	0.0	8.7	12.1	15.8	72.0
<i>Content of forward-looking disclosures</i>							
Performance fwl sentences	37,199	14.5	0	5	11	20	157
Business fwl sentences	37,199	16.8	0	6	12	12	252
Investment fwl sentences	37,199	7.7	0	2	6	10	87
Finance fwl sentences	37,199	11.8	0	5	9	16	119
Employee fwl sentences	37,199	1.8	0	0	1	2	54
Macroeconomy fwl sentences	37,199	1.6	0	0	1	2	31
Accounting fwl sentences	37,199	2.7	0	0	2	4	45
Performance fwl intensity (%)	37,199	5.1	0.0	2.8	4.6	6.8	30.4
Business fwl intensity (%)	37,199	5.9	0.0	3.3	5.3	7.8	52.0
Investment fwl intensity (%)	37,199	2.8	0.0	1.3	2.4	3.9	29.8
Finance fwl intensity (%)	37,199	4.2	0.0	2.7	3.9	5.4	37.1
Employee fwl intensity (%)	37,199	0.6	0.0	0.0	0.3	0.8	14.2
Macroeconomy fwl intensity (%)	37,199	0.6	0.0	0.0	0.4	0.8	15.3
Accounting fwl intensity (%)	37,199	1.0	0.0	0.0	0.7	1.4	18.5
<i>Quantitative and horizon features of forward-looking disclosures</i>							
Quantitative fwl keywords	37,199	10.1	0.0	4	8	14	149
Horizon fwl keywords	37,199	10.2	0.0	3	7	14	176
Short-horizon fwl keywords	37,199	4.3	0.0	1	3	5	91
Long-horizon fwl keywords	37,199	5.8	0.0	1	4	8	129
Quantitative fwl intensity (%)	37,199	3.8	0.0	1.8	3.1	4.9	97.2
Horizon fwl intensity (%)	37,199	4.0	0.0	1.5	3.0	5.2	77.5
Short-horizon fwl intensity (%)	37,199	1.8	0.0	0.4	1.0	2.1	56.0
Long-horizon fwl intensity (%)	37,199	2.1	0.0	0.6	1.5	2.9	60.9

Panel B. Forward-looking disclosures by industry groups

Fama-French industry group	Number of observations	Average forward-looking sentences	Average <i>fwlintensity</i>
Pharmaceutical products	2,320	39.7	17.3%
Precious metals	104	43.4	15.3%
Electronic equipment	2,351	43.5	14.5%
Medical equipment	1,184	35.4	14.5%
Petroleum and natural gas	1,285	41.6	13.7%
Computers	1,412	39.9	13.7%
Measuring and control equipment	869	33.9	13.6%
Utilities	1,173	52.1	13.5%
Defense	75	37.4	13.4%
Chemicals	568	40.5	13.3%
Nonmetallic mining	76	31.6	13.3%
Telecommunications	959	45.4	13.2%
Rubber and plastic products	252	29.2	13.2%
Entertainment	463	34.8	13.0%
Business services	4,185	40.0	13.0%
Electrical equipment	589	31.1	12.9%
Recreational products	238	32.6	12.9%
Business supplies	370	36.0	12.9%
Retail	1,745	28.3	12.9%
Shipping containers	108	32.7	12.8%
Tobacco products	38	49.2	12.7%
Coal	75	45.7	12.6%
Steel works	418	34.1	12.6%
Machinery	1,093	32.1	12.5%
Healthcare	640	31.5	12.5%
Alcoholic beverages	95	39.3	12.5%
Restaurants, hotel, motel	648	29.0	12.5%
Trading	2,252	32.6	12.4%
Unknown	4,979	31	12.2%
Construction	469	30.3	12.1%
Real estate	234	31.2	12.0%
Transportation	892	35.7	11.8%
Textiles	109	25.3	11.8%
Wholesale	1,170	28.3	11.8%
Automobiles and trucks	442	29.9	11.8%
Personal services	418	34.7	11.8%
Aircraft	153	31.1	11.7%
Apparel	511	26.0	11.7%
Agriculture	90	27.8	11.7%
Food products	460	26.3	11.7%
Miscellaneous	221	27.4	11.5%
Fabricated products	85	24.0	11.3%
Consumer goods	466	26.9	11.3%
Construction materials	598	25.3	11.2%
Shipbuilding, railroad equipment	122	26.3	11.0%
Candy and soda	57	32.5	10.7%
Printing and publishing	295	27.4	10.2%
Insurance	1,265	40.5	9.7%
Banking	3,557	24.8	7.2%
Total	37,199	35.1	12.5%

Notes to Table 1

Our sample includes all annual reports electronically filed between years 1994 and 2007 as part of the 10-K filing requirement to the SEC/EDGAR system. For an annual report to be included in the sample, we require non-missing financial and stock price information in CRSP and COMPUSTAT databases. Panel A presents summary statistics for forward-looking disclosures in the sample. Panel B presents average forward-looking intensity by Fama-French industry groups.

Variable Definitions

Forward-looking disclosures

Annual report sentences is the number of sentences in a company's annual report.

MD&A sentences is the number of sentences in the Management Discussion and Analysis (MD&A) section of the annual report.

Forward-looking sentences is the number of forward-looking sentences in the MD&A section of the annual report (Appendix A describes in detail how forward-looking sentences in the MD&A sections are identified.)

MD&A intensity is the number of MD&A sentences divided by the number of annual report sentences.

Forward-looking intensity is the number of forward-looking sentences divided by the number of MD&A sentences.

Content of forward-looking disclosures (see keyword list in Appendix A)

Performance fwl sentences is the number of performance-related forward-looking sentences in the MD&A section.

Business fwl sentences is the number of business-related forward-looking sentences in the MD&A section.

Investment fwl sentences is the number of investment-related forward-looking sentences in the MD&A section.

Finance fwl sentences is the number of finance-related forward-looking sentences in the MD&A section.

Employee fwl sentences is the number of employee-related forward-looking sentences in the MD&A section.

Macroeconomy fwl sentences is the number of macroeconomy-related forward-looking sentences in the MD&A section.

Accounting fwl sentences is the number of accounting-related forward-looking sentences in the MD&A section.

The related intensity measures are the number of content sentences divided by the number of MD&A sentences.

Quantitative and horizon features of forward-looking disclosures (see keyword list in Appendix A)

Quantitative fwl keywords is the total number of alphanumeric keywords (both in numerical characters and writing) in forward-looking sentences.

Horizon fwl keywords is the total number of references to a future year and horizon keywords in forward-looking sentences.

Short-horizon fwl keywords is the total number of references to the year ahead of the filing and short-horizon keywords in forward-looking sentences.

Long-horizon fwl keywords is the total number of future references that are more than one year ahead of the filing and long-horizon keywords in forward-looking sentences.

The related intensity measures are the number of relevant keywords divided by the number of MD&A sentences.

Table 2
Computing Abnormal Forward-looking Measures

Panel A. Mean and median of firm characteristics by forward-looking disclosures

		Forward-looking intensity terciles			High - Low
		Low	Medium	High	p-value
		N=12,380	N=12,416	N=12,403	
Fwlintensity	Mean	6.86%	12.1%	18.6%	0.00
	Median	7.26%	12.0%	17.5%	0.00
Log(Fwlsentences)	Mean	2.650	3.433	3.804	0.00
	Median	2.708	3.466	3.827	0.00
Log(size)	Mean	5.554	5.831	5.789	0.00
	Median	5.489	5.831	5.749	0.00
Earnings	Mean	0.015	-0.016	-0.085	0.00
	Median	0.022	0.029	0.018	0.00
Loss	Mean	0.166	0.282	0.418	0.00
	Median	0.000	0.000	0.000	0.00
Return	Mean	0.221	0.229	0.208	0.28
	Median	0.114	0.086	0.039	0.00
Earnings volatility	Mean	6.794	8.060	8.507	0.11
	Median	1.026	1.472	1.567	0.00
Return volatility	Mean	0.123	0.144	0.169	0.00
	Median	0.095	0.115	0.140	0.00
Special Items	Mean	0.074	0.111	0.142	0.00
	Median	0.000	0.000	0.000	0.00
M&A	Mean	0.092	0.124	0.129	0.00
	Median	0.000	0.000	0.000	0.00
B/M	Mean	0.771	0.695	0.621	0.00
	Median	0.837	0.693	0.594	0.00
Age	Mean	10.77	11.11	9.83	0.00
	Median	10.00	10.00	8.00	0.00

Panel B. Pearson (above diagonal), Spearman (below diagonal) correlations between forward-looking disclosures and firm characteristics

	Fwl intensity	Log(Fwl sentences)	Log (size)	Earnings	Loss	Earnings volatility	Special Items	M&A	B/M	Age
Fwlintensity		0.602 (0.00)	0.031 (0.00)	-0.214 (0.00)	0.250 (0.00)	0.007 (0.17)	0.097 (0.00)	0.039 (0.00)	-0.201 (0.00)	-0.075 (0.00)
Log(Fwl Sentences)	0.626 (0.00)		0.258 (0.00)	-0.125 (0.00)	0.154 (0.00)	-0.003 (0.59)	0.078 (0.00)	0.034 (0.00)	-0.082 (0.00)	-0.003 (0.52)
Log(size)	0.051 (0.00)	0.280 (0.00)		0.315 (0.00)	-0.319 (0.00)	-0.022 (0.00)	-0.128 (0.00)	0.089 (0.00)	-0.348 (0.00)	0.200 (0.00)
Earnings	-0.119 (0.00)	-0.140 (0.00)	0.367 (0.00)		-0.649 (0.00)	0.017 (0.00)	-0.367 (0.00)	0.034 (0.00)	0.052 (0.00)	0.188 (0.00)
Loss	0.247 (0.00)	0.151 (0.00)	-0.319 (0.00)	-0.785 (0.00)		-0.001 (0.91)	0.376 (0.00)	-0.006 (0.28)	-0.009 (0.09)	-0.178 (0.00)
Earnings volatility	0.155 (0.00)	0.055 (0.01)	-0.198 (0.00)	-0.123 (0.00)	0.243 (0.00)		-0.004 (0.50)	0.010 (0.06)	-0.006 (0.22)	0.037 (0.00)
Special Items	0.099 (0.00)	0.078 (0.00)	-0.123 (0.00)	-0.306 (0.00)	0.376 (0.00)	0.157 (0.00)		0.045 (0.00)	-0.008 (0.12)	-0.078 (0.00)
M&A	0.047 (0.00)	0.036 (0.00)	0.093 (0.00)	0.033 (0.00)	-0.006 (0.28)	0.068 (0.00)	0.045 (0.00)		-0.059 (0.00)	-0.068 (0.00)
B/M	-0.232 (0.00)	-0.094 (0.00)	-0.332 (0.00)	-0.237 (0.00)	-0.044 (0.00)	0.029 (0.00)	-0.030 (0.00)	-0.069 (0.00)		0.064 (0.00)
Age	-0.066 (0.00)	-0.014 (0.01)	0.176 (0.00)	0.189 (0.00)	-0.179 (0.00)	0.121 (0.00)	-0.076 (0.00)	-0.070 (0.00)	0.078 (0.00)	

Panel C. Estimating equation (1a) and (1b)

	Predicted sign	Dependent variable	
		fwlintensity	Log (fwl sentences)
		Coefficient (p-value)	Coefficient (p-value)
Log(size)	+	0.0020 (0.00)	0.0077 (0.00)
Earnings	-	-0.0131 (0.00)	-0.0649 (0.00)
Loss	+	0.0055 (0.00)	0.0376 (0.00)
Return	-	-0.0009 (0.00)	-0.0063 (0.00)
Earnings volatility	+	0.0000 (0.61)	0.0000 (0.50)
Return volatility	+	0.0111 (0.00)	0.1050 (0.00)
Special Items	+	-0.0021 (0.00)	-0.0161 (0.00)
M&A	+	0.0009 (0.09)	0.0079 (0.07)
B/M	-	-0.0017 (0.05)	-0.0221 (0.00)
Age	-	-0.0004 (0.00)	-0.0030 (0.00)
MD&A Intensity	?	0.0352 (0.00)	
Log(MD&A sentences)	+		1.0708 (0.00)
Log(Annual report sentences)	+		0.0051 (0.18)
N		35,371	35,434
Year and industry indicators		Included	Included
Within R ²		34.2%	84.1%
Between R ²		39.5%	79.4%
Overall R ²		38.0%	81.7%

Notes to Table 2

Panel A presents mean and median of firm characteristics across forward-looking intensity terciles. The p-values are for mean (median) differences based on the t-test (Wilcoxon median test).

Panel B provides Pearson (above diagonal), Spearman (below diagonal) correlations between forward-looking intensity and firm characteristics. Numbers within parentheses denote p-values.

Panel C provides regression estimates for the following Equation (1):

$$fwlintensity_t = \alpha_0 + \alpha_1 \text{Log}(size)_t + \alpha_2 \text{Earnings}_t + \alpha_3 \text{Loss} + \alpha_4 \text{Return}_t + \alpha_5 \text{Earnings volatility}_t + \alpha_6 \text{Return volatility}_t + \alpha_7 \text{Special Items}_t + \alpha_8 \text{M\&A}_t + \alpha_9 \text{Book-to-market}_t + \alpha_{10} \text{Age}_t + \sum \theta \text{Industry} + \sum \lambda \text{Year}_t + \varepsilon_t$$

The regression output includes coefficient estimates and their significances after excluding outliers (which have studentized residuals greater than 2). The numbers within parentheses denote p-values based on GLS Huber-White standard errors that controls for heteroskedasticity, auto-correlation, and cross-correlation.

Variable Definitions

Forward-looking sentences is the number of forward-looking sentences in the MD&A section of the annual report (Appendix A describes in detail how forward-looking sentences in the MD&A sections are identified.)

Forward-looking intensity is the number of forward-looking sentences divided by the number of MD&A sentences.

Log(size) is the natural logarithm of market value of equity in millions of dollars, measured as outstanding common shares (Compustat data item #25) multiplied by fiscal year-end share price (data199).

Earnings is the Earnings before extraordinary items (data18) divided by company total assets (data 6), winsorized at +1 and -1.

Loss is the indicator variable that takes the value of 1 if Earnings is greater than 0, and 0 otherwise.

Return is the twelve-month fiscal year stock return.

Earnings volatility is the coefficient of variation of earnings measured over the sample period (from year 1994 to 2006 using available data for each company).

Earnings volatility is computed as the absolute value of the standard deviation of earnings deflated by beginning-of-year stock price divided by the average of earnings deflated by beginning-of-year stock price.

Return volatility is the standard deviation of monthly stock returns over the fiscal year.

Special Items is the indicator variable that takes the value of 1 if the sum of unusual or non-recurring income statement items (data17) divided by total assets (data6) is greater than 5%, and 0 otherwise.

M&A is the indicator variable that takes the value of 1 if the “Acquisition – Sale contribution” (data 249) is greater than 0, and 0 otherwise.

B/M is book value of assets (data6) divided by market value of assets (the sum of market value of equity [data25 * data199] and book value of total liabilities [data181]).

Age is the number of years between the current year and the year of the company’s first appearance in CRSP database.

Table 3
Do abnormal forward-looking statements bring the future forward?

Panel A. Descriptive statistics

	N	Mean	Q1	Q2	Q3
Fwlintensity	27,164	0.1243	0.0841	0.1193	0.1576
Abnormal fwl intensity (AFWLI)	27,164	0.0019	-0.0279	-0.0018	0.0284
Log(fwlsentences)	27,164	3.2273	2.7081	3.2958	3.8067
Abnormal log fwl sentences (AFWLS)	27,164	-0.0168	-0.2232	0.0195	0.2398
R_{Filing}	27,164	0.0169	-0.0656	0.0024	0.0786
$R_{Pre-filing}$	27,164	0.1077	-0.2625	-0.0245	0.2658
R_{Full}	27,164	0.1191	-0.2620	-0.0213	0.2826
R_{t+1}	27,164	0.1036	-0.2561	-0.0254	0.2614
X_{t-1}	27,164	-0.0390	-0.0109	0.0412	0.0700
X_t	27,164	0.0041	-0.0114	0.0480	0.0817
X_{t+1}	27,164	0.0194	-0.0117	0.0531	0.0964

Panel B. CKSS model with Abnormal forward-looking intensity

	Dependent variable		
	$R_{Pre-filing}$	R_{Filing}	R_{Full}
	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)
X_{t-1}	-0.2374 (0.00)	-0.0105 (0.00)	-0.2693 (0.00)
X_t	0.2053 (0.00)	0.0057 (0.01)	0.2081 (0.00)
X_{t+1}	0.4042 (0.00)	0.0482 (0.00)	0.4917 (0.00)
R_{t+1}	-0.0554 (0.00)	0.0005 (0.63)	-0.0579 (0.00)
$AFWLI_t$	-0.0819 (0.16)	-0.0420 (0.01)	-0.1057 (0.08)
$AFWLI_t * X_{t-1}$	-0.8213 (0.00)	0.2185 (0.00)	-0.3358 (0.11)
$AFWLI_t * X_t$	1.4617 (0.00)	-0.2460 (0.00)	1.0448 (0.00)
$AFWLI_t * X_{t+1}$	-2.1054 (0.00)	0.1593 (0.00)	-1.9048 (0.00)
$AFWLI_T * R_{t+1}$	0.2266 (0.00)	-0.0086 (0.69)	0.1863 (0.01)
Number of observations	26,462	26,339	26,452
Number of groups	4,293	4,287	4,296
Within R^2	14.6%	2.7%	16.1%

Between R ²	14.8%	5.9%	17.0%
Overall R ²	15.1%	3.6%	17.0%

Panel C. CKSS model with Abnormal forward-looking sentences

	Dependent variable		
	R _{Pre-filing}	R _{Filing}	R _{Full}
	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)
X _{t-1}	-0.2399 (0.00)	-0.0092 (0.00)	-0.2704 (0.00)
X _t	0.2087 (0.00)	0.0035 (0.15)	0.2130 (0.00)
X _{t+1}	0.3910 (0.00)	0.0497 (0.00)	0.4760 (0.00)
R _{t+1}	-0.0537 (0.00)	0.0004 (0.72)	-0.0563 (0.00)
AFWLS _t	-0.0155 (0.03)	-0.0047 (0.01)	-0.0190 (0.01)
AFWLS _t * X _{t-1}	-0.1154 (0.00)	0.0181 (0.00)	-0.0551 (0.02)
AFWLS _t * X _t	0.1484 (0.00)	-0.0312 (0.00)	0.1185 (0.42)
AFWLS_t * X_{t+1}	-0.2149 (0.00)	0.0270 (0.00)	-0.2051 (0.00)
AFWLS _T * R _{t+1}	0.0183 (0.07)	-0.0012 (0.68)	0.0130 (0.22)
Number of observations	26,462	26,339	26,452
Number of groups	4,293	4,287	4,296
Within R ²	14.6%	2.70%	16.1%
Between R ²	14.6%	5.70%	16.9%
Overall R ²	15.0%	3.58%	16.9%

Notes to Table 3

Panel A provides descriptive statistics for forward-looking intensity measures, buy-and-hold stock returns, and earnings.

Panel B provides regression estimates for the following Equation (2):

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t+1} + b_4 R_{t+1} + b_5 AFWLI_t + b_6 AFWLI_t * X_{t-1} + b_7 AFWLI_t * X_t + b_8 AFWLI_t * X_t + b_9 AFWLI_t * R_{t+1} + \sum \theta Industry + \sum \lambda Year_t + \varepsilon$$

The dependent variable, R_t , is the pre-filing, filing, and full year buy-and-hold returns in Columns 1, 2, and 3 respectively. The numbers within parentheses denote p-values based on GLS Huber-White standard errors that controls for heteroskedasticity, auto-correlation, and cross-correlation.

Panel C provides descriptive statistics for forward-looking sentences.

Panel D provides regression estimates for the following Equation (3) with $AFWLI_t$ replaced by $AFWLS_t$:

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t+1} + b_4 R_{t+1} + b_5 AFWLS_t + b_6 AFWLS_t * X_{t-1} + b_7 AFWLS_t * X_t + b_8 AFWLS_t * X_t + b_9 AFWLS_t * R_{t+1} + \sum \theta Industry + \sum \lambda Year_t + \varepsilon$$

The dependent variable, R_t , is the pre-filing, filing, and full year buy-and-hold returns in Columns 1, 2, and 3 respectively. The numbers within parentheses denote p-values based on GLS Huber-White standard errors that controls for heteroskedasticity, auto-correlation, and cross-correlation.

Variable Definitions

Forward-looking intensity is the number of forward-looking sentences divided by the number of MD&A sentences. (Appendix 1 describes in detail how forward-looking sentences in the MD&A sections are identified.)

$AFWLI_t$ is the abnormal forward-looking intensity, which is the residual of Equation (1) using forward-looking intensity as the dependent variable as tabulated in Table 2 Panel C.

$AFWLS_t$ is the abnormal forward-looking sentences, which is the residual of Equation (1) using forward-looking sentences as the dependent variable as tabulated in Table 2 Panel C.

R_t is the buy-and-hold stock return for the following time periods in different columns:

- i) 11 months ending one day before the 10-K filing ($R_{Pre-filing}$) in column (1);
- ii) one month starting one day before and ending 30 days after the 10-K filing (R_{Filing}) in column (2);
- iii) 12 months ending 30 days after the 10-K filing (R_{Full}) in column (3).

X_t is income before extraordinary items in fiscal year t . All past, current, and future X_t 's are deflated by market value of equity at the start of the return measurement window for R_t .

Table 4
Two-by-two Analyses by Partitions based on Dark/Non-Dark and Positive/Negative Abnormal Forward-looking Intensity

Panel A. Average abnormal forward-looking intensity and number of observations

		Non-Dark	Δ Dark	Dark	Total
Negative AFWLI	<i>Average AFWLI</i> <i>p-value</i> <i>N</i>	-0.0317 (0.00) 11,196	-0.0013 (0.00)	-0.0330 (0.00) 2,859	-0.0330 (0.00) 14,055
Δ AFWLI	<i>Average AFWLI</i> <i>p-value</i>	0.0701 (0.00)	0.0702 (0.00)	0.0719 (0.00)	0.0704 (0.00)
Positive AFWLI	<i>Average AFWLI</i> <i>p-value</i> <i>N</i>	0.0380 (0.00) 10,468	0.0005 (0.08)	0.0385 (0.00) 2,461	0.0381 (0.00) 13,109
Total	<i>Average AFWLI</i> <i>p-value</i> <i>N</i>	0.0023 (0.00) 21,844	0.0022 (0.00)	0.0001 (0.89) 5,320	0.0019 (0.00) 27,164

Panel B. Estimating Equation 4 with pre-filing stock returns as the dependent variable

		Non-Dark	Δ Dark	Dark	Total
Negative AFWLI	<i>Coefficient on XP1</i> <i>p-value</i>	0.6540 (0.00)	-0.3196 (0.27)	0.3344 (0.00)	0.4769 (0.00)
Δ AFWLI	<i>Coefficient on XP1</i> <i>p-value</i>	-0.2207 (0.23)	-0.4753 (0.00)	-0.1556 (0.07)	-0.1577 (0.00)
Positive AFWLI	<i>Coefficient on XP1</i> <i>p-value</i>	0.4333 (0.00)	-0.2546 (0.00)	0.1787 (0.00)	0.3192 (0.00)
Total	<i>Coefficient on XP1</i> <i>p-value</i>	0.5151 (0.00)	-0.2116 (0.00)	0.3034 (0.00)	0.4366 (0.00)

Panel C. Estimating Equation 4 with filing stock returns as the dependent variable

		Non-Dark	Δ Dark	Dark	Total
Negative AFWLI	<i>Coefficient on XP1</i> <i>p-value</i>	0.0665 (0.00)	-0.0349 (0.00)	0.0316 (0.01)	0.0414 (0.00)
Δ AFWLI	<i>Coefficient on XP1</i> <i>p-value</i>	0.0026 (0.74)	-0.0166 (0.08)	0.0182 (0.03)	0.0216 (0.01)
Positive AFWLI	<i>Coefficient on XP1</i> <i>p-value</i>	0.0691 (0.00)	-0.0193 (0.02)	0.0498 (0.00)	0.0630 (0.00)
Total	<i>Coefficient on XP1</i> <i>p-value</i>	0.0676 (0.00)	-0.0338 (0.00)	0.0338 (0.00)	0.0429 (0.00)

Panel D. Estimating Equation 4 with full-year stock returns as the dependent variable

		Non-Dark	ΔDark	Dark	Total
Negative AFWLI	<i>Coefficient on XPI</i> <i>p-value</i>	0.7564 (0.00)	-0.3435 (0.09)	0.4129 (0.00)	0.5535 (0.00)
ΔAFWLI	<i>Coefficient on XPI</i> <i>p-value</i>	-0.2509 (0.37)	-0.4680 (0.00)	-0.1245 (0.00)	-0.1435 (0.00)
Positive AFWLI	<i>Coefficient on XPI</i> <i>p-value</i>	0.5055 (0.00)	-0.2171 (0.00)	0.2884 (0.00)	0.4101 (0.00)
Total	<i>Coefficient on XPI</i> <i>p-value</i>	0.6001 (0.00)	-0.2003 (0.00)	0.3998 (0.00)	0.5126 (0.00)

Notes to Table 5

Panel A provides descriptive statistics for abnormal forward-looking intensity, AFWLI_t, across dark versus non-dark and positive AFWLI_t versus negative AFWLI_t partitions.

Panel B provides regression estimates for the following Equation (4):

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t+1} + b_4 R_{t+1} + b_5 \text{PAFWLI}_t + b_6 \text{Dark} \\ + b_7 \text{PAFWL}_t * \text{Dark} + b_8 X_{t-1} * \text{PAFWL}_t + b_9 X_{t-1} * \text{Dark} + b_{10} X_{t-1} * \text{PAFWL}_t * \text{Dark} \\ + b_{11} X_t * \text{PAFWL}_t + b_{12} X_t * \text{Dark} + b_{13} X_t * \text{PAFWL}_t * \text{Dark} \\ + b_{14} X_{t+1} * \text{PAFWL}_t + b_{15} X_{t+1} * \text{Dark} + b_{16} X_{t+1} * \text{PAFWL}_t * \text{Dark} \\ + b_{17} R_{t+1} * \text{PAFWL}_t + b_{18} R_{t+1} * \text{Dark} + b_{19} R_{t+1} * \text{PAFWL}_t * \text{Dark} + \sum \theta \text{Industry} + \sum \lambda \text{Year}_t + \varepsilon$$

Panels B, C, and D report the aggregate coefficient estimates on X_{t+1} (which are b₃, b₁₄, b₁₅, b₁₆) for each return period and sample partition. The p-values reported in parentheses are based on GLS Huber-White standard errors that controls for heteroskedasticity, auto-correlation, and cross-correlation.

Variable Definitions

AFWLI_t is the abnormal forward-looking intensity, which is the residual of Equation (1) as tabulated in Table 2 Panel C.

PAFWL_t: The sign indicator of abnormal forward-looking intensity, AFWLI_t, computed as the residual of Equation (1) as tabulated in Table 2 Panel C. PAFWL_t takes the value of 1 if the AFWLI_t is positive and 0 otherwise.

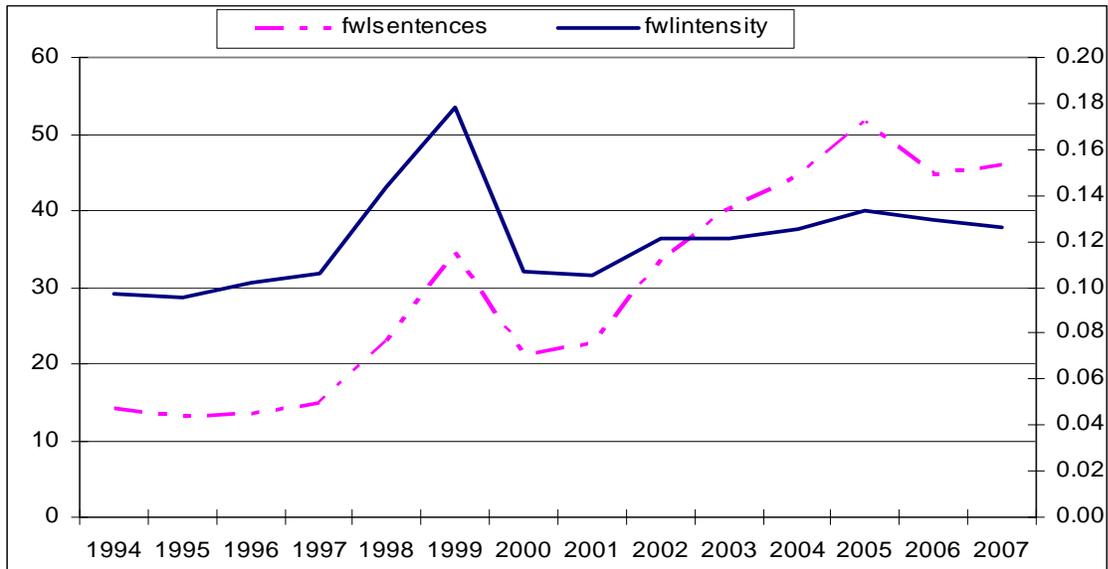
Dark is an indicator variable that is 1 if the company does not have any analyst following and if the company management does not provide guidance on quarterly earnings during a fiscal year, and 0 otherwise.

R_t is the buy-and-hold stock return for the following time periods in different panels:

- i) 11 months ending one day before the 10-K filing (*R_{Pre-filing}*) in Panel B;
- ii) one month starting one day before and ending 30 days after the 10-K filing (*R_{Filing}*) in Panel C;
- iii) 12 months ending 30 days after the 10-K filing (*R_{Full}*) in Panel D.

X_t is income before extraordinary items in fiscal year t. All past, current, and future X_t's are deflated by market value of equity at the start of the return measurement window for R_t.

Figure 1 Forward-looking sentences and intensity over the sample years



The figure depicts the average number of forward-looking sentences and forward-looking intensity in MD&A sections of the company annual reports by calendar year.