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Forward-Looking MD&A Disclosures and the Information Environment

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We use computer-intensive techniques to study the informational properties of forward-looking disclosures in the management discussion and analysis (MD&A) sections of 10-K filings made with the Securities and Exchange Commission. We find that firms make more forward-looking MD&A disclosures when their stock prices have lower informational efficiency, i.e., when their stock prices poorly reflect future earnings information. The greater levels of forward-looking MD&A disclosures help improve yet are unable to completely mitigate the lower informational efficiency of stock prices for such firms. These findings are stronger for operations-related forward-looking disclosures, disclosures that are made prior to 2000, and disclosures made by loss firms.

Data, as supplemental material, are available at <http://dx.doi.org/10.1287/mnsc.2014.1921>.

Keywords: disclosure; 10-K filings; forward looking

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1. Introduction

The management discussion and analysis (MD&A) section is an important part of the annual report that includes managerial commentary about a firm's current state and future prospects. The MD&A provides managers with an opportunity to convey their future expectations and strategic plans directly to the public. However, regulators and users have been critical of the quantity and quality of forward-looking disclosures in the MD&A (Tavcar 1998, Securities and Exchange Commission (SEC) 2003). Accordingly, in this paper we examine the relationship between the extent of forward-looking disclosures in the MD&A and the firms' information environment. In particular, we address two related questions: (1) Do firms with poor information environments make more forward-looking disclosures in the MD&A? (2) Are forward-looking disclosures in the MD&A associated with improved information environments? We characterize information environments by the informational efficiency of stock prices, which we measure by the strength of the association between current stock returns and future earnings.

We use computer-intensive techniques to examine the MD&A sections of all 10-K reports filed with the

Securities and Exchange Commission for the fiscal years between 1993 and 2009. Employing criteria from computational linguistics, we develop a comprehensive list of forward-looking phrases and keywords, and we examine the quantity of forward-looking MD&A disclosures. Our focus on the *quantity* of forward-looking disclosures rather than the *tone* (i.e., optimistic versus pessimistic) is predicated on the SEC's arguments that firms do not provide adequate forward-looking information in the MD&A and that the provision of such information will improve firms' information environments.

We test our research questions using the methodology of Lundholm and Myers (2002), in which current stock returns are regressed on future earnings and interaction of future earnings with the current level of firm disclosures.¹ We employ this methodology independently using stock returns for the 11 months

¹ The methodology of Lundholm and Myers (2002) has subsequently been used in various contexts. Gelb and Zarowin (2002) examine whether high-quality disclosures as measured by Association for Investment Management and Research (AIMR) ratings "bring the future forward." Tucker and Zarowin (2006) examine whether income smoothing increases informativeness of earnings.

prior to the 10-K filing date (prefiling period) and stock returns for the 1 month starting with the 10-K filing date (filing period).² We use prefiling stock returns to test whether firms with poor prefiling information environments make more forward-looking MD&A disclosures and filing-period stock returns to test whether such disclosures are associated with improved information environment. To control for firm characteristics that are correlated with information environments and forward-looking disclosures, we use a measure of *abnormal* disclosure, i.e., level of forward-looking MD&A disclosures net of the level predicted by firm characteristics such as size, performance, growth, age, volatility of business, analyst following, operational complexity, industry, and year.

We find the following. First, firms with a greater level of abnormal forward-looking disclosures have prefiling stock returns that are less strongly associated with future earnings. Second, firms with a greater level of abnormal forward-looking disclosures have filing-period stock returns that are more strongly associated with future earnings. Third, firms with a greater level of abnormal forward-looking disclosures have combined prefiling and filing period stock returns that are less strongly associated with future earnings. Overall, these findings support the following thesis. Firms provide forward-looking MD&A disclosures in part to mitigate their poor information environments; such disclosures help improve, but do not fully mitigate, the informational disadvantage of firms with high levels of abnormal forward-looking disclosures.³

We next explore cross-sectional and time-series variation in our results. First, our results—in both the prefiling and filing windows—are driven by firms reporting losses, suggesting that forward-looking MD&A disclosures are more useful when firms report losses. Second, our findings in the prefiling window are more pronounced prior to 2000, suggesting that motivations other than improving information environment drive MD&A disclosures in the post-Regulation Fair Disclosure period. Finally, we find that operations-related disclosures are the most important category of forward-looking MD&A disclosures and that they drive much of our results.

Several more recent studies have used computer-intensive techniques to examine large samples of

MD&A disclosures in the United States (Li 2008, 2010; Brown and Tucker 2011; Davis and Tama-Sweet 2011). Much of this literature has focused on qualitative characteristics of the MD&A information, such as tone and readability. In contrast to much of the prior literature, we focus on the *quantity* of forward-looking information in the MD&A. We find that ameliorating poor information environments is a potential motivation for why firms provide forward-looking MD&A disclosures and that the provision of more forward-looking disclosures helps improve information environments. We use two different return windows to tease out the motivations for and consequences of forward-looking MD&A disclosures. The contrasting results across the two windows strengthen identification and make it less likely that our results are driven by endogeneity or some unidentified firm characteristic. Having said that, we do acknowledge that we document only empirical associations, from which it is difficult to derive causal inferences. Overall, our results should be of interest to the SEC, which has frequently expressed concerns about the limited amount of forward-looking information in the MD&A.

2. Motivation

2.1. Importance of MD&A

Public companies are required to file MD&A sections as an integral part of their 10-K filings (SEC 1980); however, the content of MD&A sections remains largely voluntary. In other words, the MD&A section of the annual report is a *quasimandatory* or a *quasivoluntary* disclosure setting (Beyer et al. 2010). The SEC intends that the MD&A provide investors with an opportunity to see the company through the eyes of the management and has periodically provided guidance about the content of MD&A disclosures (SEC 1987, Garmong 2007). In particular, the SEC has emphasized investors' greater need for forward-looking disclosures than for disclosures about past events, and it has guided companies to present any known trends, events, commitments, plans, and uncertainties that are likely to materially affect company liquidity, capital resources, or future operations (SEC 1989, 2003). Voluntary projections of anticipated trends are also encouraged. Nevertheless, the SEC finds that MD&A disclosures are generally deficient (Cole and Jones 2005, Garmong 2007).⁴ In particular, MD&A disclosures typically include boilerplate statements and immaterial details but little information of substance (SEC 2003). Overall, such criticism of

² Because the 11-month return window could be contaminated by intervening 10-Q disclosures, we also use an alternative 3-month window for the prefiling period that is not subject to this problem. All our results for this alternative window are qualitatively similar to those using the 11-month window.

³ This thesis is consistent with the notion of the "second-best" embedded in analytical models; i.e., information asymmetry can be mitigated but cannot be completely eliminated through various disclosure mechanisms (Bens and Monahan 2004).

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 disclosures to be deficient (SEC 1989). More recently, in its general review of MD&A disclosures, the SEC found several deficiencies (SEC 2003).

insufficient forward-looking disclosures motivates us to examine the association between the information environment and forward-looking disclosures for a large sample of 10-K filings.⁵

2.2. Background and Research Objective

Early research has examined MD&A disclosures using small samples. Pava and Epstein (1993) find that the MD&A sections of 25 randomly selected companies mostly describe past performance. Bryan (1997) examines 250 firms' fiscal year 1990 filings and searches for the seven MD&A topics required by the SEC. Of the seven, three topics—namely, liquidity, capital expenditures, and known trends on sales and costs—can be considered forward looking. Bryan finds that the existence of some MD&A topics is associated with future financials, analyst forecast revisions, and current stock returns. However, it is not clear whether the existence of the three forward-looking topics is incrementally more informative. For instance, disclosures about capital expenditures are only associated with current stock returns, and none of the forward-looking topics is associated with changes in future cash flows. This result is likely to be due to either the lack of statistical power or the lack of information content of MD&A disclosures in 1990. Other studies that use small samples examine human-assigned MD&A quality scores. Barron et al. (1999) examine MD&A quality scores assigned by a SEC study in 1987 and find that MD&A quality is associated with lower analyst forecast errors and dispersion. Clarkson et al. (1999) show that analyst ratings of MD&A quality for Toronto Stock Exchange firms are associated with various factors related to voluntary disclosure identified by Lang and Lundholm (1993). These studies do not focus on forward-looking MD&A disclosures.

More recent studies examine MD&A disclosures of large samples by using computer-intensive techniques. Li (2010) uses a Bayesian machine-learning algorithm to assess the tone of forward-looking MD&A disclosures between 1994 and 2007 and finds that the optimistic (pessimistic) tone is positively (negatively) associated with future earnings.⁶ Feldman et al. (2010) find that the market reacts to the change in MD&A tone around the 10-K and 10-Q filings for the quarters between

Q4/1995 and Q2/1996. Brown and Tucker (2011) show that market reacts more strongly to the 10-K filings of companies that modify their MD&A more extensively, but analysts' forecast revisions are not affected. Davis and Tama-Sweet (2011) show that managers opportunistically provide more pessimistic information in MD&A disclosures than in earnings press releases. In addition, Li (2008) finds that firms opportunistically hide poor performance by obfuscating related information; i.e., the annual report "readability" is lower when a 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 motivations behind and consequences of forward-looking disclosures for a large sample of MD&A disclosures. Specifically, we ask whether companies with poor information environments make more forward-looking disclosures and whether forward-looking disclosures help improve poor information environments. Our research questions, which are concerned with the *quantity* of forward-looking disclosures in the MD&A, complement and differ from those of recent studies, which focus on the *tone* of MD&A disclosures.⁷ In particular, our research questions provide insights into the potential benefits of the SEC's call for more forward-looking MD&A disclosures irrespective of the tone or nature of these disclosures.

The closest research to ours is a set of UK studies. Hussainey et al. (2003) use computer-intensive techniques and show that earnings-related forward-looking disclosures in annual reports help the market predict next year's earnings change more accurately. Schleicher et al. (2007) show that the ability of stock returns to anticipate next year's earnings change is significantly greater when loss firms, but not profit firms, provide a large number of earnings predictions in the annual reports. Hussainey and Walker (2009) show that earnings-related forward-looking disclosures help investors to form better expectations about the

⁵ A large body of research has focused on quantitative variables such as earnings, yet there has been a dearth of research examining MD&A disclosures, despite their importance to users. Noting this, Core (2001) and Beyer et al. (2010) encourage large-sample research on narratives that accompany quantitative disclosures.

⁶ Li (2008) also finds that companies use complex language to obfuscate poor performance, suggesting that incentives to both improve and deteriorate the information environment can coexist in the cross section of companies.

⁷ Identifying the quantity of forward-looking disclosures avoids the arguably less precise task of identifying the tone in the absence of complementary company information. Consider a typical statement such as "We project our earnings per share to be \$1.0 in the next year." Our analysis can easily capture this statement as forward looking. However, the tone of this statement is remarkably difficult to assess because it depends on many factors such as past performance and investments of the company, competition, and analyst forecasts, for example. Even seemingly positive (negative) statements such as "We project our EPS [earnings per share] to increase (decrease) to \$1.0 in the next year" may be misleading in the absence of complementary information. This conjecture we developed while reading the prospective statements in our sample is corroborated by the literature. For instance, Li (2010) manually assigns "uncertain" ("neutral") ratings to 22.6% (40.0%) of the forward-looking sentences in his sample and excludes them from his analysis.

cumulative earnings changes during the next three years.

2.3. Theoretical Considerations

The question of whether forward-looking MD&A disclosures provide useful information to the capital markets may seem superfluous in light of prior evidence that voluntary disclosure quality is associated with informative stock prices (Lang and Lundholm 1996, Lundholm and Myers 2002, Gelb and Zarowin 2002). However, it is not obvious that forward-looking MD&A disclosures are informative for several reasons, thereby generating tension in our predictions.⁸ First, the MD&A is not a timely channel of communication. Other channels such as press releases, conference calls, and analyst-hosted investor conferences are timelier and could therefore preempt information communicated through the MD&A. Second, investors may rely less on the MD&A than on other parts of the annual report because MD&A sections are reviewed by auditors only for consistency with the other parts of the annual report (Hüfner 2007). Finally, prior evidence on the lack of MD&A usefulness and the SEC's related criticisms suggest a strong possibility that forward-looking MD&A disclosures are not informative.

Furthermore, voluntary disclosure theories are ambivalent about whether managers disclose useful information. The *informativeness perspective* predicts that managers disclose value-relevant information. Early signaling models argue that firms disclose all value-relevant information to mitigate the adverse selection problem (Grossman and Hart 1980, Grossman 1981, Milgrom 1981). Subsequent models impose costs and derive selective disclosure strategies where managers generally disclose *good* news (Verrecchia 1983, Dye 1985). In contrast to the predictions of signaling models, the litigation risk hypothesis purports that firms 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 investors' information demands (McNichols 1989, Lang and Lundholm 1996, Hutton and Stocken 2010) or to align investors' expectations with their own (Ajinkya and Gift 1984). Overall, the informativeness perspective argues that voluntary disclosures will be informative even if these disclosures are selective. In contrast, the *opportunism perspective* predicts that company disclosures are largely shaped by managers'

motives. Managers disclose good news to the market to "hype" the stock, especially prior to raising capital or extracting rents (Aboody and Kazsnik 2000, Lang and Lundholm 2000). Kothari et al. (2009) show that managers leak good news in a timely fashion but withhold bad news based on career concerns. Overall, the opportunism perspective argues that voluntary disclosure can mislead the market in the short term. Therefore, whether forward-looking MD&A disclosures communicate useful information to the capital markets remains an empirical question.

3. Data and Preliminary Analyses

3.1. 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 fiscal years 1993 and 2009, (2) extracts MD&A sections from the 10-K filings, (3) extracts forward-looking sentences from the MD&A sections, and (4) analyzes the nature of the forward-looking sentences. For brevity, we summarize our methodology here and describe it in detail in the appendix. We parse the MD&A into sentences and use these sentences as the unit of analysis instead of words or text lines, because a sentence is the smallest integral unit of text that conveys an idea or message (Ivers 1991).⁹ We identify an MD&A sentence as forward looking if the sentence includes any of the following phrases: (1) keywords that imply the future (e.g., "next year"), (2) verb conjugations that imply the future (e.g., "the company plans to"), or (3) a numerical reference to future years (e.g., "in 2006" in a 2004 filing). These phrases are developed based on computational linguistics for identifying future-related sentences (Wang and Lin 2004) and our reading of 100 randomly selected MD&A disclosures. We validate our methodology by comparing the Perl output of 50 randomly selected MD&A disclosures with MBA students' reading of the same disclosures and find that our methodology is well specified and powerful.

3.2. Descriptive Statistics

Our sample consists of 44,708 10-K filings from 5,705 firms between fiscal years 1993 and 2009. Table 1, panel A presents descriptive statistics. On average, an annual report has 1,531 sentences (excluding tables and exhibits), 301 of which belong to the MD&A section. The MD&A intensity, which is defined as the number of MD&A sentences divided by the total number of sentences in the annual report, has a mean (median) of 21.2% (20.4%). Turning to the key variable of interest, there are on average 39 forward-looking sentences in

⁸ In their review of the voluntary disclosure literature, Hirst et al. (2008, p. 329) 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)."

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

Table 1 Sample of Annual Report Disclosures

Panel A: General descriptive statistics					
	Mean	Q1	Q2	Q3	Std. dev.
<i>Annual report sentences</i>	1,531	975	1,331	1,816	968
<i>MD&A sentences</i>	301	166	265	385	194
<i>MD&A intensity (%)</i>	21.2	14.0	20.4	27.4	9.8
<i>Forward-looking sentences</i>	39	18	32	52	30
<i>Forward-looking intensity (%)</i>	12.8	9.1	12.5	16.0	5.4
Panel B: Descriptive statistics by fiscal year					
Fiscal year	<i>MD&A sentences</i>	<i>Forward-looking sentences</i>	<i>Forward-looking intensity (%)</i>		
1993	147	14	9.5		
1994	144	14	9.4		
1995	133	13	9.7		
1996	140	14	10.4		
1997	156	21	13.3		
1998	194	34	18.1		
1999	194	23	11.6		
2000	207	22	10.5		
2001	259	32	12.1		
2002	318	40	12.2		
2003	350	45	12.5		
2004	385	52	13.2		
2005	361	47	13.1		
2006	366	46	12.7		
2007	398	55	14.3		
2008	417	58	14.4		
2009	425	56	13.7		

Notes. Panel A reports descriptive statistics for annual report disclosures in our sample. Panel B reports average number of MD&A sentences, forward-looking sentences, and forward-looking intensity across fiscal years. Our sample includes 44,708 annual reports that are electronically filed between fiscal years 1993 and 2009 as part of the 10-K filing requirement to the SEC EDGAR system. All firm-years in the sample have nonmissing financials and stock returns in the Compustat and Center for Research in Security Prices databases. *Annual report sentences* is the total number of sentences in a firm's annual report excluding exhibits and tables. *MD&A sentences* is the number of sentences in the MD&A section of the annual report. *MD&A intensity* is the number of MD&A sentences divided by total number of annual report sentences. *Forward-looking sentences* is the number of forward-looking sentences in the MD&A section of the annual report. The appendix describes how forward-looking sentences in the MD&A are identified. *Forward-looking intensity* is the number of forward-looking sentences divided by number of MD&A sentences.

the MD&A section. The forward-looking intensity (*FLI*), which is defined as the number of forward-looking sentences divided by the total number of sentences in the MD&A section, has a mean (median) of 12.8% (12.5%). *FLI* ranges from 0% to 72%, indicating considerable variation across companies. *FLI* also varies across two-digit Standard Industrial Classification (SIC) industries. Chemicals (16.6%), metal mining (15.5%), and oil and gas extraction (14.6%) have the highest average forward-looking intensities, whereas banking (7.2%), agricultural production (9.2%), and brokerage (9.8%) have the lowest average forward-looking intensities.

Table 1, panel B presents descriptive statistics by fiscal year. The average number of MD&A sentences increases from around 140 sentences until 1997 to 425 sentences in 2009. The average number of forward-looking sentences exhibits a similar pattern from approximately 14 sentences until 1997 to 56 sentences in 2009.¹⁰ Overall, the average *FLI* increases from 9.5% in 1993 to 13.7% in 2009, consistent with the SEC's frequent encouragements for forward-looking disclosures in the MD&A. The smaller increase in forward-looking intensity over the sample period (44%) relative to that of forward-looking sentences (300%) suggests that the total number of MD&A sentences 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.

3.3. Measuring Abnormal Forward-Looking Disclosures

Table 2, panel A reports mean and median values of firm characteristics for low and high *FLI* terciles. Consistent with Li (2010), high *FLI* firms have a higher number of analysts following them, a more frequent number of managerial earnings guidance, and larger equity market capitalization; but they also have lower accounting performance, as measured by earnings and (inversely) by losses.¹¹ Moreover, high *FLI* firms have more volatile business, as measured by volatility in earnings and stock returns, and incidence of special items and merger and acquisition (M&A) activities. Finally, high *FLI* firms have higher growth opportunities, as measured (inversely) by the book-to-market ratio and (inversely) by age; higher operational complexity, as measured by the number of business and geographical segments; and higher financial complexity, as measured by the number of nonmissing Compustat items. These univariate associations across *FLI* terciles are consistent with untabulated univariate associations across terciles based on forward-looking sentences as well as untabulated Pearson and Spearman correlations between *FLI* and firm characteristics.

It is likely that the above firm-level characteristics that correlate with *FLI* also correlate with the firms' information environment. For example, smaller firms and firms with more volatile business have poor

¹⁰ The number of forward-looking sentences spikes in fiscal year 1998, largely attributable to references to year 2000 regarding Y2K preparedness. We choose not to filter out this effect because these discussions are, in essence, forward looking. Our results are unaffected if we drop observations from fiscal year 1998.

¹¹ This result is corroborated by the Altman z-statistic (unreported). Also, unreported tests show that much of the negative correlation between *FLI* and earnings results from the negative correlation of *FLI* with cash flow from operations rather than with accruals.

Table 2 Determinants of Forward-Looking MD&A Disclosures

Panel A: Firm characteristics across low and high <i>FLI</i> terciles				
Variable	Low (<i>N</i> = 14,901)		High (<i>N</i> = 14,920)	
	Mean	Median	Mean	Median
<i>FLI</i> (%)	7.237	7.627	18.721	17.744
<i>FLS</i>	2.790	2.833	3.889	3.932
<i>ANALYST</i>	1.193	1.099	1.423	1.609
<i>GUIDANCE</i>	0.401	0.000	0.530	0.000
<i>SIZE</i>	5.566	5.494	5.792	5.756
<i>EARN</i>	0.027	0.057	−0.048	0.017
<i>LOSS</i>	0.187	0.000	0.432	0.000
<i>EARNVOL</i>	0.080	0.035	0.106	0.055
<i>RETVOL</i>	0.125	0.098	0.169	0.140
<i>SI</i>	0.246	0.000	0.366	0.000
<i>MA</i>	0.190	0.000	0.201	0.000
<i>BTM</i>	0.775	0.842	0.644	0.619
<i>AGE</i>	11.219	11.000	10.803	9.000
<i>NBSEG</i>	1.184	1.386	1.433	1.386
<i>NGSEG</i>	1.029	1.099	1.398	1.386
<i>NITEMS</i>	5.504	5.533	5.649	5.663

Panel B: Determinants of forward-looking intensity and forward-looking sentences

$$\begin{aligned}
 FLI_t = & \alpha_0 + \alpha_1 ANALYST_t + \alpha_2 GUIDANCE_t + \alpha_3 SIZE_t + \alpha_4 EARN_t \\
 & + \alpha_5 LOSS_t + \alpha_6 EARNVOL_t + \alpha_7 RETVOL_t + \alpha_8 SI_t + \alpha_9 MA_t \\
 & + \alpha_{10} BTM_t + \alpha_{11} AGE_t + \alpha_{12} NBSEG_t + \alpha_{13} NGSEG_t + \alpha_{14} NITEMS_t \\
 & + \alpha_{15} MDAI_t + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t, \quad (1a)
 \end{aligned}$$

$$\begin{aligned}
 FLS_t = & \alpha_0 + \alpha_1 ANALYST_t + \alpha_2 GUIDANCE_t + \alpha_3 SIZE_t + \alpha_4 EARN_t \\
 & + \alpha_5 LOSS_t + \alpha_6 EARNVOL_t + \alpha_7 RETVOL_t + \alpha_8 SI_t + \alpha_9 MA_t \\
 & + \alpha_{10} BTM_t + \alpha_{11} AGE_t + \alpha_{12} NBSEG_t + \alpha_{13} NGSEG_t + \alpha_{14} NITEMS_t \\
 & + \alpha_{15} MDAS_t + \alpha_{16} ARS_t + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t. \quad (1b)
 \end{aligned}$$

	Prediction	<i>FLI</i> (%)	<i>FLS</i>
<i>ANALYST</i>	+	0.115** (2.40)	0.007* (1.92)
<i>GUIDANCE</i>	+	−0.020 (−0.46)	−0.003 (−0.77)
<i>SIZE</i>	+	0.210*** (5.57)	0.007*** (2.72)
<i>EARN</i>	−	−0.077 (−0.58)	0.004 (0.42)
<i>LOSS</i>	+	1.528*** (10.82)	0.108*** (10.39)
<i>EARNVOL</i>	+	0.656** (2.39)	0.023 (1.01)
<i>RETVOL</i>	+	3.048*** (7.52)	0.218*** (7.54)
<i>SI</i>	+	−0.036 (−0.58)	−0.008 (−1.51)
<i>MA</i>	+	−0.351*** (−6.07)	−0.028*** (−5.32)
<i>BTM</i>	−	−0.675*** (−4.38)	−0.070*** (−5.44)
<i>AGE</i>	−	−0.048*** (−6.38)	−0.003*** (−5.93)
<i>NBSEG</i>	+	−0.301*** (−4.79)	−0.025*** (−4.43)
<i>NGSEG</i>	+	0.018 (0.37)	0.001 (0.15)

Table 2 (Continued)

	Prediction	<i>FLI</i> (%)	<i>FLS</i>
<i>NITEMS</i>	+	0.582 (0.94)	0.166*** (3.66)
<i>MDAI</i>	+	0.023** (2.06)	
<i>MDAS</i>	+		1.025*** (55.04)
<i>ARS</i>	+		0.010 (1.39)
Observations		44,708	44,708
Adjusted <i>R</i> ² (%)		40.7	84.5

Notes. Panel A presents mean and median firm characteristics of low and high *FLI* terciles. All mean (median) differences between the low and high *FLI* terciles are statistically significant at 1% based on the *t*-test (Wilcoxon median test). Panel B provides regression estimates for Equations (1a) and (1b), where the dependent variables are *FLI* and *FLS*, respectively. The regression estimation excludes outliers, which are defined as observations with studentized residuals greater than 2. The numbers in parentheses show *t*-values after standard errors are clustered by firm and year. *FLI* is the number of forward-looking sentences in the MD&A section divided by the number of sentences in the MD&A section of the annual report. *FLS* is the logarithm of 1 plus the number of forward-looking sentences in the MD&A section. *ANALYST* is the logarithm of 1 plus the number of analysts following the firm. *GUIDANCE* is the logarithm of 1 plus the number of earnings guidance issued by the firm. *SIZE* is the logarithm of 1 plus the market value of equity in millions of dollars, measured as outstanding common shares (Compustat data item “csho”) multiplied by fiscal year-end share price (“prcc_f”). *EARN* is net income before extraordinary items (“ib”) divided by market capitalization at the beginning of the year. *EARN* is Winsorized at +1 and −1. *LOSS* is a dummy variable that equals 1 if *EARN* is positive and 0 otherwise. *EARNVOL* is the standard deviation of earnings deflated by beginning-of-year market capitalization during the last five fiscal years. *RETVOL* is the standard deviation of monthly stock returns over the fiscal year. *SI* is a dummy variable that equals 1 if the sum of unusual or nonrecurring income statement items (“spi”) divided by sales (“sale”) is greater than 1% and 0 otherwise. *MA* is a dummy variable that equals 1 if the “Acquisition–Sale contribution” (“aqs”) divided by sales is greater than 1% or if the value of acquisitions (“aqc”) divided by total assets is greater than 2% and 0 otherwise. *BTM* is the book value of assets (“at”) divided by market value of assets, defined as the sum of the market value of equity (csho · prcc_f) and the book value of total liabilities (“lt”). *AGE* is the number of years between the current year and the year of the firm’s first appearance in the Compustat database. *NBSEG* is the logarithm of 1 plus the number of business segments according to Compustat segments database. *NGSEG* is the logarithm of 1 plus the number of geographical segments according to Compustat segments database. *NITEMS* is the logarithm of 1 plus the number of nonmissing numerical items in the Compustat database. *MDAI* is the number of MD&A sentences divided by the total number of sentences in the annual report. *MDAS* is the logarithm of 1 plus the number of MD&A sentences. *ARS* is the logarithm of 1 plus the total number of sentences in the annual report.

p* < 0.05; *p* < 0.01; ****p* < 0.001.

information environments. Since we examine the association between forward-looking disclosures and the information environment, we need to control for firm characteristics to ensure that our findings are not driven by spurious correlations. Accordingly, we develop a measure of *abnormal* forward-looking disclosure level, which controls for the following firm characteristics that

prior literature and the above associations identify as determinants of forward-looking disclosures (Li 2010).¹²

- **Availability of earnings-related information:** More available earnings-related information may motivate companies to provide more forward-looking disclosures. We measure such information using *ANALYST*, which is the logarithm of 1 plus the number of analysts following the company, and *GUIDANCE*, which is the logarithm of 1 plus the number of earnings guidance issued by the company.

- **Size:** We expect larger firms to provide more forward-looking information. Firm size is measured by *SIZE*, which is the logarithm of 1 plus the market value of equity at the end of the fiscal year.

- **Performance:** Bad performance usually means greater uncertainty and may require firms to provide more information to assure investors (Hayn 1995) or to mitigate litigation risk (Skinner 1994). We measure firm performance by *EARN*, which is net earnings before extraordinary items deflated by market value of equity at the beginning of the year and is Winsorized at +1 and −1, and (inversely) by *LOSS*, which is a dummy variable that is 1 if *EARN* is negative and 0 otherwise.

- **Volatility of business:** A volatile business is associated with greater uncertainty and information asymmetry between firms and investors (Andersen 1996), which may induce managers to provide more forward-looking information. We measure the volatility of business by *EARNVOL*, the standard deviation of *EARN* during the last five years; *RETVOL*, the standard deviation of monthly stock returns over the fiscal year; *SI*, a dummy variable that is 1 if the sum of unusual and nonrecurring income statement items (“spi” in Compustat) divided by sales is greater than 1% and 0 otherwise; and *MA*, a dummy variable that is 1 if the “Acquisition–Sale contribution” (“aqc”) divided by sales is greater than 1% or the value of acquisitions (“aqc”) divided by total assets is greater than 2% and 0 otherwise.

- **Growth options:** Growth firms may have uncertain operating environments as well as less informative earnings (Anthony and Ramesh 1992). We measure

growth options (inversely) by *BTM*, book-to-market ratio of assets (Smith and Watts 1992), and (inversely) by *AGE*, the number of years since the company’s first appearance in Compustat.

- **Operational complexity:** Firms with complex operations are likely to have higher information asymmetry, increasing the demand for forward-looking information. We measure operational complexity by *NBSEG* and *NGSEG*, which are the logarithm of 1 plus the number of business and geographic segments, respectively.

- **Financial complexity:** Firms with complex financial transactions are likely to have higher information asymmetry, increasing the demand for forward-looking information. We measure financial complexity by *NITEMS*, the logarithm of the number of nonmissing items in Compustat.

- **Reporting style:** We expect that firms that emphasize the MD&A section in their annual reports will emphasize more prospective information in their MD&A disclosures. We measure the level of MD&A emphasis by MD&A intensity (*MDAI*), which is the number of MD&A sentences divided by the total number of annual report sentences.

We also control for two-digit SIC industry and fiscal year. Consequently, we estimate the following regression models that use *FLI* and *FLS* (which is defined as logarithm of 1 plus the number of forward-looking MD&A sentences) as alternative dependent variables:

$$\begin{aligned} FLI_t = & \alpha_0 + \alpha_1 ANALYST_t + \alpha_2 GUIDANCE_t + \alpha_3 SIZE_t \\ & + \alpha_4 EARN_t + \alpha_5 LOSS_t + \alpha_6 EARNVOL_t \\ & + \alpha_7 RETVOL_t + \alpha_8 SI_t + \alpha_9 MA_t + \alpha_{10} BTM_t \\ & + \alpha_{11} AGE_t + \alpha_{12} NBSEG_t + \alpha_{13} NGSEG_t \\ & + \alpha_{14} NITEMS_t + \alpha_{15} MDAI_t \\ & + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t, \end{aligned} \quad (1a)$$

$$\begin{aligned} FLS_t = & \alpha_0 + \alpha_1 ANALYST_t + \alpha_2 GUIDANCE_t + \alpha_3 SIZE_t \\ & + \alpha_4 EARN_t + \alpha_5 LOSS_t + \alpha_6 EARNVOL_t \\ & + \alpha_7 RETVOL_t + \alpha_8 SI_t + \alpha_9 MA_t + \alpha_{10} BTM_t \\ & + \alpha_{11} AGE_t + \alpha_{12} NBSEG_t + \alpha_{13} NGSEG_t \\ & + \alpha_{14} NITEMS_t + \alpha_{15} MDAS_t + \alpha_{16} ARS_t \\ & + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t. \end{aligned} \quad (1b)$$

Table 2, panel B reports results of estimating Equations (1a) and (1b) with standard errors clustered at the firm and fiscal year levels. The results largely corroborate the univariate associations reported in Table 2, panel A. Firms with more available earnings-related information, large firms, poorly performing firms, firms with volatile business, growth firms, and firms that emphasize the MD&A section in annual reports make more forward-looking disclosures, as evidenced

¹² Untabulated analyses show significant firm-level persistence in forward-looking disclosures. However, persistent disclosures do not necessarily imply stale information. For instance, Microsoft Inc. reports, “We estimate worldwide PC shipments will grow between 8% and 10%” in its FY 2007 outlook (Microsoft Corporation 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 its FY 2008 outlook (Microsoft Corporation 2007). The new numbers clearly provide Microsoft’s updated projections. This explains why we do not use changes in forward-looking disclosures as the key variable of interest. Our key variable of interest, an abnormal level of forward-looking disclosures, is not a measure of newly introduced information types but a measure of the level of information net of what is expected given a firm’s innate information environment.

by positive and significant coefficients for *ANALYST*, *SIZE*, *LOSS*, *EARNVOL*, *RETVOL*, *NITEMS*, *MDAI*, and *MDAS* and negative and significant coefficients for *BTM* and *AGE*. The coefficients for *GUIDANCE*, *EARN*, *SI*, and *ARS* are not significant but do not change our inferences because of significant coefficients for the alternative measures. Contrary to our expectation and univariate associations, the coefficient for *NBSEG* is negative and significant and the coefficient for *NGSEG* is not significant, suggesting that firms with operational complexity make less forward-looking disclosures. This result, however, is in line with Li (2008), who finds a negative correlation between the number of geographical segments and annual report complexity. Contrary to our expectation and univariate associations, the coefficient for *MA* is negative, likely because of higher proprietary costs preventing firms to make forward-looking disclosures during the year of M&A activities. Overall, the explanatory power of the regressions is high: the adjusted R^2 is 40.7% when *FLI* is the dependent variable and 84.5% when *FLS* is the dependent variable. This gives us confidence that the residuals of Equations (1a) and (1b) are well-specified proxies for *abnormal* forward-looking disclosure.

4. Forward-Looking Disclosures and the Information Environment

In this section, we test our research questions regarding the association between forward-looking disclosures in the MD&A and the firm's information environment.

4.1. Forward-Looking Disclosures and the Informational Efficiency of Stock Prices

Collins et al. (1994) regress current stock returns on current and future earnings and show that current stock returns anticipate information contained in future earnings. Lundholm and Myers (2002) extend the regression of Collins et al. by interacting future earnings with the AIMR disclosure index (referred to hereafter as the LM model). The documented positive coefficient estimates for the interactions between future earnings and the AIMR disclosure index suggest that disclosure activity improves the relation between current stock returns and future earnings.

We augment the LM model by replacing the AIMR disclosure index with abnormal forward-looking intensity *AFLI*, i.e., residual from Equation (1a), and abnormal logarithm of forward-looking sentences *AFLS*, i.e., residual from Equation (1b). Furthermore, we estimate the LM model over the following discrete windows: (1) the prefilings periods, which are 11 months and 3 months prior to the 10-K filing date, and (2) the filing period, which is 1 month starting from the 10-K filing date. The prefilings periods provide a "benchmark" for the information environment prior to the 10-K filing,

as measured by the ability of prefilings stock returns to incorporate information about future earnings. The longer 11-month window is used to measure the prefilings information environment in its entirety regardless of other company disclosures such as 10-Qs; the shorter 3-month window is used to measure the prefilings information environment after all the 10-Qs of the fiscal year are filed. On the other hand, the filing period provides evidence on how the abnormal forward-looking disclosures change the ability of stock returns to incorporate information about future earnings. Overall, the prefilings and filing windows provide insights into whether abnormal forward-looking MD&A disclosure levels are associated with and improve poor information environments. We estimate the following regression models:

$$R = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X_{3t} + \alpha_4 R_{3t} + \alpha_5 AFLI_t + \alpha_6 AFLI_t \cdot X_{t-1} + \alpha_7 AFLI_t \cdot X_t + \alpha_8 AFLI_t \cdot X_{3t} + \alpha_9 AFLI_t \cdot R_{3t} + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t, \quad (2a)$$

$$R = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X_{3t} + \alpha_4 R_{3t} + \alpha_5 AFLS_t + \alpha_6 AFLS_t \cdot X_{t-1} + \alpha_7 AFLS_t \cdot X_t + \alpha_8 AFLS_t \cdot X_{3t} + \alpha_9 AFLS_t \cdot R_{3t} + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t, \quad (2b)$$

where R is alternatively measured as (1) prefilings returns $R_{[-11,0]}$ and $R_{[-3,0]}$; buy-and-hold stock returns for the 11 months and 3 months that end two days prior to the 10-K filing date; (2) filing returns $R_{[0,1]}$; buy-and-hold stock returns for the month starting 1 day before and ending 30 days after the 10-K filing date; and (3) combined period returns $R_{[-11,1]}$ and $R_{[-3,1]}$; buy-and-hold stock returns for the 12 months and 4 months that end 30 days after the 10-K filing date. The variable X_t is earnings before extraordinary items in fiscal year t deflated by market value of equity at the beginning of the fiscal year t , X_{3t} is cumulative earnings before extraordinary items for fiscal years $t+1$ to $t+3$ deflated by market value of equity at the beginning of the fiscal year t , and R_{3t} is buy-and-hold stock returns during years $t+1$ and $t+3$.

The sample for this analysis drops from 44,708 to 36,043 because of the requirement of nonmissing returns and earnings between the one year before and three years ahead of fiscal year t . Panel A of Table 3 presents descriptive statistics for the forward-looking disclosure measures, stock returns, and earnings. The mean and median *AFLI* are not different from zero. The mean and median *AFLS* are -0.023 and 0.008 , respectively, indicating a left-skewed distribution. The prefilings returns $R_{[-11,0]}$ and $R_{[-3,0]}$ have averages of 8.6% and 3.6%, respectively. The filing return $R_{[0,1]}$ has an average of 1.8%.

Panel B of Table 3 reports results of estimating Equation (2a). The key variable of interest, $AFLI_t \cdot X_{3t}$, reflects the extent to which forward-looking disclosures

Table 3 Do Forward-Looking Statements Bring the Future Forward?

Panel A: Descriptive statistics ($N = 36,043$)					
Variable	Mean	Q1	Q2	Q3	
Raw and abnormal forward-looking disclosures in MD&A sections of 10-K filings					
FLI	0.127	0.089	0.123	0.159	
$AFLI$	0.003	−0.026	−0.001	0.028	
FLS	3.378	2.890	3.466	3.951	
$AFLS$	−0.023	−0.214	0.008	0.213	
Stock returns around 10-K filing dates					
$R_{[-11,0]}$	0.086	−0.252	−0.025	0.244	
$R_{[-3,0]}$	0.036	−0.107	0.001	0.126	
$R_{[0,1]}$	0.018	−0.062	0.002	0.076	
$R_{[-3,1]}$	0.051	−0.117	0.005	0.153	
$R_{[-11,1]}$	0.099	−0.253	−0.022	0.259	
$R3_t$	0.214	−0.416	−0.052	0.434	
Earnings					
X_{t-1}	−0.007	−0.003	0.042	0.069	
X_t	0.008	−0.008	0.047	0.078	
$X3_t$	0.104	−0.045	0.147	0.288	
Panel B: LM model with abnormal forward-looking intensity					
$R = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X3_t + \alpha_4 R3_t + \alpha_5 AFLI_t + \alpha_6 AFLI_t \cdot X_{t-1} + \alpha_7 AFLI_t \cdot X_t + \alpha_8 AFLI_t \cdot X3_t + \alpha_9 AFLI_t \cdot R3_t + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t.$					
(2a)					
	Prefiling returns		Filing returns	Combined period returns	
	$R_{[-11,0]}$	$R_{[-3,0]}$	$R_{[0,1]}$	$R_{[-11,1]}$	$R_{[-3,1]}$
X_{t-1}	−0.592*** (−7.98)	−0.076*** (−7.96)	−0.015* (−1.91)	−0.629*** (−7.97)	−0.107*** (−9.25)
X_t	0.574*** (9.29)	0.006 (0.43)	−0.020** (−2.51)	0.554*** (10.37)	−0.022 (−1.30)
$X3_t$	0.224*** (12.84)	0.062*** (10.52)	0.024*** (8.73)	0.251*** (11.17)	0.084*** (11.78)
$R3_t$	−0.047*** (−6.70)	−0.011*** (−4.04)	−0.004*** (−3.36)	−0.051*** (−6.93)	−0.014*** (−5.94)
$AFLI_t$	−0.018 (−0.18)	0.054 (1.58)	−0.059* (−1.83)	−0.043 (−0.49)	0.005 (0.16)
$AFLI_t \cdot X_{t-1}$	0.502 (0.84)	−0.005 (−0.03)	−0.171 (−1.56)	0.612 (1.12)	−0.032 (−0.13)
$AFLI_t \cdot X_t$	0.612* (1.70)	−0.072 (−0.28)	−0.052 (−0.49)	0.246 (0.52)	−0.591** (−2.57)
$AFLI_t \cdot X3_t$	−0.881*** (−4.89)	−0.237*** (−4.46)	0.123*** (2.69)	−0.725*** (−4.25)	−0.091** (−1.98)
$AFLI_t \cdot R3_t$	0.174*** (2.67)	0.062*** (3.82)	0.032*** (2.81)	0.175*** (2.60)	0.111*** (6.97)
Adjusted R^2 (%)	21.2	7.8	2.7	21.1	8.3

help current stock returns incorporate information about one- to three-year-ahead earnings. When $R_{[-11,0]}$ is the dependent variable (column 1), the coefficient estimates for $X3_t$ and $AFLI_t \cdot X3_t$ are 0.224 (p -value = 0.00) and −0.881 (p -value = 0.00), respectively. The negative sign on $AFLI_t \cdot X3_t$ shows that companies with higher levels of abnormal forward-looking disclosures have prefiling returns that are less informative about future earnings. This translates to an annualized return impact of −0.40% ($= -0.881 \times 0.028 \times 0.147 \times (12/11)$)

and 0.37% ($= -0.881 \times (-0.026) \times 0.147 \times (12/11)$) for the third and first quartiles of $AFLI$, respectively, holding future earnings at its median. When $R_{[-3,0]}$ is the dependent variable (column 2), the coefficient estimate for $AFLI_t \cdot X3_t$ remains negative and significant. The annualized return impacts are −0.39% ($= -0.237 \times 0.028 \times 0.147 \times (12/3)$) and 0.36% ($= -0.237 \times (-0.026) \times 0.147 \times (12/3)$) for the third and first quartiles of $AFLI$, respectively. Similar annualized economic significances between the 11-month and 3-month prefiling windows

Table 3 (Continued)

Panel C: LM model with abnormal forward-looking sentences					
$R = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X3_t + \alpha_4 R3_t + \alpha_5 AFLS_t + \alpha_6 AFLS_t \cdot X_{t-1} + \alpha_7 AFLS_t \cdot X_t + \alpha_8 AFLS_t \cdot X3_t + \alpha_9 AFLS_t \cdot R3_t$ $+ \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t.$					
	Prefiling returns		Filing returns	Combined period returns	
	$R_{[-11,0]}$	$R_{[-3,0]}$	$R_{[0,1]}$	$R_{[-11,1]}$	$R_{[-3,1]}$
X_{t-1}	−0.589*** (−7.96)	−0.077*** (−7.74)	−0.015* (−1.92)	−0.632*** (−7.89)	−0.108*** (−8.87)
X_t	0.580*** (9.23)	0.005 (0.39)	−0.020** (−2.57)	0.556*** (10.21)	−0.026 (−1.42)
$X3_t$	0.218*** (13.25)	0.061*** (10.43)	0.025*** (8.93)	0.246*** (10.95)	0.082*** (12.08)
$R3_t$	−0.045*** (−6.23)	−0.010*** (−3.73)	−0.003*** (−2.92)	−0.050*** (−6.44)	−0.012*** (−5.28)
$AFLS_t$	−0.007 (−0.46)	0.004 (0.80)	−0.007* (−1.94)	−0.009 (−0.72)	−0.002 (−0.47)
$AFLS_t \cdot X_{t-1}$	0.084 (1.09)	0.015 (0.65)	−0.017 (−1.37)	0.041 (0.48)	0.007 (0.27)
$AFLS_t \cdot X_t$	0.043 (1.00)	−0.019 (−0.59)	−0.012 (−0.76)	0.000 (0.01)	−0.093*** (−2.69)
$AFLS_t \cdot X3_t$	−0.099*** (−3.76)	−0.026*** (−3.26)	0.021*** (3.54)	−0.062*** (−2.86)	−0.002 (−0.18)
$AFLS_t \cdot R3_t$	0.019** (1.97)	0.008*** (3.83)	0.003 (1.57)	0.017* (1.72)	0.012*** (5.21)
Adjusted R^2 (%)	87.1	7.8	2.7	88.6	8.1

Notes. Panel A reports descriptive statistics for raw and abnormal forward-looking MD&A disclosures, stock returns around 10-K filing dates, and earnings. Panel B reports estimates of the LM model of Equation (2a), where dependent variables are prefiling, filing, and combined buy-and-hold returns. The regression estimation excludes outliers, which are defined as observations with studentized residuals greater than 2. The numbers within parentheses show t -values after standard errors are clustered by firm and year. Panel C provides regression estimates for Equation (2b) that replaces abnormal forward-looking intensity $AFLI$ of Equation (2a) with abnormal forward-looking sentences $AFLS$. FLI is forward-looking intensity, defined as the number of forward-looking sentences in the MD&A section of the annual report divided by the total number of MD&A sentences. $AFLI$ is the residual forward-looking intensity, which is the residual of Equation (1a) tabulated in Table 2, panel B. FLS is the logarithm of 1 plus the number of forward-looking sentences in the MD&A section. $AFLS$ is the residual forward-looking sentences, which is the residual of Equation (1b) tabulated in Table 2, panel B. $R_{[-11,0]}$ is prefiling buy-and-hold stock returns for the period that begins 11 months before and ends two days before the 10-K filing dates; $R_{[-3,0]}$ is prefiling buy-and-hold stock returns for the period that begins three months before and ends two days before the 10-K filing dates; $R_{[0,1]}$ is filing buy-and-hold stock returns for the period that begins 1 day before and ends 30 days after the 10-K filing dates; $R_{[-11,1]}$ is combined period buy-and-hold stock returns for the period that begins 11 months before and ends 30 days after the 10-K filing dates; $R_{[-3,1]}$ is combined period buy-and-hold stock returns for the period that begins three months before and ends 30 days after the 10-K filing dates; X_{t-1} and X_t are income before extraordinary items for fiscal years $t - 1$ and t , respectively; and $X3_t$ is cumulative income before extraordinary items for fiscal years $t + 1$ to $t + 3$. X_{t-1} , X_t , and $X3_t$ are deflated by market value of equity at the start of the return measurement window for $R_{[-11,0]}$. X_{t-1} and X_t ($X3_t$) are Winsorized at -1 and $+1$ (-3 and $+3$). $R3_t$ is buy-and-hold returns for three years that begin one month after the 10-K filing.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

suggest that other company disclosures throughout the fiscal year such as 10-Q filings do not critically affect the inverse relationship between the prefiling information environment and companies' decisions to provide forward-looking disclosures in 10-K filings.

When $R_{[0,1]}$ is the dependent variable (column 3), the coefficients for $X3_t$ and $AFLI_t \cdot X3_t$ are 0.024 (p -value = 0.00) and 0.123 (p -value = 0.00), respectively. The positive sign on $AFLI_t \cdot X3_t$ indicates that higher levels of abnormal forward-looking disclosures convey information about future earnings to investors. The annualized return impacts are 0.61% ($= 0.123 \times 0.028 \times 0.147 \times 12$) and -0.56% ($= 0.123 \times (-0.026) \times 0.147 \times 12$) for the

third and first $AFLI$ quartiles, respectively, holding future earnings at its median.¹³

Comparing the average annualized return impacts between the prefiling and filing periods makes it appear as if abnormal forward-looking disclosures completely mitigate poor information environments. To investigate this further, we use combined period returns $R_{[-11,1]}$

¹³ In untabulated tests, we modify Equation (2a) by decomposing $X3_t$ into X_{t+1} , X_{t+2} , and X_{t+3} . When $R_{[0,1]}$ is the dependent variable, the coefficient for $AFLI \cdot X_{t+1}$ is positive and significant, whereas the coefficients for $AFLI \cdot X_{t+2}$ and $AFLI \cdot X_{t+3}$ are not significant. These findings suggest that MD&A disclosures provide more information about the near future than the later future.

as the dependent variable. The fourth column shows that the coefficient estimates for $X3_t$ and $AFLI_t \cdot X3_t$ are 0.251 (p -value = 0.00) and -0.725 (p -value = 0.00), respectively. The negative sign on $AFLI_t \cdot X3_t$ suggests that combined period stock returns of companies with higher levels of abnormal forward-looking disclosures are still less informative about future earnings. This translates to return impacts of -0.30% ($= -0.725 \times 0.028 \times 0.147$) and 0.28% ($= -0.725 \times (-0.026) \times 0.147$) for the third and first $AFLI$ quartiles, respectively. On an annualized basis, the improvement in the information environment is roughly 25% ($= 1 - [0.30 + 0.28]/[0.40 + 0.37]$). When $R_{[-3,1]}$ is the dependent variable (column 5), the coefficient estimate for $AFLI_t \cdot X3_t$ remains negative and significant.

Table 3, panel C reports results of estimating Equation (2b), which uses $AFLS$ instead of $AFLI$. The results are qualitatively similar to those in Table 3, panel B. The annualized return impacts in the 11-month pre-filing period for the third and first quartiles of $AFLS$ are -0.34% and 0.34% , respectively. Similarly, the return impacts in the filing period are 0.79% and -0.79% for the third and first quartiles, respectively; the return impacts in the combined period are -0.19% and 0.20% for the third and first quartiles, respectively. On an annualized basis, the improvement in information environment is roughly 43% ($= 1 - [0.20 + 0.19]/[0.34 + 0.34]$). The coefficient estimate for $AFLS_t \cdot X3_t$ remains negative and significant when pre-filing return $R_{[-3,0]}$ is used (column 2); it is insignificant when combined period return $R_{[-3,1]}$ is used (column 5). The findings with the short-term period suggest that forward-looking disclosures in 10-K filings mitigate poor information environments more strongly when the impact of other company filings made throughout the year is excluded.

Overall, the evidence in Table 3 suggests the following: Firms with higher abnormal forward-looking disclosures have poor pre-filing information environments. That is, pre-filing stock returns incorporate less information about future earnings. At the same time, forward-looking MD&A disclosures improve the ability of returns to reflect future earnings. However, this improvement does not fully mitigate poor information environments of firms with higher abnormal forward-looking disclosures.

4.2. Robustness

We perform a number of sensitivity tests to enhance the confidence in our findings. Table 3 shows that $AFLI$ and $AFLS$ are not normally distributed, potentially rendering regression estimates sensitive to outliers. To address this concern, we replace $AFLI$ ($AFLS$) with a dummy variable that is 1 if $AFLI$ ($AFLS$) is positive and 0 otherwise. Alternatively, we use a *quartile* rank variable based on $AFLI$ ($AFLS$). We also use a continuous rank variable based on $AFLI$ ($AFLS$) that

is scaled to range between 0 and 1. Equations (2a) and (2b) estimated using these alternative proxies produce findings similar to those reported in Table 3.

Previous literature shows that factors such as size, loss, earnings volatility, return volatility, book-to-market, and age affect earnings response coefficients. To the extent $AFLI$ and $AFLS$ are correlated with these factors, they may confound the interpretation of the reported coefficient estimates. We believe that this is not critical for our study because $AFLI$ and $AFLS$ are defined to be orthogonal to these factors. However, as a sensitivity test we modify Equation (2a) by adding interactions of each of these factors with the independent variables of Equation (2a). The coefficient estimates for the independent variables without the interactions are similar to the coefficient estimates in Table 3.

Our methodology of identifying abnormal forward-looking disclosures may not be well specified. To investigate, we modify Equation (2a) by adding predicted FLI and its interactions with X_{t-1} , X_t , $X3_t$, and $R3_t$. The inclusion of predicted FLI does not qualitatively alter the coefficient estimates for $AFLI$. Similarly, we modify Equation (2b) by adding year-to-year change in FLS and its interactions with X_{t-1} , X_t , $X3_t$, and $R3_t$. The inclusion of the change in FLS does not qualitatively alter the coefficient estimates for $AFLS$.

Equations (2a) and (2b) use the three-month window $[-3,0]$ to assess the pre-filing information environment after the third quarter 10-Q filing. Even though this window is appropriate, given that the average number of days between the third quarter 10-Q filing and the subsequent 10-K filing of the fiscal year is 120, it may still include third quarter 10-Q filings for some observations. As such, we conduct a sensitivity analysis using a more precise window that starts two days after the third quarter filing and ends two days prior to the 10-K filing. The results are similar to those reported in Table 3.¹⁴

We also examine whether forward-looking disclosures improve the information environment as measured by analyst forecasts (Hefflin et al. 2003). Empirically, we regress absolute forecast errors of one-year-ahead consensus forecasts on $AFLI$ and industry and year fixed effects at two points in time: (1) one day prior to the 10-K filing date and (2) one month after the 10-K filing date. Unreported results show that absolute forecast errors both before and after the 10-K filing dates are positively and significantly associated with $AFLI$. More importantly, the change in absolute forecast errors is negatively and significantly associated with $AFLI$. The findings are qualitatively similar when we replace consensus forecasts from the I/B/E/S summary

¹⁴ For 15% of the sample where 10-Q filing dates are not available, we use a pseudo 10-Q filing date of 120 days before the 10-K filing, which approximates the sample average.

file with either the most recent forecast or the average of recent forecasts issued in the last month prior to the 10-K filing date.

4.3. Relevance of Forward-Looking Disclosures Across Time and Firms

To gain a better understanding of the findings and examine how they agree with the extant literature, we partition the sample in two ways. The first is a time-series partition. We define a dummy variable *POST2000* that is 1 if the fiscal year of the 10-K filing is after 2000 and 0 otherwise. We modify Equation (2a) by including interactions of the independent variables with *POST2000* and estimate the following regression model:

$$\begin{aligned} R = & \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X3_t + \alpha_4 R3_t + \alpha_5 AFLI_t \\ & + \alpha_6 AFLI_t \cdot X_{t-1} + \alpha_7 AFLI_t \cdot X_t + \alpha_8 AFLI_t \cdot X3_t \\ & + \alpha_9 AFLI_t \cdot R3_t + \alpha_{10} POST2000_t \\ & + \alpha_{11} POST2000_t \cdot X_{t-1} + \alpha_{12} POST2000_t \cdot X_t \\ & + \alpha_{13} POST2000_t \cdot X3_t + \alpha_{14} POST2000_t \cdot R3_t \\ & + \alpha_{15} POST2000_t \cdot AFLI_t \\ & + \alpha_{16} POST2000_t \cdot AFLI_t \cdot X_{t-1} \\ & + \alpha_{17} POST2000_t \cdot AFLI_t \cdot X_t \\ & + \alpha_{18} POST2000_t \cdot AFLI_t \cdot X3_t \\ & + \alpha_{19} POST2000_t \cdot AFLI_t \cdot R3_t \\ & + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t. \end{aligned} \quad (3a)$$

Table 4, panel A reports coefficient estimates for $AFLI_t \cdot X3_t$ during the pre- and post-2000 periods and the difference between the coefficient estimates. When the dependent variable is $R_{[-11,0]}$ (column 1), we see that firms with higher levels of abnormal forward-looking disclosures have poor pre-filing information environments both pre- and post-2000. This relation is significantly stronger prior to 2000, suggesting a convergence in the pre-filing information environment and/or MD&A disclosure strategies after 2000. Similarly, when the dependent variable is $R_{[-3,0]}$ (column 2), we see that firms with higher levels of abnormal forward-looking disclosures have poor information environments only pre-2000. When the dependent variable is $R_{[0,1]}$ (column 3), we see that abnormal forward-looking disclosures are equally informative both pre- and post-2000. Consequently, when the dependent variable is $R_{[-11,1]}$ (column 4), abnormal forward-looking disclosures fully (partially) mitigate poor information environments in the post-2000 (pre-2000) period. These findings extend the insights of Brown and Tucker (2011), who document that changes in MD&A content are informative before 2000.

The second sample partition is based on performance. We define a dummy variable *PROFIT* that is 1 if the firm is profitable during the fiscal year and 0 otherwise.

We modify Equation (2a) by including interactions of the independent variables with *PROFIT* and estimate the following regression model:

$$\begin{aligned} R = & \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X3_t + \alpha_4 R3_t + \alpha_5 AFLI_t \\ & + \alpha_6 AFLI_t \cdot X_{t-1} + \alpha_7 AFLI_t \cdot X_t \\ & + \alpha_8 AFLI_t \cdot X3_t + \alpha_9 AFLI_t \cdot R3_t + \alpha_{10} PROFIT_t \\ & + \alpha_{11} PROFIT_t \cdot X_{t-1} + \alpha_{12} PROFIT_t \cdot X_t \\ & + \alpha_{13} PROFIT_t \cdot X3_t + \alpha_{14} PROFIT_t \cdot R3_t \\ & + \alpha_{15} PROFIT_t \cdot AFLI_t + \alpha_{16} PROFIT_t \cdot AFLI_t \cdot X_{t-1} \\ & + \alpha_{17} PROFIT_t \cdot AFLI_t \cdot X_t \\ & + \alpha_{18} PROFIT_t \cdot AFLI_t \cdot X3_t \\ & + \alpha_{19} PROFIT_t \cdot AFLI_t \cdot R3_t \\ & + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t. \end{aligned} \quad (3b)$$

Table 4, panel B reports coefficient estimates for $AFLI_t \cdot X3_t$ for the loss and profit subsamples and the difference between the coefficient estimates. All regressions that use pre-filing, filing, and combined period returns as dependent variables show that our findings are driven by loss firms. Loss firms provide more forward-looking disclosures because of their poor information environments and these disclosures appear to be more informative to investors. These findings extend the Schleicher et al. (2007) findings that stock returns in the United Kingdom anticipate next period's earnings changes more strongly when loss firms (and not profit firms) provide more earnings predictions in annual reports.

4.4. The Nature of Forward-Looking Disclosures and the Information Environment

We group forward-looking sentences based on whether they include business operations, finance, and accounting keywords, as described in the appendix. A sentence that includes keywords from two or three groups is labeled as belonging to all groups. The forward-looking intensity for each group is computed by dividing the number of sentences in the group by the number of MD&A sentences. Table 5, panel A shows that average operating, financial, and accounting forward-looking intensities ($FLI_{Operations}$, $FLI_{Financial}$, and $FLI_{Accounting}$) are 10.6%, 3.7%, and 1.1%, respectively.

We examine the differential effect of abnormal forward-looking disclosures of each group. We first estimate Equation (1a) independently using the intensity of each group and compute abnormal forward-looking disclosure intensities $AFLI_{Operations}$, $AFLI_{Financial}$, and $AFLI_{Accounting}$. These variables have respective means (medians) of 0.3% (−0.1%), 0.2% (−0.1%), and 0.1% (−0.1%). The untabulated correlations of *AFLI* with $AFLI_{Operations}$, $AFLI_{Financial}$, and $AFLI_{Accounting}$ are 89%, 58%, and 28%, respectively.

Table 4 Cross-Sectional Relevance of Forward-Looking Disclosures

Panel A: Relevance of forward-looking disclosures before and after 2000					
$R = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X_{3t} + \alpha_4 R_{3t} + \alpha_5 AFLI_t + \alpha_6 AFLI_t \cdot X_{t-1} + \alpha_7 AFLI_t \cdot X_t + \alpha_8 AFLI_t \cdot X_{3t} + \alpha_9 AFLI_t \cdot R_{3t} + \alpha_{10} POST2000_t + \alpha_{11} POST2000_t \cdot X_{t-1} + \alpha_{12} POST2000_t \cdot X_t + \alpha_{13} POST2000_t \cdot X_{3t} + \alpha_{14} POST2000_t \cdot R_{3t} + \alpha_{15} POST2000_t \cdot AFLI_t + \alpha_{16} POST2000_t \cdot AFLI_t \cdot X_{t-1} + \alpha_{17} POST2000_t \cdot AFLI_t \cdot X_t + \alpha_{18} POST2000_t \cdot AFLI_t \cdot X_{3t} + \alpha_{19} POST2000_t \cdot AFLI_t \cdot R_{3t} + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t. \quad (3a)$					
	Prefiling returns		Filing returns	Combined period returns	
	$R_{[-11,0]}$	$R_{[-3,0]}$	$R_{[0,1]}$	$R_{[-11,1]}$	$R_{[-3,1]}$
Pre-2000: $AFLI_t \cdot X_{3t}$	−1.367*** (−5.08)	−0.220*** (−2.79)	0.147** (2.24)	−1.217*** (−4.12)	−0.044 (−0.52)
Difference	1.024*** (3.06)	0.141 (1.27)	−0.022 (−0.27)	0.944*** (2.64)	0.089 (0.63)
Post-2000: $AFLI_t \cdot X_{3t}$	−0.342* (−1.69)	−0.080 (−1.12)	0.125** (2.52)	−0.273 (−1.35)	0.045 (0.43)
Panel B: Relevance of forward-looking disclosures for loss and profit firms					
$R = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X_{3t} + \alpha_4 R_{3t} + \alpha_5 AFLI_t + \alpha_6 AFLI_t \cdot X_{t-1} + \alpha_7 AFLI_t \cdot X_t + \alpha_8 AFLI_t \cdot X_{3t} + \alpha_9 AFLI_t \cdot R_{3t} + \alpha_{10} PROFIT_t + \alpha_{11} PROFIT_t \cdot X_{t-1} + \alpha_{12} PROFIT_t \cdot X_t + \alpha_{13} PROFIT_t \cdot X_{3t} + \alpha_{14} PROFIT_t \cdot R_{3t} + \alpha_{15} PROFIT_t \cdot AFLI_t + \alpha_{16} PROFIT_t \cdot AFLI_t \cdot X_{t-1} + \alpha_{17} PROFIT_t \cdot AFLI_t \cdot X_t + \alpha_{18} PROFIT_t \cdot AFLI_t \cdot X_{3t} + \alpha_{19} PROFIT_t \cdot AFLI_t \cdot R_{3t} + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t. \quad (3b)$					
	Prefiling returns		Filing returns	Combined period returns	
	$R_{[-11,0]}$	$R_{[-3,0]}$	$R_{[0,1]}$	$R_{[-11,1]}$	$R_{[-3,1]}$
Loss: $AFLI_t \cdot X_{3t}$	−1.385*** (−4.73)	−0.437*** (−4.63)	0.127** (2.06)	−1.516*** (−5.16)	−0.312*** (−4.20)
Difference	1.007*** (2.93)	0.414*** (3.22)	−0.027 (−0.35)	1.184*** (3.06)	0.480*** (3.70)
Profit: $AFLI_t \cdot X_{3t}$	−0.379 (−1.49)	−0.023 (−0.44)	0.100 (1.43)	−0.332 (−1.22)	0.168 (1.95)

Notes. Panel A reports regression estimates for a modified version of the LM model of Equation (3a), where independent variables are interacted with *POST2000*. Panel B reports estimates for a modified version of the LM model of Equation (3b), where independent variables are interacted with *PROFIT*. For brevity, both panels present only the coefficient estimates for $AFLI_t \cdot X_{3t}$, when the interaction variables (*POST2000* or *PROFIT*) are 0 or 1. In both panels, dependent variables are prefiling, filing, and combined period buy-and-hold returns. The regression estimations in both panels exclude outliers, which are defined as observations with studentized residuals greater than 2. The numbers within parentheses show *t*-values after standard errors are clustered by firm and year. *POST2000* is a dummy variable that is 1 if the fiscal year of the 10-K filing is greater than 2000 and 0 otherwise. *PROFIT* is a dummy variable that is 1 if the firm is profitable during fiscal year of the 10-K filing and 0 otherwise. *FLI* is forward-looking intensity, defined as the number of forward-looking sentences in the MD&A section of the annual report divided by the total number of MD&A sentences. *AFLI* is the residual forward-looking intensity, which is the residual of Equation (1a) tabulated in Table 2, panel B. $R_{[-11,0]}$ is prefiling buy-and-hold stock returns for the period that begins 11 months before and ends two days before the 10-K filing dates; $R_{[-3,0]}$ is prefiling buy-and-hold stock returns for the period that begins three months before and ends two days before the 10-K filing dates; $R_{[0,1]}$ is filing buy-and-hold stock returns for the period that begins 1 day before and ends 30 days after the 10-K filing date; $R_{[-11,1]}$ is combined period buy-and-hold stock returns for the period that begins 11 months before and ends 30 days after the 10-K filing dates; $R_{[-3,1]}$ is combined period buy-and-hold stock returns for the period that begins three months before and ends 30 days after the 10-K filing dates; X_{t-1} and X_t are income before extraordinary items for fiscal years $t-1$ and t , respectively; and X_{3t} is cumulative income before extraordinary items for fiscal years $t+1$ to $t+3$. X_{t-1} , X_t , and X_{3t} are deflated by market value of equity at the start of the return measurement window for $R_{[-11,0]}$. X_{t-1} and X_t (X_{3t}) are Winsorized at -1 and $+1$ (-3 and $+3$). R_{3t} is buy-and-hold returns for three years that begin one month after the 10-K filing.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

We then estimate a modified version of Equation (2a) that replaces *AFLI* with *AFLI_Operations*, *AFLI_Financial*, and *AFLI_Accounting*:

$$\begin{aligned}
 R = & \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X_{3t} + \alpha_4 R_{3t} \\
 & + \alpha_5 AFLI_Operations_t + \alpha_6 AFLI_Operations_t \cdot X_{t-1} \\
 & + \alpha_7 AFLI_Operations_t \cdot X_t \\
 & + \alpha_8 AFLI_Operations_t \cdot X_{3t} \\
 & + \alpha_9 AFLI_Operations_t \cdot R_{3t} + \alpha_{10} AFLI_Financial_t \\
 & + \alpha_{11} AFLI_Financial_t \cdot X_{t-1} \\
 & + \alpha_{12} AFLI_Financial_t \cdot X_t \\
 & + \alpha_{13} AFLI_Financial_t \cdot X_{3t} \\
 & + \alpha_{14} AFLI_Financial_t \cdot R_{3t} \\
 & + \alpha_{15} AFLI_Accounting_t \\
 & + \alpha_{16} AFLI_Accounting_t \cdot X_{t-1} \\
 & + \alpha_{17} AFLI_Accounting_t \cdot X_t \\
 & + \alpha_{18} AFLI_Accounting_t \cdot X_{3t} \\
 & + \alpha_{19} AFLI_Accounting_t \cdot R_{3t} \\
 & + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t. \quad (4)
 \end{aligned}$$

Table 5 What Nature of Forward-Looking Disclosures Helps Bring the Future Forward?

Panel A: Descriptive statistics for the nature of forward-looking disclosures ($N = 36,043$)

Variable	Mean	Q1	Q2	Q3
<i>FLI_Operations</i>	0.106	0.067	0.101	0.140
<i>FLI_Financial</i>	0.037	0.023	0.034	0.048
<i>FLI_Accounting</i>	0.011	0.002	0.008	0.016
<i>AFLI_Operations</i>	0.003	−0.026	−0.001	0.028
<i>AFLI_Financial</i>	0.002	−0.011	−0.001	0.012
<i>AFLI_Accounting</i>	0.001	−0.005	−0.001	0.005

Panel B: LM model with nature of forward-looking disclosures

$$R = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_t + \alpha_3 X_{t+1} + \alpha_4 R_{3,t} + \alpha_5 AFLI_Operations_t + \alpha_6 AFLI_Operations_t \cdot X_{t-1} + \alpha_7 AFLI_Operations_t \cdot X_t + \alpha_8 AFLI_Operations_t \cdot X_{t+1} + \alpha_9 AFLI_Operations_t \cdot R_{3,t} + \alpha_{10} AFLI_Financial_t + \alpha_{11} AFLI_Financial_t \cdot X_{t-1} + \alpha_{12} AFLI_Financial_t \cdot X_t + \alpha_{13} AFLI_Financial_t \cdot X_{t+1} + \alpha_{14} AFLI_Financial_t \cdot R_{3,t} + \alpha_{15} AFLI_Accounting_t + \alpha_{16} AFLI_Accounting_t \cdot X_{t-1} + \alpha_{17} AFLI_Accounting_t \cdot X_t + \alpha_{18} AFLI_Accounting_t \cdot X_{t+1} + \alpha_{19} AFLI_Accounting_t \cdot R_{3,t} + \sum \theta Industry + \sum \lambda Year_t + \varepsilon_t.$$

	Prefiling returns		Filing returns	Combined period returns	
	$R_{[-11, 0]}$	$R_{[-3, 0]}$	$R_{[0, 1]}$	$R_{[-11, 1]}$	$R_{[-3, 1]}$
$X_{3,t}$	0.221*** (10.53)	0.064*** (10.20)	0.024*** (7.59)	0.247*** (10.55)	0.082*** (10.48)
$AFLI_Operations_t$	−0.171 (−1.48)	0.040 (0.74)	−0.049 (−1.62)	−0.170 (−1.52)	0.006 (0.13)
$AFLI_Operations_t \cdot X_{3,t}$	−0.804*** (−3.11)	−0.306*** (−3.35)	0.102** (2.01)	−0.749*** (−2.83)	−0.179 (−1.59)
$AFLI_Financial_t$	0.477* (1.70)	0.143 (1.54)	0.005 (0.13)	0.543** (2.02)	0.199** (2.14)
$AFLI_Financial_t \cdot X_{3,t}$	−0.942*** (−2.78)	0.031 (0.26)	0.018 (0.23)	−1.278*** (−4.73)	0.062 (0.56)
$AFLI_Accounting_t$	−0.028 (−0.08)	−0.276 (−1.42)	−0.087 (−0.94)	−0.256 (−0.80)	−0.464*** (−2.79)
$AFLI_Accounting_t \cdot X_{3,t}$	2.615*** (3.34)	0.735*** (2.79)	0.101 (0.50)	3.405*** (4.68)	0.454 (1.01)
Adjusted R^2 (%)	20.0	7.0	2.6	20.1	7.2

Notes. Panel A reports descriptive statistics for the intensity of three types of forward-looking disclosures in the MD&A section of 10-K filings: forward-looking intensity of operations (*FLI_Operations*), financial (*FLI_Financial*), and accounting (*FLI_Accounting*) disclosures, as well as their abnormal levels, i.e., *AFLI_Operations*, *AFLI_Financial*, and *AFLI_Accounting*. Panel B reports regression estimates for a modified version of the LM model Equation (4), where independent variables include *AFLI_Operations*, *AFLI_Financial*, and *AFLI_Accounting* and their interactions with past, current, and future earnings as well as future returns. The dependent variables are prefiling, filing, and combined buy-and-hold returns. The regression output includes coefficient estimates and their significance after excluding outliers, which are defined as observations with studentized residuals greater than two. The numbers within parentheses show t -values after standard errors are clustered by firm and year. *FLI_Operations* is the number of operations-related forward-looking sentences in the MD&A section divided by the number of MD&A sentences. *FLI_Financial* is the number of finance-related forward-looking sentences in the MD&A section divided by the number of MD&A sentences. *FLI_Accounting* is the number of accounting-related forward-looking sentences in the MD&A section divided by the number of MD&A sentences. The appendix lists operations, financial, and accounting keywords. $R_{[-11,0]}$ is prefiling buy-and-hold stock returns for the period that begins 11 months before and ends two days before the 10-K filing dates; $R_{[-3,0]}$ is prefiling buy-and-hold stock returns for the period that begins three months before and ends two days before the 10-K filing dates; $R_{[0,1]}$ is filing buy-and-hold stock returns for the period that begins 1 day before and ends 30 days after the 10-K filing dates; $R_{[-11,1]}$ is combined period buy-and-hold stock returns for the period that begins 11 months before and ends 30 days after the 10-K filing dates; $R_{[-3,1]}$ is combined period buy-and-hold stock returns for the period that begins three months before and ends 30 days after the 10-K filing dates; X_{t-1} and X_t are income before extraordinary items for fiscal years $t - 1$ and t , respectively; $X_{3,t}$ is cumulative income before extraordinary items for fiscal years $t + 1$ to $t + 3$. X_{t-1} , X_t , and $X_{3,t}$ are deflated by market value of equity at the start of the return measurement window for $R_{[-11,0]}$. X_{t-1} and X_t ($X_{3,t}$) are Winsorized at -1 and $+1$ (-3 and $+3$). $R_{3,t}$ is buy-and-hold returns for three years that begin one month after the 10-K filing.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 4, panel B reports results of estimating Equation (4). The coefficient estimates for $AFLI_Operations_t \cdot X_{3,t}$ are negative, positive, and negative (all statistically significant) for prefiling, filing, and combined periods, respectively. Firms with poor information environments

provide more *operations-related* forward-looking disclosures, and these disclosures improve the information environment, but not fully. The coefficient estimates for $AFLI_Financial_t \cdot X_{3,t}$ are negative and significant, insignificant, and negative and significant for prefiling,

filing, and combined periods, respectively. Firms with poor information environments provide more *finance-related* forward-looking disclosures, but these disclosures do not improve the information environment. The coefficient estimates for $AFLI_Accounting_t \cdot X3_t$ are positive and significant, insignificant, and positive and significant for prefiling, filing, and combined periods, respectively. Firms with rich information environments provide more *accounting-related* forward-looking disclosures, and these disclosures do not improve the information environment. In sum, our results are driven by operations-related disclosures. Finance- and accounting-related disclosures do not, on average, improve the information environment. This finding is in line with Hussainey et al. (2003), who show that earnings-related forward-looking disclosures, but not broader forward-looking disclosures, help investors to predict future earnings changes more accurately in a sample of UK annual reports.

In additional analyses on the nature of forward-looking disclosures, we distinguish between short- and long-horizon keywords that accompany forward-looking sentences. Short-horizon keywords are numerical references to the year ahead of the fiscal year as well as the following keywords: “short term,” “month(s),” “current fiscal/quarter/year/month/period,” “following fiscal/quarter/month/period,” “coming fiscal/quarter/month/period,” “next fiscal/quarter/month/period,” and “subsequent fiscal/quarter/month/period.” Long-horizon keywords are numerical references to further than one year ahead of the fiscal year as well as the following keywords: “2 (two) years” to “20 (twenty) years,” “century,” “decade,” “foreseeable future,” “long term,” and “coming/following/next/subsequent year(s).” We independently rank observations between 0 and 1 based on their count of short- and long-horizon keywords. We then estimate a modified version of Equation (2a) that replaces *AFLI* with the short-horizon keyword rank and long-horizon keyword rank. Untabulated results show that the coefficient estimates for the short-horizon keyword rank are significant and have the same signs as those of *AFLI*, whereas the coefficient estimates for the long-horizon keyword rank are largely insignificant. We conclude that short-horizon disclosures are more effective than long-horizon disclosures in bringing the future forward.

5. Conclusion

In this paper, we examine the association between the firms’ information environment and forward-looking MD&A disclosures using all 10-Ks filed with the SEC between fiscal years 1993 and 2009. We document three major findings. First, firms that make more abnormal forward-looking MD&A disclosures have prefil-

ing stock returns that less strongly reflect future earnings information. This suggests that firms with more forward-looking disclosures have poor information environments before the 10-K filing. Second, firms that make more abnormal forward-looking MD&A disclosures have filing stock returns that more strongly reflect future earnings information. This suggests that forward-looking disclosures are associated with improved information environments. Third, firms that make more abnormal forward-looking MD&A disclosures have combined prefil- and filing stock returns that less strongly reflect future earnings information. This suggests that forward-looking disclosures appear to mitigate poor information environments, but not completely. From a cross-sectional perspective, these findings are driven by disclosures among loss firms. Also, our findings are driven by operations-related forward-looking disclosures rather than by finance- or accounting-related forward-looking sentences. Overall, our results support the SEC’s calls for greater prospective MD&A disclosures by suggesting that more forward-looking MD&A disclosures help improve the information environment.

We note the following limitations in our study. First, our evidence does not explain why firms choose this particular channel of communication as opposed to other channels. Second, similar to other studies that use computer-intensive techniques, our study is a joint test of the appropriateness of the measure and our hypotheses. Although we have included veracity checks on the measures, the validity of the empirical evidence relies on the reliability of our measures. Third, 10-K filings provide a host of other information. Our inferences may be inappropriate if other information in the 10-K filings correlates with abnormal forward-looking disclosure levels despite our controls for firm characteristics. Finally, our empirical tests are primarily tests of association. For this reason, it is difficult to infer causality. In particular, it is difficult to conclude that forward-looking disclosures in the MD&A *caused* the documented improvement in the information environment after the 10-K filing.

Supplemental Material

Supplemental material to this paper is available at <http://dx.doi.org/10.1287/mnsc.2014.1921>.

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Appendix. Identifying Forward-Looking Disclosures

Step 1: Obtaining 10-K Filings

We downloaded 10-K filings (annual reports) for fiscal years between 1993 and 2009 from the SEC EDGAR database. Prior to 2002, companies made 10-K filings in the ASCII-code text format. After 2002, companies make 10-K filings in various formats such as text, html, or pdf. Since our Perl code handles ASCII-code text files most accurately, we supplement our post-2002 sample with annual reports obtained from the 10-K Wizard database in rich text format. To obtain financial data, we match the code “CIK” in EDGAR with “GVKEY” in the Wharton Research Data Services.¹⁵

Step 2: Extracting the MD&A Sections from the 10-K Filings

For each 10-K filing, we extract the management’s discussion and analysis section using the following two iterations.

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 code keeps searching for another pair.

We impose the 60-line restriction because in our audit of a sample of 100 10-K filings, we found that in some occasions the Perl code extracted the “Table of Contents” or only the executive summary of the MD&A section.¹⁶ The first iteration extracts MD&A sections for 89% of the 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” is missing. For these observations, we use a second iteration.

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)atement of C(c)ash F(f)lows” with tabs or spaces between the words, or “C(c)onsolidated S(s)atement 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.

¹⁵ Li (2010) considers MD&A disclosures from both 10-Q and 10-K filings. We restrict our sample to 10-K filings because our reading of forward-looking statements indicates that such statements in 10-K filings are more comprehensive both qualitatively and quantitatively than those in 10-Q filings, attesting to the importance accorded to 10-Ks by regulatory authorities. Furthermore, the annual reporting frequency is a more suitable frequency for the Lundholm and Myers (2002) tests. As such, our results and conclusions relate only to the MD&A disclosures in 10-K filings.

¹⁶ 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 disclosures with fewer than 60 lines. However, such 10-K filings with very short or nonexistent MD&A sections are atypical.

The second iteration keeps the 60-line requirement between the starting and ending phrases. The second iteration extracts MD&A sections for an additional 4% 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 (7% of the sample). A perusal of some of these annual reports shows that their MD&A content is 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 section as *forward looking* using three searches:

- (1) The first search tags an MD&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” (e.g., “This will result in the Company expensing \$13,043 in fiscal 2006, which would previously have been presented in a proforma footnote disclosure”¹⁷).

Sentences with keywords “shall,” “should,” “can,” “could,” “may,” or “might” are not tagged as forward looking even though they may imply the future. The reason is that these keywords are frequently associated with legal language and uninformative boilerplate disclosures that do not have any real forward-looking connotations. Our excluding such boilerplate language from being classified as forward looking is consistent with the SEC’s criticism that firms often provide noninformative boilerplate disclosures and immaterial information in their MD&A (SEC 2003, Li 2010).

- (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 conjugations (“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,” and “also expects.” As in the first search, the use of such an extensive list of conjugations, versus a simple keyword search of verbs, reduces the likelihood of erroneously capturing noun forms of some verbs that have no forward-looking connotation (particularly those of “plan,” “project,” and “estimate”) (e.g., “In addition, our pharmacy

¹⁷ CostCo Wholesale Corporation FY 2005 annual report.

departments accept payments for prescription drugs through our customers' health benefit plans"¹⁸).

(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 2001). 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 (e.g., "\$," "%," ",") disqualifies the number from being tagged as year.

We check the validity of the Perl methodology by asking MBA students to identify forward-looking sentences in 50 randomly selected MD&A disclosures. The sentences identified by the MBA students and the Perl methodology largely overlap. More importantly, the level of disparities between the two outputs does not appear to be correlated with firm characteristics such as total assets, sales, and book-to-market ratio. We conclude that the Perl code is well specified and powerful, and potential measurement errors are unlikely to change our results.

Step 4: Analyzing the Nature of Forward-Looking Disclosures

A forward-looking sentence is identified as *operations 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" (e.g., "Such purchase obligations are based on anticipated sales to specific customers through March 31, 2005"¹⁹);
- "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," "unit," "power," "compete," "competitive," "demand," "supply," "market," "business," "segment," "subsidy," "industry," "license," "patent," "outsource," and "promotion" (e.g., "The year-end 1998 backlog consisted of orders most of which will be delivered in 1999, but only about 40% of such backlog is expected to be shipped in the first quarter of 1999"²⁰);
- "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" (e.g., "Our joint venture with Nufarm, which

will market Butoxone[®] to increase our market share of the peanut, soybean and alfalfa herbicide commenced operations in April 2004"²¹);

- "compensation," "salary," "bonus," "grant," "award," "pension," "retirement," "health care," "employee," "labor," "union," "director," "chairman," "president," "director," "CEO," "CFO," "COO," "CIO," "manager," "executive," and "worker" (e.g., "Additionally, the Company expects to make \$31.1 million in cash contributions to its defined benefit pension plans during 2005, including a \$9.4 million discretionary payment"²²);

- "economic," "world," "country," "population," "environment," "government," and "inflation" (e.g., "The long end of the curve saw another year of consumer inflation below 3% and with mixed economic signals and slower growth the outlook is for lower inflation in the future"²³).

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" (e.g., "The balance of the debt, principally the (pound) 200 million notes and the \$150 million notes, cannot be paid until maturity in 2010 and 2013, respectively"²⁴).

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" (e.g., "Absent this acceleration, we estimate we would have recognized approximately \$5.4 million as compensation expense for these vested options under FAS 123(R) beginning January 1, 2006 through December 31, 2009"²⁵).

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²¹ See Footnote 19.

²² Harsco Corporation FY 2004 annual report.

²³ United Security Bancshares Inc. FY 1995 annual report.

²⁴ See Footnote 22.

²⁵ Quality Distribution Inc. 2005 annual report.

¹⁸ Wal-Mart Stores, Inc., FY 2005 annual report.

¹⁹ Aceto Corporation FY 2004 annual report.

²⁰ K-Tron International Inc. FY 1998 annual report.

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