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Carrot or Stick?
The Shift from Voluntary to Mandatory Disclosure of Risk Factors

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Abstract: This study investigates risk factor disclosures under the voluntary, incentive-based disclosure regime provided by the safe harbor provision of the Private Securities Litigation Reform Act and the SEC's subsequent disclosure mandate. Firms subject to greater litigation risk disclose more risk factors, update the language more from year-to-year, and use more readable language than firms with lower litigation risk. These differences in the quality of disclosure are pronounced in the voluntary disclosure regime, but converge following the SEC mandate. Consistent with these findings, the risk factor disclosures of high litigation risk firms are significantly more informative about systematic and idiosyncratic firm risk when disclosure is voluntary but not when disclosure is mandated. Overall, the results suggest that for some firms voluntary disclosure of risk factors is not a substitute for a regulatory mandate.

Keywords: risk factors; disclosure regulation; litigation risk; information content.

Data Availability: All data are available from public sources.

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1. Introduction

Theories of voluntary disclosure emphasize that managers generally are eager to share their firms' positive outlook, but they may be less forthcoming with bad news. Empirical evidence supports this proposition; for example, Kothari et al. (2009) finds that managers delay the release of bad news to investors. What about the *potential* for bad news? Investors assessing the value of a firm's securities are interested in the likelihood of both good and bad outcomes in forecasting the firm's future cash flows. In the extreme, positive projections could be rendered misleading by the omission of potential risks that might thwart the firm's plans and aspirations.

This paper examines public companies' disclosure of risk factors that are meant to inform investors about risks and uncertainties. In 1995, Congress created a legal incentive to disclose risk factors as part of the Private Securities Litigation Reform Act (PSLRA). The PSLRA's safe harbor provision shields firms from liability for forward-looking statements provided they are accompanied by "meaningful cautionary statements identifying important factors that could cause actual results to differ materially from those in the forward looking statement." The voluntary disclosure of risk factors provides a direct means for firms to reduce the often substantial expected costs of securities fraud class actions. Thus, the safe harbor provides an important incentive for public companies to disclose risk factors, but that incentive is likely to vary with firms' perception of their potential vulnerability to securities class actions.

Risk factor disclosure shifted from a voluntary, incentive-based regime to a mandatory one in 2005 when the SEC added Item 1A to Form 10-K, requiring most public companies to disclose risk factors annually and update them quarterly as necessary in Form 10-Q. In adopting the new rule, the SEC acknowledged that some issuers had already been disclosing risk factors to take advantage of the PSLRA's safe harbor.

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We study how these two changes in the law affect the disclosure of risk factors. We conjecture that litigation risk plays an important role in firms' disclosure practices, particularly during the voluntary disclosure period from 1996 to 2005. Further, we expect that the SEC's 2005 disclosure mandate will narrow, but not necessarily close, the gap between firms with a litigation–related incentive to provide risk factor disclosure and those compelled to disclose because of the mandate. Finally, we expect that differences in the quality of the disclosure are likely to affect its usefulness to investors in assessing firm risk.

To conduct our analyses, we construct a sample of firms with high ex-ante risk of being sued in a securities fraud class action and a sample with low ex-ante risk of being sued. We examine risk factors disclosed by these firms in annual reports filed with the SEC from 1996-2010 using three metrics designed to capture characteristics of "meaningful" disclosure suggested by the PSLRA's legislative history, subsequent court decisions, and the SEC: (i) the amount of risk factor disclosure, measured with the number of words; (ii) the extent to which the risk factors are updated year-to-year, measured with the Resemblance score of text similarity; and (iii) the readability of the risk factors, measured using the Fog index of text complexity. All else equal, risk factor disclosure is more "meaningful" if it is comprehensive, if it is not a boilerplate copy from the prior year, and if it can be understood by the average investor.

We use these disclosure metrics to investigate whether firms at greater risk of securities fraud lawsuits provide more "meaningful" risk factor disclosure, and how the SEC's 2005 mandate affects this disclosure. Controlling for other factors that could affect the disclosure decision, we find that, on average, firms with greater litigation risk provide more risk factor disclosure, revise their disclosure more from year-to-year, and use more readable language than firms with low litigation risk. When we allow these effects to vary with the disclosure regime,

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we find significant differences in disclosure between high and low risk firms in the voluntary regime. After the SEC mandate in 2005, however, firms with low litigation risk increase the amount of risk factor disclosure, revise it more extensively each year, and use more readable language, thus leading to more similar disclosure across the two groups of firms.

Our conclusion is that the SEC's mandate had a material effect on the disclosure decisions of companies that had relatively little incentive to provide meaningful disclosure under the PSLRA's safe harbor provision alone. This is not to say, however, that litigation-related disclosure incentives have no role to play in the mandatory disclosure regime. We find that firms with high litigation risk continue to provide a significantly greater amount of risk factor disclosure in the mandatory regime. Moreover, in both disclosure regimes, high risk firms disclose significantly more risk factor information as litigation risk increases.

We also find evidence that risk factor disclosures provide information useful to investors in assessing future firm risk, although here again the findings vary predictably with firms' disclosure incentives and the disclosure regime. For firms with high litigation risk and hence greater incentive to provide meaningful disclosure, one-year-ahead beta and stock return volatility are increasing in the unexpected portion of risk factor disclosure. Moreover, in the voluntary disclosure regime, firms with high litigation risk provide risk factor disclosures that are significantly more informative about systematic and idiosyncratic risk than firms with low litigation risk. Subsequent to the SEC mandate, however, there is no statistical difference, consistent with a convergence in the meaningfulness of risk factor disclosures.

Overall, our findings are consistent with managers responding to high ex ante litigation risk with risk factor disclosures designed to reduce the expected costs of litigation. In contrast, low risk firms perceiving little net benefit to disclosure did not provide meaningful risk factor

disclosure until compelled to do so by the SEC. Understanding risk factor disclosures is important to managers and legal counsel responsible for formulating a disclosure strategy, to regulators and courts charged with evaluating the quality of these disclosures, and to investors interested in assessing the risks posed by firms.

We proceed as follows. Section 2 provides institutional background on the evolution of risk factor disclosures in regulatory filings. Section 3 surveys related research. Section 4 develops our hypotheses. Section 5 describes our research design, and Section 6 presents the results of our empirical tests. Section 7 concludes.

2. Evolution of Risk Factor Disclosures

For many years, risk factors were disclosed primarily by domestic companies registering public offerings on Form S-1 and foreign private issuers on Form 20-F annual reports. Over the past two decades, two regulatory changes progressively broadened the set of firms disclosing risk factors. The first, the enactment of the PSLRA in December 1995, provided an incentive to voluntarily disclose risk factors for firms wishing to avail themselves of its statutory safe harbor for forward-looking statements.[1] Ten years later in December 2005, the SEC approved a rule mandating disclosure of risk factors in periodic filings. This section discusses the regulatory background and requirements of these two rule changes affecting risk factor disclosures.

2.1 PSLRA Safe Harbor and the Voluntary Disclosure of Risk Factors

In enacting the PSLRA, Congress expressed concern that securities class actions were discouraging managers from providing forward-looking information to investors. The PSLRA addresses that issue by creating a statutory safe harbor protecting written or oral statements that are identified as forward-looking and "accompanied by meaningful cautionary statements

[1] Although the SEC adopted a limited safe harbor for forward-looking disclosures in 1979, its reach is narrow, providing very limited protection against liability.

identifying important factors that could cause actual results to differ materially from those in the forward looking statement."[2] The phrase "accompanied by" has been interpreted loosely by the courts, allowing firms to invoke the safe harbor by including language regarding risk factors in their periodic filings with the SEC and incorporating that disclosure by reference in subsequent communications containing forward-looking statements.[3]

The statute does not explicitly define, however, what constitutes a "meaningful" cautionary statement, although legislative history and court decisions provide some insights. In particular, the Conference Report (1995) states that "cautionary statements must convey substantive information about factors that realistically could cause results to differ materially from those projected in the forward-looking statements." Thus, courts have concluded that a "cursory" discussion of risk factors will not invoke the protections of the safe harbor.[4]

The Conference Report (1995) also states that "boilerplate warnings will not suffice." For the discussion of risk factors to be meaningful, it must change as the firm's circumstances change. Accordingly, courts have ruled that when a firm's "cautionary language remained fixed even as the risks changed," it was insufficient to warrant the protection of the safe harbor.[5] Finally, courts have ruled that cautionary risk factor statements will not satisfy the safe harbor's requirements if they are "too cryptic to be meaningful to the average investor."[6] Taken together, the prescriptions found in the PSLRA's legislative history and court decisions suggest that cautionary statements regarding risk factors should be thorough, should not cut and paste

[2] See Johnson et al. (2000; 2001) for additional discussion of the PSLRA's legislative history and the safe harbor.
[3] For example, firms will often reference the risk factors discussed in their securities filings in their corporate press releases or investor conference calls.
[4] See, for example, Helwig v. Vencor, Inc., 251 F.3d 540, 559 (6th Cir. 2001) and Yanek v. Staar Surgical Co., 388 F.Supp.2d 1110, 1123 (C.D. Cal. 2005). The statute does not, however, require a firm to disclose *all* risk factors that could cause future results to differ from those projected, or *the* particular risk factor that ultimately causes the forward-looking statement to be in error. See Conference Report (1995) and Harris v. IVAX, Corp., 182 F.3d 799, 807 (11th Cir. 1999).
[5] Asher v. Baxter International, Inc. 377 F.3d 727 (7th Cir. 2004).
[6] In re Nike, Inc. Sec. Litig., 181 F.Supp.2d 1160, 1172 (D. Or.2002).

boilerplate language from the preceding year, and should be written in language easily understood by the average investor.

2.2 SEC Risk Factor Disclosure Mandate

In 2005, the SEC streamlined considerably the public offering process under the Securities Act of 1933 (SEC 2005). In addition to these changes, the SEC also imposed several new disclosure requirements on public companies pursuant to the Exchange Act. Notable for our purposes is a new requirement that most public companies disclose the most significant factors that may adversely affect the issuer's business, operations, industry, financial position, or its future financial performance. The risk factors are required to be presented in Item 1A of Form 10-K and must be updated quarterly in the 10-Q to reflect material changes from previously disclosed risks.[7]

The SEC rule does not require particular risk factors be disclosed. Instead, it notes that disclosures should be clearly written in everyday language investors can read and understand, in accordance with the SEC's plain English standards, and should avoid "boilerplate" discussion of risks that could affect any issuer. Consistent with these prescriptions, the SEC has called on companies to provide more information on the risks they face and to avoid "copying and pasting" from earlier filings (Johnson 2010). Thus, as under the PSLRA, risk factor disclosures should be thorough, updated year-to-year, and readable. In our research design discussed below, we develop measures to capture these three facets of risk factor disclosures.

[7] Smaller reporting companies and asset-backed issuers are excluded from the disclosure requirement are. At the time the SEC implemented securities offering reform, small public companies were allowed to follow the reduced disclosure requirements of Regulation S-B. The Smaller Reporting Company rule, adopted by the SEC effective February 4, 2008, consolidated Regulation S-B into Regulation S-K and effectively expanded the number of smaller companies eligible to follow the reduced disclosure requirements. Firms identifying themselves as "smaller reporting companies" may adopt reduced disclosure requirements on an item-by-item basis, including the option to forego Item 1A risk factor disclosures.

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3. Related Research

This paper contributes to our understanding of how law and regulation shape managers' response to disclosure incentives and mandates. In particular, we contribute to three inter-related streams of literature regarding: (1) voluntary versus mandatory disclosure; (2) risk disclosures; and (3) the link between disclosure and litigation risk.

3.1 Voluntary versus Mandatory Disclosure

The earliest work on disclosure regulation examines the market reaction to the passage of the Securities Act of 1933, which allows the SEC to mandate disclosure in public offerings. Stigler (1964) and Jarrell (1981) find no evidence that securities offered after the Securities Act provide investors with greater returns, although they do find that post-legislation offerings demonstrate less variance. Less variance may be evidence that investors are better able to assess risk with mandatory disclosure, or it may simply reflect riskier offerings moving to private placements (Benston, 1969; Jarrell, 1981; Simon, 1989).

Other work examines the extension of mandatory disclosure requirements to new segments of the capital markets. Ferrell (2003) investigates the effect of the 1964 extension of periodic disclosures required under the Exchange Act to the over-the-counter market. He finds that the changes are associated with a significant reduction in volatility for the affected securities. Greenstone et al. (2006) shows positive abnormal stock returns and an increase in operating performance for firms brought in to the disclosure regime by the 1964 amendments. Related to this work, Bushee and Leuz (2005) finds that the extension of the Exchange Act disclosure requirements to the OTC-Bulletin Board in 1999 results in positive abnormal returns for OTC-BB firms already subject to the disclosure requirements, suggesting externality effects from disclosure. However, they also find that the imposition of SEC disclosure requirements

forced a large number of firms into the less regulated Pink Sheets. Moreover, the OTC firms that chose to comply with the new disclosure requirements to continue trading on the OTC-BB experienced, on average, negative abnormal returns.

Although most research examines the imposition of mandatory disclosure requirements, Cheng et al. (2013) examines the SEC's 2008 decision to exempt companies under $75 million in market capitalization from certain disclosure requirements. They find that firms choosing to voluntarily continue such disclosures after the regulatory change nonetheless experience a drop in liquidity, although the decline is not as great as it is for firms that stop disclosing. They interpret their results as supporting the argument that mandatory disclosure serves as a credible commitment device that perhaps cannot be duplicated by voluntary disclosure.

3.2 Risk Disclosures

Early research in this area examines mandatory quantitative disclosures detailing firms' market risk exposures (e.g., Rajgopal, 1999; Linsmeier et al., 2002; Jorion, 2002). The findings show that these disclosures are correlated with market-based measures of risk and equity prices. More recent work uses textual analysis tools to analyze qualitative risk disclosures. For example, Li (2006) counts the frequency of the word stems "risk" and "uncertain" over a sample period that pre-dates the risk factor disclosure mandate, 1993 to 2004, and finds that an increase in the risk sentiment of annual reports is associated with lower future earnings and equity returns. Kravet and Muslu (2013) counts the number of sentences containing risk-related keywords in corporate annual reports over a sample period that spans both the PSLRA safe harbor and the risk factor disclosure mandate, 1994 to 2007, and finds that increases in this measure are associated with increased stock return volatility and trading volume around the 10-K filing date, as well increased volatility of analyst forecast revisions. Campbell et al. (2014) examines the

number of words and specific keywords in Item 1A over the post-mandate period, 2005-2008, and finds a positive association between the length of risk factor disclosures and post-disclosure market beta and stock return volatility.

3.3 Litigation Risk and Disclosure

The relation between litigation risk and disclosure is complex. On the one hand, high litigation risk can reduce managers' incentives to provide forecasts. For example, Rogers and Van Buskirk (2009) finds that firms reduce disclosure in the immediate aftermath of a lawsuit filing. Baginski et al. (2002) reports that firms in the U.S. issue fewer forecasts of both good and bad news than do firms in the less litigious Canadian environment. Moreover, U.S. firms were significantly less likely to provide forecasts before the PSLRA's safe harbor provision was enacted increasing protection for forward-looking disclosures (Johnson et al. 2001).

On the other hand, when faced with bad news, managers have an incentive to provide an early warning of the earnings shortfall to reduce the likelihood and expected costs of litigation (Skinner, 1994; Kasznik and Lev, 1995). Although timely disclosure of bad news does not always deter the filing of a lawsuit (Francis et al. 1994), it can deter certain types of lawsuits (Field et al. 2005) and reduce the expected costs of resolving litigation (Skinner 1997).

3.4 Contribution

We extend the literature summarized above in several important directions. We provide direct evidence on how a shift from a regime providing incentives for voluntary disclosure to one requiring disclosure affects the disclosed information and its usefulness to investors. Prior research on disclosure regulation generally infers the consequences of a disclosure mandate from its capital market effects without directly linking the market response to disclosure practices and attributes under the alternative regimes. Moreover, we also consider whether the requirement to

disclose an item affects the quality of disclosures for the firms that already voluntarily provide the information, an important issue that has not been addressed in the literature.

With respect to our particular focus on risk factor disclosures, prior research does not consider the effects of changes in disclosure regime. Moreover, these studies generally focus on a single disclosure property, most often the amount of disclosure, whereas we develop and test predictions for three complementary measures that explain variation in risk factor disclosures in general and in relation to MD&A. Finally, this work, and prior textual analysis research in general, gives little consideration to managers' disclosure incentives (Li, 2010). We examine the complementary role of legal incentives and regulatory mandates on risk factor disclosures. Moreover, the focus of litigation-related disclosure research has been on managements' voluntary earnings forecasts. In this paper, we turn our attention to incentives to disclose risk factors in corporate annual reports as a preemptive means of controlling firms' exposure to litigation.

4. Hypothesis Development

Based on the institutional background and prior research discussed above, we develop a series of hypotheses for our empirical tests. In particular, we examine the association between the risk of securities fraud litigation and risk factor disclosures, firms' response to the SEC's 2005 disclosure mandate, and the relevance of risk factor disclosures to investors.

4.1 Litigation Risk and Risk Factors

All else equal, the greater the probability of litigation, the greater the expected benefits from disclosing risk factors under the PSLRA. Prior research presents empirical evidence consistent with the PSLRA's safe harbor reducing expected legal costs. For example, the likelihood an earnings warning will result in a lawsuit filing or an allegation of false or

misleading projections is significantly lower after enactment of the PSLRA (Johnson et al. 2007), suggesting the safe harbor dissuades potential plaintiffs from pursuing disclosure-related complaints. Moreover, lawsuits containing allegations of fraud in forward-looking statements are more likely to be dismissed in the post-PSLRA period (Pritchard and Sale 2005), which also reduces defendants' legal costs from securities fraud class actions.

For some firms, however, the expected legal benefits of risk factor disclosure are likely minimal. Firms that are unlikely to be sued have little incentive to craft a meaningful risk factor discussion, especially when weighed against the potential business and personal costs of disclosure. Although the marginal administrative costs of formulating the disclosure are likely slight relative to the overall costs of preparing the 10-K, managers face a range of incentives to withhold unfavorable information (Kothari et al. 2009). Risk factors by their very nature convey information about a firm's vulnerabilities and potential adverse outcomes which could be exploited by competitors and investors, leading to negative career consequences for managers. Trading off these costs against the legal benefits of disclosure, firms are likely to minimize risk factors unless there is a nontrivial probability of being sued.[8]

To trigger safe harbor protection, risk factors must be "meaningful." We posit that firms at greater risk of litigation will provide more "meaningful" risk factor disclosure. As discussed above, the Conference Report (1995) states that risk factors must convey "substantive information." Given this prescription, and the courts' interpretation that risk factors are not meaningful if they are "cursory," we expect firms with higher litigation risk to provide more risk factor disclosure:

H1a: Firms at greater risk of litigation provide more risk factor disclosure.

[8] We are not aware of any a priori reason to expect that the costs of disclosure, whether administrative, proprietary, or personal, are related to the ex-ante probability of being sued.

The Conference Report (1995) also states that "boilerplate warnings" repeated from year to year are inadequate. Courts assessing the adequacy of firms' risk factors examine whether firms update their disclosed risks to reflect the current operating environment. The ordinary practice of managers and lawyers preparing SEC filings is to cut and paste from the previous filing, and then revise to reflect any developments in the business. If the risk factors are not adequately updated, they are less likely to provide protection against suit. Accordingly, we test the following hypothesis:

H1b: Firms at greater risk of litigation revise their risk factor disclosure more.

Courts have also held that risk factors must be comprehensible to provide a meaningful warning. As a result, they are likely to view risk factors that use excessive legalese or contain highly technical business terms as inadequate to secure safe harbor protection. Thus, we posit a positive association between litigation risk and the readability of risk factor disclosure:

H1c: Firms at greater risk of litigation provide more readable risk factor disclosure.

The risk of securities litigation is not static; firms may vary in their exposure as their business environment changes. If firms with higher litigation risk have incentives to provide more meaningful risk factor disclosure, we expect an increase in litigation risk to trigger the disclosure of more risk factor information that is less boilerplate and more readable. Moreover, we expect the sensitivity of risk factor disclosure to increases in litigation risk to be especially acute for firms already at a high risk of being sued, as marginal changes in litigation exposure for low risk firms are unlikely to subject them to a substantial risk of a lawsuit. This line of reasoning leads to our second hypothesis:

> **H2:** In response to an increase in litigation risk, firms at greater risk of litigation will provide more risk factor disclosure that is less boilerplate and more readable.

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We do not expect firms to respond to a decrease in litigation risk with a corresponding decrease in risk factor disclosure. Once a firm has identified and described a risk factor, the marginal cost of including it in subsequent filings is likely to be small. Even if a risk factor no longer provides substantial benefit in terms of reducing litigation exposure, there is likely to be a presumption favoring its continuance unless the factor becomes obviously irrelevant, such as "Year 2000" risk disclosures in 2001 and beyond.

4.2 Disclosure Regulation and Risk Factors

The SEC's 2005 risk factors disclosure requirement made mandatory a category of disclosure that was previously voluntary, albeit with a legal incentive to disclose in the form of the PSLRA's safe harbor. Given that pre-existing incentive, however, the mandate likely had a differential effect on firms depending on what disclosure, if any, they had already been providing. If our prior hypotheses are correct, firms with high litigation risk had an incentive to disclose meaningful risk factor information prior to the mandate. Therefore, in the voluntary disclosure regime, we expect firms at greater risk of litigation to disclose significantly more risk factor information that is less boilerplate and more readable. Because the SEC also wants companies to provide detailed risk factor information while avoiding boilerplate and complex language, as discussed above, we expect that the mandate will induce firms that previously had little incentive to disclose (i.e., firms with low litigation risk) to produce more meaningful risk factor disclosures. Thus, in the mandatory disclosure regime, we expect the difference in the risk factor disclosures of high and low litigation risk firms to narrow or disappear.[9] We summarize these predictions in our third hypothesis:

[9] This is not to suggest that the mandate would have no effect on high litigation risk firms that were previously disclosing risk factors. The SEC's adoption of a mandate implied that they would now be policing such disclosures through the review and comment process. Thus, the disclosure mandate could induce even previously-disclosing firms to be more diligent. Nevertheless, we expect any such changes to be small at the margin relative to the

H3a: In the voluntary disclosure regime, firms at greater risk of litigation provide more risk factor disclosure that is less boilerplate and more readable.

H3b: In the mandatory disclosure regime, there is little or no difference in the attributes of meaningful risk factor disclosure (amount, boilerplate, and readability) between firms with high and low litigation risk.

4.3 Risk Factors and Investors' Risk Assessments

Risk factor disclosures, if meaningful, should allow investors to make more precise estimates of the risks associated with firms' expected future cash flows. Thus, the attributes of meaningful risk factor disclosures discussed above should be positively associated with the market's assessment of firm risk (i.e., beta and stock return volatility). However, our prior hypotheses also suggest that meaningful risk factor disclosure varies systematically with firms' disclosure incentives and the disclosure regime. In particular, we posit that firms at greater risk of litigation provide more meaningful risk factor disclosures, particularly during the voluntary disclosure regime. Thus, our final hypothesis is as follows:

H4: The information content of risk factor disclosures is positively associated with the market's assessment of firm risk, particularly for firms at high risk of litigation in the voluntary disclosure regime.

5. Research Design

5.1 Sample Selection

During the voluntary disclosure period, 1996-2004, firms did not report risk factors in a specific section of the 10-K, and hence there are no common markers indicating the beginning or end of the risk factor discussion that can be used to reliably extract this text using computer-aided search and retrieval. Because the risk factor text must be manually identified and collected, we select a sample of firms for testing. To do this, we estimate firm-specific ex-ante

changes necessitated by the mandate for firms with low litigation risk.

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litigation risk for each year in the voluntary disclosure period and then select two subsamples — one with high litigation risk and the other with low litigation risk.

We discuss the litigation risk model in Appendix A. The evidence indicates that only those observations in the top decile of estimated litigation risk have any substantive risk of being sued. Therefore, for our *High Risk* sample, we randomly select 5% of firms from those that rank in the top decile in at least one year of the voluntary disclosure period, for a sample of 181 firms. The *Low Risk* sample consists of firms that never rank above decile 6 in the voluntary disclosure period. We use this cutoff because the maximum estimated litigation risk for decile 6 (0.015) is less than the minimum for decile 10 (0.022), ensuring that litigation risk in the *Low Risk* sample does not exceed that of the *High Risk* firms. We again randomly select 5% of the firms in this group, resulting in 112 *Low Risk* firms. To examine the effects of the risk factor disclosure mandate, we follow the sample of *High Risk* and *Low Risk* firms through the mandatory disclosure period, 2005-2010, for which we again obtain firm-specific litigation risk estimates for each year using the model described in Appendix A.

Table 1 reports the distribution of sample observations by litigation risk decile. By construction in the voluntary disclosure period, observations in the *Low Risk* sample never rank above decile 6. Even so, two-thirds of the observations cluster in deciles 1-3. Conversely, observations in the *High Risk* sample are skewed toward the highest risk deciles, with decile 10 containing one-quarter of the observations, and deciles 8-10 more than half the sample. Because we include all firm-years in our analysis, however, some observations fall into the lower deciles. The sample profile is similar in the mandatory disclosure period, suggesting that litigation risk is

relatively stable over time. Specifically, observations in the *Low Risk* (*High Risk*) sample cluster in the extreme low (high) litigation risk deciles.[10]

5.2 Risk Factor Disclosure Measures

For each firm-year in the sample, we obtain the annual filing from the SEC's online EDGAR system and extract the risk factor text. During the voluntary disclosure period, the location of the risk factors varies, but is typically found in either Item 7 (Management Discussion and Analysis) or Item 1 (Business). During the mandatory disclosure period, the risk factors are located in Item 1A (Risk Factors). We develop three proxies to measure the properties of firms' risk factor disclosures discussed above in Section II.

To assess the amount of risk factor disclosure, we use the word count of the risk factors disclosure. As shown in Figure 1, Panel A, disclosure by the *High Risk* sample increases steadily over the sample period, from a median of 265 words in 1996 to 6,602 words in 2010. In contrast, disclosure by the *Low Risk* sample is relatively flat throughout the voluntary disclosure period, never exceeding 600 words at the median. However, there is a sharp increase in the amount of disclosure beginning in 2005 with the risk factor disclosure mandate. Even during the mandatory disclosure period, however, disclosure by the *Low Risk* sample is still typically less than half the level of the *High Risk* sample.

It is possible that the increase in the amount of risk factor disclosure over time reflects a general trend towards longer corporate disclosures (e.g., Francis et al. 2002; Li 2008) rather than a specific trend related to risk factors. Similarly, the difference between the *High Risk* and *Low Risk* samples could be driven by differences in these firms' general disclosure tendencies rather

[10] There are 30 observations in the *Low Risk* group that are in deciles 7-10 during the mandatory disclosure period. Because our objective is to study how firms' disclosure policies evolve across regulatory regimes, we retain these observations in our primary tests. Untabulated supplemental analysis reveals, however, that their exclusion does not alter inferences.

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than by litigation risk. Thus, we also examine the word count of risk factors relative to that of MD&A.[11] For the *High Risk* sample, the results in Figure 1, Panel B reveal a rapid increase in the relative amount of risk factor disclosure until 2000, when it levels off at approximately 50 percent of MD&A. For the *Low Risk* sample, risk factors are approximately 10 percent of MD&A until 2005, but under the disclosure mandate quickly converge to the same relative level as the *High Risk* sample.

Our second measure assesses the extent to which risk factors merely repeat language from the prior year. Theoretical and empirical work in linguistics shows that the frequency distribution of words in human languages is highly skewed; a few words are used very often but most words are used rarely (Manning and Schütze 1999). This distinctive distribution is more pronounced for word bigrams (a sequence of two adjacent words) and even more so for word trigrams (a sequence of three adjacent words).[12] If the probability of a word occurring is low, the probability of it occurring in conjunction with others is even lower. Independently written documents, even if they are on the same or similar subjects or are written by the same author at different points in time, typically have few matching trigrams.[13]

To measure the extent to which risk factor disclosures are cut and paste from the prior year, we first convert each disclosure into a set of trigrams. The set of trigrams in the reference document, denoted S(A), is then compared with that of the comparison document, denoted S(B), and the resemblance between the two documents is determined as follows:

[11] During the voluntary disclosure period, some firms disclose their risk factors in the MD&A section. We exclude the risk factor language from the MD&A text in our analysis.

[12] For example, the sentence "*A storm is forecast for today*" has four overlapping trigrams: (*a storm is*), (*storm is forecast*), (*is forecast for*), (*forecast for today*).

[13] For example, Gibbon et al. (1997) reports that even in a sample of Wall Street Journal articles comprising over 38 million words, 77% of trigrams occurred only once. Lyon et al. (2001) investigates the use of *n*-grams as lexical features and finds that single words and bigrams have low power to identify similar text relative to trigrams. The ability to detect similar text is reduced for $n > 3$.

$$Resemblance = \frac{\left|S(A) \cap S(B)\right|}{\left|S(A) \cup S(B)\right|}, \quad (1)$$

where $0 \leq Resemblance \leq 1$. Two identical documents have a *Resemblance* score of 1. We focus our analysis on one-year *Resemblance* scores, i.e., a comparison of risk factor disclosures for firm *i* in year *t* relative to year *t* – 1. The *Resemblance* score thus provides a simple and intuitive measure of text similarity that is grounded in linguistics theory.

Figure 2, Panel A compares *Resemblance* scores for the *High Risk* and *Low Risk* samples. As expected, *Resemblance* is systematically lower for the *High Risk* sample, indicating that these firms annually revise risk factor disclosures to a greater extent than *Low Risk* firms.[14] There is a sizeable drop in *Resemblance*, however, for the *Low Risk* sample in 2005, consistent with the dramatic increase in the amount of risk factor discussion by these firms to comply with the disclosure mandate shown in Figure 1. The decline was short-lived, however, as *Resemblance* for the *Low Risk* sample quickly rebounded to its pre-2005 level. There is also a smaller drop in *Resemblance* in 2005 for the *High Risk* sample, but the level is not outside of its historical range. Panel B compares the *Resemblance* of risk factors relative to that of MD&A. The ratio is greater than one in all years for both the *High Risk* and *Low Risk* samples, indicating that risk factors are updated to a lesser extent than MD&A. Nevertheless, there is relatively more boilerplate language in the risk factors of *Low Risk* firms throughout the voluntary disclosure period, only converging with the *High Risk* firms after the risk factor disclosure mandate.

[14] Nevertheless, the *Resemblance* scores in Figure 2 are quite high by usual standards; median *Resemblance* in the *High* (*Low*) Risk sample is approximately 0.61 (0.77). To put these findings in context, we examine one-year *Resemblance* scores between firms, i.e., for firm *i* in year *t* relative to firm *j* in year *t* – 1. For all permutations of firm pairings, mean (median) *Resemblance* is 0.02 (0.01); the 99th percentile is 0.07. We find similar results for *Resemblance* between firms in the same year, i.e., for firms *i* and *j* in year *t*. These results are comparable to findings in other settings (e.g., Lyon et al., 2001; Bao and Malcolm, 2006), where the average *Resemblance* score typically ranges between 0.01 and 0.03. Thus, the results in Figure 2 indicate that the year-to-year *Resemblance* in firms' risk factors is quite high, consistent with the SEC's concerns about boilerplate disclosure.

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Our third measure assesses the readability of the risk factor disclosures. Following prior research (e.g., Li 2008), we use the Fog Index of text complexity which measures readability as a function of syllables per word and words per sentence:

$$Fog = (words\ per\ sentence + percent\ of\ complex\ words) \times 0.40, \quad (2)$$

where complex words are defined as words with three syllables or more. *Fog* indicates the number of years of formal education a person of average intelligence would need to understand the text after reading it once, and thus a higher *Fog* score indicates a less readable document.

Figure 3, Panel A shows that *High Risk* firms generally provide more readable risk factor disclosures than *Low Risk* firms during the voluntary disclosure period. Following the risk factor mandate, readability improves substantially for the *Low Risk* firms. Conversely, there is some evidence that readability deteriorated for *High Risk* firms, although the level remained within its historical range. Relative to MD&A, Panel B shows that the readability of risk factors for *High Risk* and *Low Risk* firms converged during the mandatory disclosure period. In all years, however, risk factors are more difficult to read than MD&A, as evidenced by a ratio greater than one, consistent with the SEC's concerns regarding the use of "legalese" in risk factors.

Overall, the graphical evidence supports our predictions regarding the incentives of *High Risk* firms to voluntarily provide meaningful risk factor disclosures under the PSLRA and the subsequent effects of the disclosure mandate on *Low Risk* firms. We next develop the empirical models we use to formally test our hypotheses.

5.3 Empirical Models

To examine the association between litigation risk and risk factor disclosures, we estimate the following regression model:

$$\begin{aligned} Disclosure \;=\; & \beta_1 Risk + \beta_2 Disclosure\_MDA + \beta_3 Forward\_MDA \\ & + \beta_4 ScaledDisclosure + \beta_5 BigN + \beta_6 LogMVE + \beta_7 MTB \\ & + \beta_8 Delaware + \beta_9 Restructure + \beta_{10} Segments + \varepsilon \end{aligned} \tag{3}$$

where *Disclosure* indicates one of the three risk factor disclosure metrics discussed above, (i) *Count*, the natural log of one plus the number of words in the risk factors discussion, (ii) *Resemblance*, or (iii) *Fog*. The main variable of interest is the litigation risk proxy, *Risk*, an indicator variable equal to one if the firm is in the *High Risk* sample, and zero otherwise. H1 predicts that *Risk* is positively (negatively) associated with *Count* (*Resemblance* and *Fog*).

We report results for two alternative specifications of equation (3). The first specification pools all observations to estimate the average association between litigation risk and the three risk factor disclosure metrics across the sample period. The second specification allows the coefficient estimate on *Risk* to vary for the voluntary and mandatory disclosure regimes. To the extent that the disclosure mandate reduces or eliminates differences in firms' risk factor disclosures, H3 predicts that the coefficient estimate on *Risk* in the mandatory disclosure period will be insignificant and/or less than the coefficient estimate in the voluntary disclosure period.

To control for firms' general disclosure tendencies, we include *Disclosure_MDA* which indicates one of the three disclosure metrics calculated using the firm's MD&A (exclusive of any risk factor disclosure). Specifically, *Count_MDA* is the natural log of the number of words, *Resemblance_MDA* is the one-year resemblance score, and *Fog_MDA* is the Fog Index for MD&A. Including the relevant MD&A disclosure measure not only mitigates concerns regarding correlated omitted variables, but also allows us to differentiate the characteristics of risk factors relative to other disclosures in the 10-K.

Forward_MDA is the number of forward-looking words in the firm's MD&A divided by the total number of words in the MD&A. When invoking safe harbor protection, firms typically

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indicate keywords which identify forward-looking statements.[15] We read a sample of these invoking statements to formulate the list of forward-looking words shown in Appendix B. Firms that provide relatively more forward-looking disclosure, as indicated by the use of these keywords, likely have greater incentives to provide meaningful risk factor disclosures. *ScaledDisclosure* is an indicator variable equal to one for firms eligible to adopt the reduced disclosure requirements under the Smaller Reporting Company rule or its predecessor, Regulation S-B. Because of scaled reporting for these firms, they may be less likely to provide meaningful risk factor disclosures.

BigN is an indicator variable equal to one for one of the top-tier external auditors.[16] Firms that invest in a high quality auditor may be more likely to provide high quality disclosures. *LogMVE* is the natural log of the market value of equity. Prior research shows that disclosure quality is positively related to firm size (e.g., Lang and Lundholm 1993). Following Li (2008), we control for business risk using growth, as measured by the market-to-book ratio (*MTB*), and complexity of operations using the number of business segments (*Segments*). *Delaware* is an indicator variable equal to one for firms incorporated in Delaware. Firms with greater exposure to shareholder lawsuits may choose to incorporate in Delaware because it affords more certain liability protection for officers and directors (Jagannathan and Pritchard 2013). This cautious attitude may also cause managers of these firms to provide more meaningful risk factors. We include *Restructure*, an indicator variable equal to one if the firm engaged in restructuring

[15] For example, Parlex Corp.'s 2003 10-K invokes statutory safe harbor protection as follows: "This document includes and incorporates forward-looking statements that are subject to a number of risks and uncertainties. All statements, other than statements of historical facts included or incorporated in this document, regarding our strategy, future operations, financial position and estimated revenues, projected costs, prospects, plans and objectives of management are forward-looking statements. When used in this document, the words "will," "believe," "anticipate," "intend," "estimate," "expect," "project" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words."

[16] During our sample period, the top-tier auditors are Arthur Andersen, Deloitte & Touche, Ernst & Young, KPMG, and PricewaterhouseCoopers.

activity, as a control for financing activities that could affect the quality of disclosure. Finally, we include year fixed effects.

To examine whether firms' risk factor disclosures are sensitive to changes in litigation risk, we estimate the following regression model:

$$\begin{aligned}\Delta Disclosure \;=\; & \beta_1 IncRisk + \beta_2 DecRisk + \beta_3 \Delta Disclosure\_MDA + \beta_4 \Delta Forward\_MDA \\ & + \beta_5 ScaledDisclosure + \beta_6 BigN + \beta_7 LogMVE + \beta_8 MTB \\ & + \beta_9 Delaware + \beta_{10} Restructure + \beta_{11} Segments + \varepsilon\end{aligned} \tag{4}$$

where *ΔDisclosure* indicates the change in one of the three risk factor disclosure metrics and *ΔDisclosure_MDA* is the change in the respective disclosure metric calculated for the firm's MD&A (exclusive of any risk factor disclosure). *IncRisk* (*DecRisk*) is the change in the estimated probability of litigation for positive (negative) changes. *ΔForward_MDA* is the change in the number of forward-looking words in the firm's MD&A divided by the total number of words in MD&A. All other variables are as defined above.

To avoid the confounding effects of changes in disclosure associated with the risk factor disclosure mandate, we estimate the model separately for the voluntary (1996-2004) and mandatory (2006-2010) disclosure periods, excluding the transition period from 2004-2006. In other words, holding the disclosure regime constant, we test whether firms adjust their risk factor disclosures in response to changes in litigation risk. H2 predicts that *IncRisk* is positively (negatively) associated with *ΔCount* (*ΔResemblance* and *ΔFog*), with *High Risk* firms more responsive to increases in litigation risk than *Low Risk* firms. However, we do not expect the opposite proposition to hold; firms are unlikely to change their risk factor disclosure as litigation risk decreases. Thus, we expect the coefficient estimate on *DecRisk* to be insignificant.

To examine whether risk factor disclosures are associated with the market's assessment of firm risk, we estimate the following regression model:

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$$\begin{aligned} \textit{Market Risk}_{t+1} = {} & \beta_1 \textit{Disclosure}_t + \beta_2 \textit{Disclosure\_MDA}_t + \beta_3 \textit{Forward\_MDA}_t \\ & + \beta_4 \textit{ScaledDisclosure}_t + \beta_5 \textit{BigN}_t + \beta_6 \textit{LogMVE}_t + \beta_7 \textit{MTB}_t \\ & + \beta_8 \textit{Delaware}_t + \beta_9 \textit{Restructure}_t + \beta_{10} \textit{Segments}_t + \beta_{11} \textit{MarketRisk}_t + \varepsilon \end{aligned} \quad (5)$$

where *Market Risk* indicates either *Beta*, the slope coefficient from a regression of daily returns on the *CRSP* equal-weighted market index, or *Std_AbRet*, the standard deviation of daily abnormal stock returns, both measured over the 250 trading days beginning two days after the release of the 10-K for year *t*. We include the determinants of risk factor disclosures from equation (3) to control for the expected level of disclosure. We also control for market risk, *Beta* or *Std_AbRet*, at time *t*.

We report results for two alternative specifications of equation (5). The first specification allows *Disclosure* to vary for *High Risk* and *Low Risk* firms to examine how disclosure incentives affect the informativeness of risk factor disclosures for future market-based measures of firm risk. The second specification allows the coefficient estimates on *Disclosure* to vary with both firms' disclosure incentives (*High Risk* or *Low Risk*) and across the disclosure regime (*Voluntary* or *Mandatory*). H4 predicts that for *High Risk* firms *Market Risk*$_{t+1}$ is positively (negatively) associated with *Count* (*Resemblance* and *Fog*).

6. Results

6.1 Descriptive Statistics

Table 2 presents descriptive statistics for the regression variables. Panel A (Panel B) compares mean and median values across the *High Risk* and *Low Risk* samples for the voluntary (mandatory) disclosure period. In the voluntary disclosure period, *Count* is significantly higher in the *High Risk* sample and *Resemblance* and *Fog* are significantly lower, as predicted.[17] In the

[17] Note that *Fog* is undefined for observations with zero word count and *Resemblance* is undefined for observations zero word count in either the current or prior year. Hence, the number of available observations for these two measures is less than the full sample size.

mandatory disclosure period, the differences in *Count* and *Resemblance* between the *High Risk* and *Low Risk* samples narrow, with the difference for *Resemblance* insignificant at the mean. More striking, *Fog* is significantly higher in the *High Risk* sample.

In general, the disclosure patterns in MD&A parallel those found in the risk factors; specifically, *Count_MDA* is higher and *Resemblance_MDA* is lower in the *High Risk* sample. It is interesting to note, however, that resemblance is uniformly lower for MD&A relative to the risk factors, suggesting that firms tend to update MD&A to a much greater extent. *Fog_MDA* is significantly higher for *High Risk* firms in both disclosure regimes, suggesting a general tendency for these firms to provide more complex disclosures.

High Risk firms use more forward-looking words in their MD&A, although the difference is significant only in the voluntary disclosure period. In both periods, a significantly higher proportion of the *Low Risk* sample is eligible for scaled disclosure. Moreover, the proportion increases between the voluntary and mandatory disclosure periods in both the *Low Risk* and *High Risk* samples, consistent with SEC rules expanding the number of eligible smaller companies. Finally, *High Risk* firms are larger, have higher growth, are more likely to employ a top-tier auditor, incorporate in Delaware, and engage in restructuring activity.

Panel C of Table 2 presents a Pearson correlation matrix for the regression variables. As predicted, *Risk* is positively correlated with *Count* and negatively correlated with *Resemblance* and *Fog*, although the correlation with *Fog* is insignificant. *Count* is negatively correlated with both *Resemblance* and *Fog*, consistent with firms that provide more risk factor disclosure using less boilerplate and more readable language. *Count*, *Resemblance*, and *Fog* are all positively correlated with their corresponding MD&A-based disclosure measure, demonstrating that firms adopt similar disclosure practices for both risk factors and MD&A. *Forward_MDA* is positively

correlated with *Count* but negatively correlated with *Resemblance* and *Fog*, suggesting that providing relatively more forward-looking information in the MD&A is associated with longer risk factor sections that are updated to a greater extent and use more readable language. Finally, larger firms, as indicated by *LogMVE* and firms not eligible for *ScaledDisclosure*, and those using a top-tier auditor provide more discussion of risk factors and use less readable language.

6.2 Regression Results

Our first set of tests examines the association between litigation risk and the properties of risk factor disclosures in the voluntary and mandatory disclosure regimes. Table 3 presents results regarding the amount of risk factor disclosure. In the first specification reported in column (1), we find that the amount of risk factor disclosure is increasing in litigation risk, consistent with H1a; on average, *High Risk* firms provide significantly more risk factor disclosure than *Low Risk* firms.

The results for the control variables indicate that firms providing more risk factor disclosure tend to be more verbose in general, as indicated by the positive and significant coefficient estimate on *Count_MDA*. Risk factors are also increasing with the amount of forward-looking disclosure (*Forward_MDA*), consistent with the incentives provided by the PSLRA's safe harbor. Finally, firms with a Big N auditor and firms incorporated in Delaware provide significantly more risk factor discussion, while large firms and firms with more business segments provide significantly less.

Findings for the second specification reported in column (2) of Table 3 show that *High Risk* firms disclose significantly more risk factor information in the voluntary disclosure regime, consistent with H3a. *High Risk* firms continue to be more forthcoming with risk factors in the mandatory regime, although the effect of litigation risk on disclosure is significantly reduced

(i.e., the null hypothesis that the coefficient estimates on *Risk* are equal for the voluntary and mandatory disclosure periods is rejected at less than the 0.01 level). This finding supports H3b.

Table 4 presents analogous results for boilerplate risk factor disclosure. Consistent with H1b, the negative and significant coefficient estimate on *Risk* in column (1) indicates that *High Risk* firms provide less boilerplate risk factor disclosure. In column (2), we find that this result holds in the voluntary disclosure regime, as predicted in H3a. However, the positive and significant coefficient estimate on *Risk_Mandatory* in column (2) suggests that *High Risk* firms use significantly more boilerplate language in the mandatory regime, counter to expectations. Recall from Figure 2 that *Resemblance* dropped precipitously for *Low Risk* firms in 2005 as these firms were forced to substantially update their risk factor disclosures to comply with the new mandate. Because *Resemblance* inherently captures differences in language across two years, including 2005 in the analysis could result in spurious inferences for the mandatory disclosure period. Consistent with this conjecture, untabulated robustness tests excluding 2005 observations reveal that the coefficient estimate on *Risk_Mandatory* is insignificant while that on *Risk_Voluntary* remains significantly negative. Thus, within the mandatory disclosure regime, this evidence supports the prediction in H3b that there is no statistical difference in boilerplate risk factor disclosure between firms with high and low litigation risk following the mandate.

Table 4 also shows that firms that tend to "cut and paste" risk factor disclosure follow the same practice with MD&A, as evident from the positive and significant coefficient estimate on *Resemblance_MDA*. However, firms update their risk factors significantly more when they provide more forward-looking disclosure in their MD&A. This finding suggests that firms are aware of the litigation risk posed by their forward-looking disclosures and take actions to avoid boilerplate warnings that are less likely to provide safe harbor protection.

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We examine the readability of risk factor disclosures in Table 5. The results in column (1) indicate that *High Risk* firms use more readable language to describe their risk factors, consistent with H1c. This relation holds in both the voluntary and mandatory disclosure periods, as shown in column (2), although the results are statistically significant in the voluntary regime only. Taken together, these findings provide support for H3a and H3b. We also find that the readability of risk factor disclosures is positively associated with the readability of MD&A, and that providing more forward-looking disclosure is associated with more readable risk factors.

Overall, the findings indicate that litigation risk provides a significant incentive for firms to disclose more meaningful risk factors (i.e., not only more disclosure but also disclosure that is less boilerplate and more readable). Firms that perceived little net benefit to disclosure (i.e., firms with low litigation risk) provided less meaningful disclosure on all three dimensions until disclosure was required by the SEC. Even then, firms at greater risk of litigation continue to provide significantly more risk factor disclosure, all else equal, suggesting that the mandate did not level disclosure practices completely. In other words, even in a mandatory disclosure regime, firm-specific incentives have an important influence on disclosure.

We examine whether firms change risk factor disclosures in response to changes in litigation risk in Table 6. Focusing first on changes in the amount of disclosure, we find that firms disclose significantly more risk factor information as litigation risk increases, as indicated by the positive and significant coefficient estimate on *IncRisk* in both the voluntary and mandatory disclosure periods. Untabulated findings reveal that this result is driven by the *High Risk* firms where the coefficient estimate on *IncRisk* is positive and significant at the 0.06 (0.12) level in the voluntary (mandatory) disclosure period. In contrast, coefficient estimates for the *Low Risk* firms never approach significance at conventional levels. Thus, consistent with H2, we

find that an increase in litigation risk, especially for firms already at a higher risk of being sued, is accompanied by an increase in risk factor discussion. Also consistent with expectations, Table 6 reveals insignificant results for *DecRisk*, suggesting that firms do not remove risk factor discussion when litigation risk falls.[18] Regarding the control variables, the positive and significant coefficient estimate on *ΔCount_MDA* indicate that changes in MD&A and risk factor disclosure tend to move in tandem. In addition, changes in forward-looking disclosure in the MD&A (*ΔForward_MDA*) are positively associated with changes in risk factor disclosure.

The results in the remaining columns of Table 6 provide no evidence that changes in litigation risk are associated with changes in the extent to which risk factor disclosures are boilerplate or readable. However, changes in boilerplate and readability are highly positively correlated with Δ*Resemblance_MDA* and Δ*Fog_MDA*, respectively, providing further evidence of correlated disclosure tendencies within firms' periodic filings.

Table 7 presents results for tests of the association between the amount of risk factor disclosure and the market's assessment of future firm risk. Pooling across disclosure regime, the findings reveal that *Count* is significantly positively associated with $Beta_{t+1}$ (column (1)) and Std_AbRet_{t+1} (column (3)) for *High Risk* firms only; there is no evidence of an association between risk factor disclosure and investors' risk assessments for firms with low litigation risk.[19] These results are consistent with the evidence presented above showing that firms at greater risk of litigation provide more meaningful risk factor disclosures.

[18] We present results controlling for disclosure regime although we do not have any a priori reason to expect that the regime affects the sensitivity of risk factor disclosure to changes in litigation risk. Untabulated results reveal that the coefficient estimates on *IncRisk* and *DecRisk* are not significantly different between the voluntary and mandatory disclosure periods.

[19] Untabulated results indicate that the correlation is low between ex-ante litigation risk and either $Beta_{t+1}$ ($\rho = 0.24$) or Std_AbRet_{t+1} ($\rho=0.10$). This can also be seen in our litigation risk model reported in Appendix A; these covariates are significantly associated with contemporaneous lawsuit filings in only two of the nine years in the voluntary disclosure period. Thus, there is no evidence of a mechanical association between litigation risk and either systematic or idiosyncratic firm risk.

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Columns (2) and (4) of Table 7 present results from a specification which allows the coefficient estimate on *Count* to vary for *High Risk* and *Low Risk* firms across the voluntary and mandatory disclosure regimes. In the voluntary disclosure regime, the findings indicate that the coefficient estimate on $Count_{HighRisk}$ is positive and significant for both market-based measures of future firm risk. In stark contrast, the coefficient estimate on $Count_{LowRisk}$ is negative, and significantly so with Std_AbRet_{t+1} as the dependent variable. Moreover, the null hypothesis that the coefficient estimates for the *High Risk* and *Low Risk* samples are equal is rejected at less than the 0.01 level. Thus, consistent with H4, *High Risk* firms provide significantly more informative risk factor disclosures in the voluntary disclosure regime.

In the mandatory disclosure regime, the coefficient estimates for *High Risk* and *Low Risk* firms are both significantly positive (insignificant) in the regression with Std_AbRet_{t+1} ($Beta_{t+1}$) as the dependent variable. However, in both regressions, tests of coefficient differences are insignificant at conventional levels. Thus, consistent with the findings in our previous tests, the evidence is consistent with a convergence in the meaningfulness of risk factors after the disclosure mandate.

In additional untabulated analysis, we include *Resemblance* and *Fog* in the estimation of equation (5). Risk factor disclosures that are more boilerplate or less readable may be less informative to investors about future firm risk. We find, however, that the coefficients on these alternative risk factor disclosure metrics are insignificant. To further test the robustness of our results, we re-estimate the regressions in columns (2) and (4) of Table 7 substituting the change in the dependent variable for the level of the dependent variable with no change in inferences. We also implement a two-stage regression approach, where in the first stage we estimate the determinants model in equation (3) for *Count* (including the lagged value of *Count* as an

additional explanatory variable). We then estimate a regression of $Beta_{t+1}$ or Std_AbRet_{t+1} on this residual. Findings from both of these second stage estimations are consistent with our primary tests.

7. Summary and Conclusion

Risk factors disclosure has steadily increased, both in absolute terms and as a proportion of MD&A, since Congress adopted the PSLRA in 1995, and continuing with the SEC's 2005 mandate. Risk factors now represent a substantial part of firms' annual securities filings. In this paper, we assess the effects of this shift from a voluntary incentive to a disclosure mandate.

Consistent with predictions, we find that prior to the SEC's 2005 mandate, firms with high securities litigation risk disclose more risk factors, revise their disclosure more from year-to-year, and use language that is easier to read. These findings are consistent with litigation risk providing an incentive for firms to voluntarily disclose risk factors that are more likely to be viewed as "meaningful" by the courts. With the advent of the SEC's mandate, these differences in disclosure largely disappear, although firms at higher risk of litigation continue to provide a greater amount of risk factor disclosure.

We also find that firms are sensitive to changes in litigation risk, but that this sensitivity is asymmetric. Firms experiencing an increase in litigation risk increase the amount of risk factor disclosure, but we do not find a corresponding decrease in disclosure when litigation risk declines. Moreover, this sensitivity is only displayed by high risk firms; we find no evidence that low risk firms are sensitive to changes in their litigation exposure.

Finally, we find that risk factor disclosures by firms at high risk of litigation are positively associated post-disclosure measures of firm risk, consistent with investors incorporating this information into their risk assessments. For low litigation risk firms, the

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association is insignificant, suggesting that disclosures by these firms convey little useful information. This difference is pronounced in the voluntary disclosure regime, but like our other results largely converges subsequent to the SEC's mandate.

Overall, we conclude from the evidence presented in this paper that firms with high litigation risk use risk factor disclosure in an effort to mitigate the expected costs of litigation. The SEC's introduction of a risk factor mandate induced substantial convergence in risk factor disclosure by firms at low risk of litigation. Nevertheless, the incentive to provide meaningful risk factor disclosure provided by the PSLRA may continue to affect disclosure decisions and the usefulness of risk factor disclosure for investors, at least for firms at high risk of securities fraud class actions. This paper contributes to our understanding of the roles of incentives and regulation in the evolution of narrative corporate disclosures, and its consequences for investors. The SEC's mandate in 2005 led to substantial convergence in risk factors disclosure, but scholars studying risk factor disclosure should be cognizant of the complementary role of legal incentives and regulatory mandates on disclosure decisions.

Appendix A
Estimation of Firm-Specific Litigation Risk

We estimate the probability of litigation for each firm-year using the following model:

$$Prob\,(Lawsuit = 1) = F\begin{pmatrix} \alpha + \beta_1 Size + \beta_2 Beta + \beta_3 Cum\_Ret + \beta_4 Min\_Ret + \beta_5 Std\_Ret \\ + \beta_6 Skewness + \beta_7 Turnover + \beta_8 Biotech + \beta_9 Hardware \\ + \beta_{10} Software + \beta_{11} Retail + \beta_{12} Electronic s + \varepsilon \end{pmatrix} \quad \text{(A1)}$$

For notational convenience, we suppress year and firm subscripts.

Lawsuit is equal to one if the firm was a defendant in a class action securities lawsuit during the year, and zero otherwise.[20] We use data from the Stanford Securities Class Action Clearinghouse to identify sued firms. *Size* is the natural log of the average of market value of common equity. *Beta* is the slope coefficient from a regression of daily returns on the *CRSP* equal-weighted market index. *Cum_Ret* is the cumulative daily return. *Min_Ret* is the minimum one day return. *Std_Ret* is the standard deviation of daily returns. *Skewness* is the skewness of the daily returns. *Turnover* is the proportion of shares traded, measured as $1 - (1 - Turn)^X$, where *Turn* is the average daily trading volume divided by the number of shares outstanding and X is the number of trading days.[21] Prior research finds that *Size*, *Beta*, *Std_Ret*, and *Turnover* are positively associated with lawsuit filings, while *Cum_Ret*, *Min_Ret*, and *Skewness* are negatively associated with lawsuit filings. Finally, the model includes indicator variables for firms in five industries generally believed to be at higher risk of litigation than other industries, specifically *Biotech* (SIC codes 2833–2836), computer *Hardware* (SIC codes 3570–3577), computer *Software* (SIC codes 7371–7379), *Retail* (SIC codes 5200–5961), and *Electronics* (SIC codes 3600–3674). To the extent the firm-specific variables in the model do not capture cross-

[20] We exclude lawsuits arising out of public offerings as the legal standards applicable to such lawsuits are substantially different and the PSLRA safe harbor does not apply to statements made in connection with initial public offerings.

[21] We divide daily trading volume for NASDAQ stocks by two to take into account differences in the way trading volume is reported on NASDAQ as opposed to NYSE and AMEX.

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sectional variation in litigation risk for firms in these industries, we expect the coefficient estimates on the industry indicator variables to be positive.

Table A1, Panel A reports summary statistics from the annual regressions of the litigation risk model for the voluntary disclosure period, 1996-2004. Coefficient estimates on four of the variables – *Size*, *Cum_Ret*, *Min_Ret*, and *Turnover* – are significant in the predicted direction in all nine annual estimations. The remaining firm-specific risk variables – *Beta*, *Std_Ret*, and *Skewness* – have coefficient estimates that are consistent with predictions in most of the annual estimations, but are generally not significant at the 0.05 level. The results for the industry indicator variables indicate that industry membership is not a significant determinant of litigation risk incremental to firm-specific factors.

Table A1, Panel B reports descriptive statistics for the estimated probability of litigation, ranked in deciles by year and pooled across years. Overall, the probability of litigation ranges from 0.000 to 0.992, with a mean (median) of 0.023 (0.007). The results reveal, however, that litigation risk is concentrated in the highest decile of firms.[22] The mean (median) estimated litigation risk in decile 10 is 0.131 (0.096), approximately three times higher than the mean (median) for decile 9. This evidence illustrates the highly skewed nature of the distribution of firms' litigation risk. In any given year, most firms face little or no risk of a securities fraud class action. Untabulated results for the estimation of the litigation risk model for the mandatory disclosure period, 2005-2010, yield similar inferences to those reported in Table A1.

[22] Because deciles are formed for each year, the maximum estimated litigation risk in a decile can exceed the minimum in higher deciles.

Table A1
Estimation of Litigation Risk for the Voluntary Disclosure Period, 1996-2004

Panel A: Summary Statistics from Annual Logistic Estimations of Litigation Risk Model

Variable	Prediction	Mean Coefficient Estimate	# positive / # negative	# significant[a]
Intercept	?	–5.10	0 / 9	9
Size	+	0.14	9 / 0	9
Beta	+	0.01	6 / 3	2
Cum_Ret	–	–0.40	0 / 9	9
Min_Ret	–	–3.08	0 / 9	9
Std_Ret	+	–0.34	6 / 3	2
Skewness	–	–0.03	2 / 7	2
Turnover	+	1.05	9 / 0	9
Biotechnology	+	–0.48	5 / 4	0
Computer Hardware	+	0.05	5 / 4	1
Computer Software	+	0.03	4 / 5	1
Electronics	+	0.02	4 / 5	0
Retail	+	–0.09	2 / 7	0
Mean Pseudo R^2	0.27			
Mean N	6,471			

Panel B: Litigation Risk, Ranked in Deciles by Year

Decile	N	Mean	Median	Std. Dev.	Minimum	Maximum
1	5,819	0.000	0.000	0.000	0.000	0.001
2	5,826	0.001	0.001	0.001	0.000	0.003
3	5,825	0.002	0.002	0.001	0.000	0.004
4	5,826	0.004	0.004	0.002	0.000	0.006
5	5,820	0.006	0.006	0.002	0.001	0.010
6	5,826	0.009	0.009	0.003	0.001	0.015
7	5,826	0.014	0.015	0.005	0.002	0.024
8	5,825	0.022	0.023	0.007	0.004	0.036
9	5,826	0.038	0.038	0.013	0.008	0.076
10	5,819	0.131	0.096	0.105	0.022	0.992
Total	58,238	0.023	0.007	0.051	0.000	0.992

Table A1 (continued)
Estimation of Litigation Risk for the Voluntary Disclosure Period, 1996-2004

The litigation risk model estimated in Panel A is as follows:

$$Prob\ (Lawsuit\ =\ 1)\ =\ F\begin{pmatrix}\alpha+\beta_1 Size+\beta_2 Beta+\beta_3 Cum\_Ret+\beta_4 Min\_Ret+\beta_5 Std\_Ret\\+\beta_6 Skewness+\beta_7 Turnover+\beta_8 Biotech+\beta_9 Hardware\\+\beta_{10} Software+\beta_{11} Retail+\beta_{12} Electronics+\varepsilon\end{pmatrix}$$

where *Lawsuit* is equal to one if the firm was a defendant in a class action securities lawsuit during the year, and zero otherwise. *Size* is the natural log of the average of market value of common equity. *Beta* is the slope coefficient from a regression of daily returns on the *CRSP* equal-weighted market index. *Cum_Ret* is the cumulative daily return. *Min_Ret* is the minimum one day return. *Std_Ret* is standard deviation of daily returns. *Skewness* is the skewness of the daily returns. *Turnover* is the proportion of shares traded, measured as $1 - (1 - Turn)^X$, where *Turn* is the average daily trading volume divided by the number of shares outstanding and X is the number of trading days. The high risk industry indicator variables represent *Biotech* (SIC codes 2833–2836), computer *Hardware* (SIC codes 3570–3577), computer *Software* (SIC codes 7371–7379), *Retail* (SIC codes 5200–5961), and *Electronics* (SIC codes 3600–3674).

[a] Significant in the predicted direction at the 0.05 level or better. Tests for all explanatory variables are one-sided; tests for the intercept are two-sided.

Appendix B
Forward-Looking Words

Word	Frequency	Word	Frequency
Aim/aims	0.02%	Ongoing	0.82%
Anticipate/anticipates	1.23	Optimism/optimistic	0.03
Believe/believes	4.14	Outlook	0.35
Can/could	9.50	Pessimistic	0.01
Continue	3.36	Plan/plans	5.41
Contraction	0.03	Possible/possibility	0.74
Decline	2.28	Potential	1.85
Estimate/estimates	5.93	Predict/predicts/prediction	0.43
Expand/expansion	1.80	Probable/probability	0.71
Expect/expects/expectation	3.38	Project/projects/projection	2.92
Forecast/forecasts	0.50	Prospect/prospects	0.20
Future	9.52	See/sees	3.19
Goal	0.17	Seek/seeks	0.50
Grow/growth	4.37	Should	1.62
Hope/hopeful	0.03	Shrink	0.06
Intend/intends/intention	0.72	Target/targets	0.43
Look/looking	1.87	Trend/trends	1.12
May/might	12.54	Upbeat	0.01
Next	0.96	View/views	0.23
Objective	0.22	Will/would	16.80

This table reports forward-looking words used to invoke safe harbor protection identified from a search of 10-K filings and the relative frequency (in percentage terms) of these words in the sample firms' MD&A.

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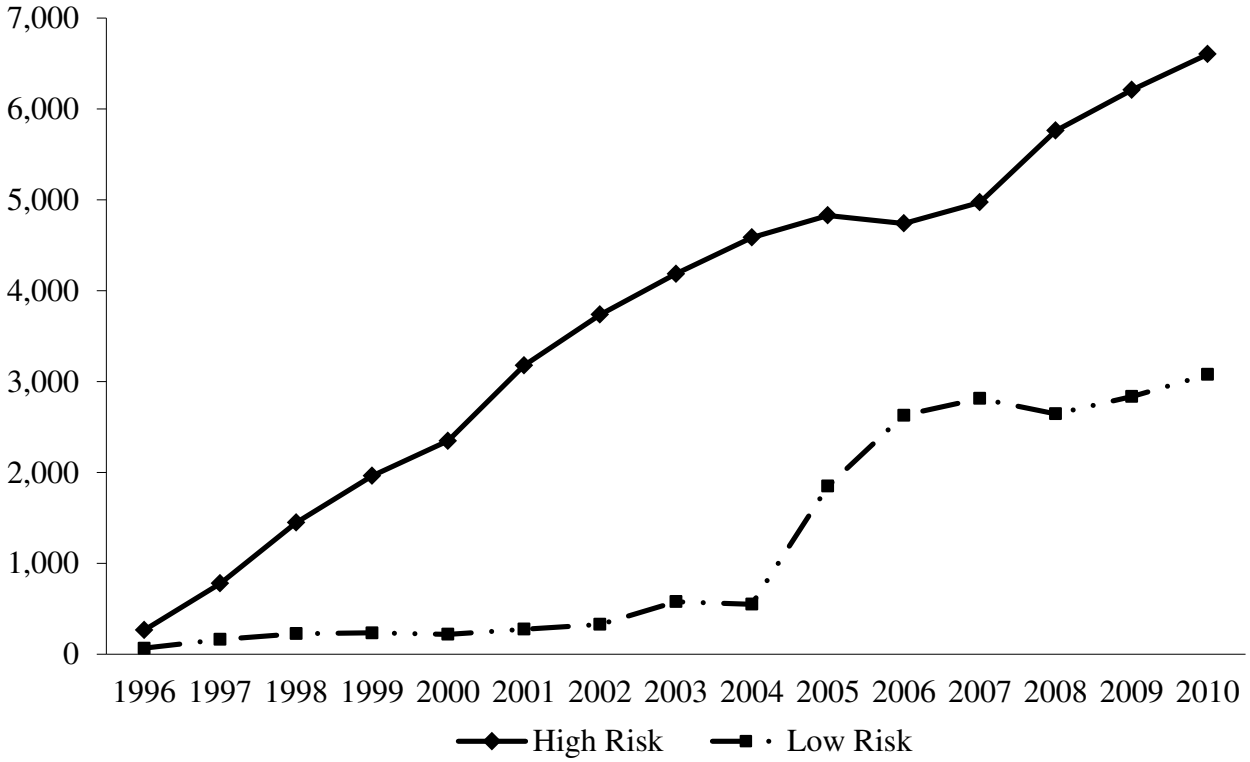
Figure 1
Word Count of Risk Factors by Year

Panel A: Word count



Panel B: Relative to MD&A

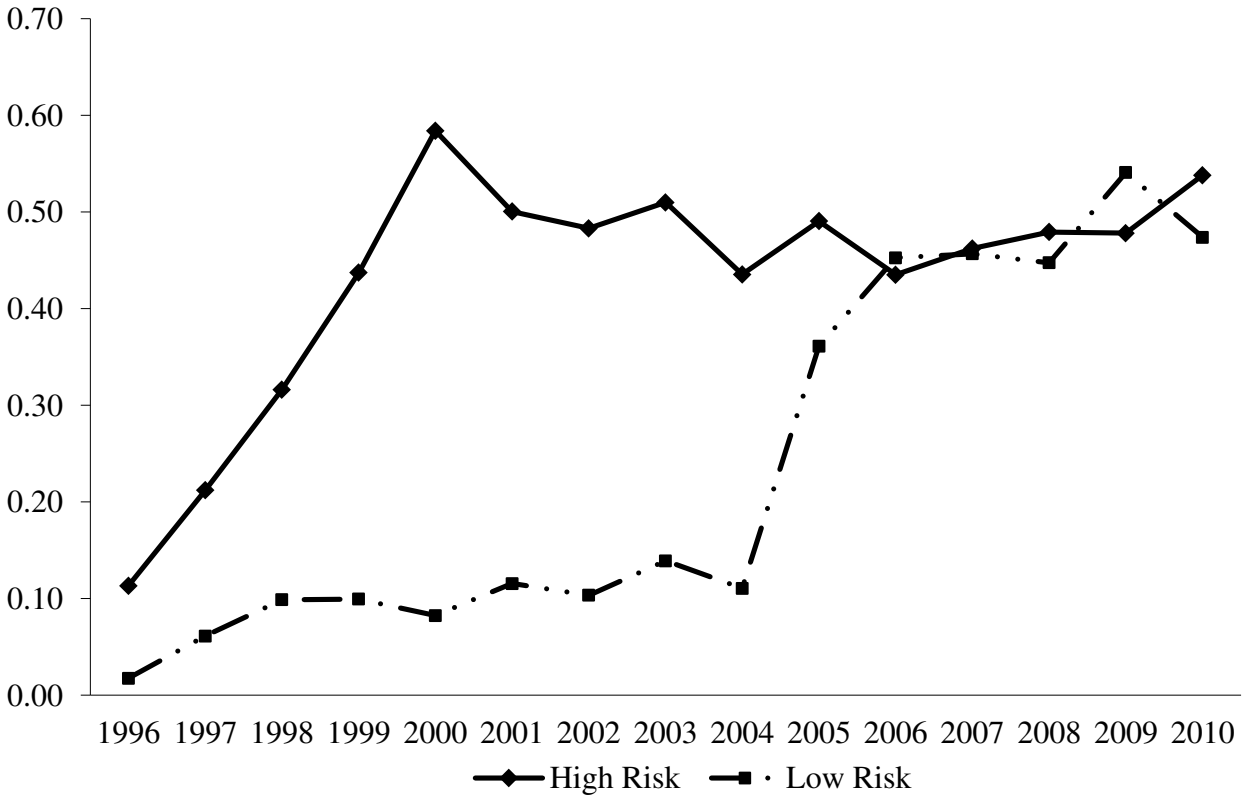
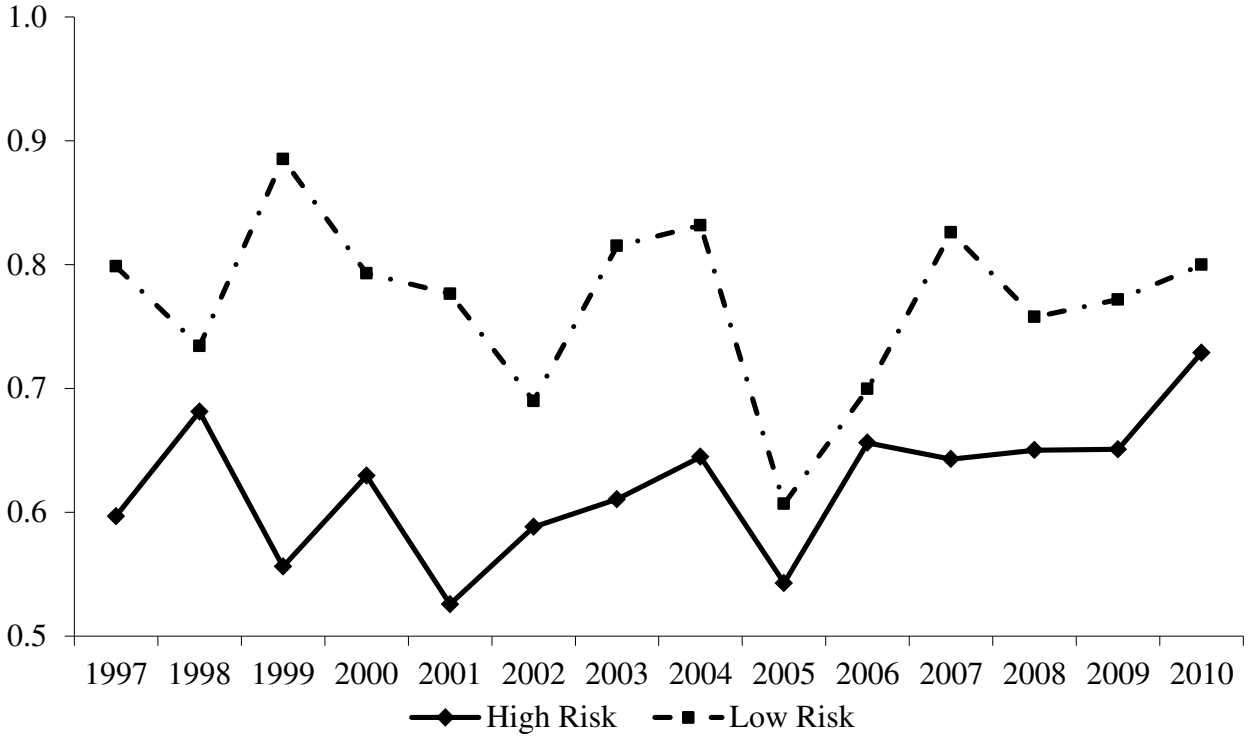


Figure 1 (continued)
Word Count of Risk Factors by Year

This figure presents the median word count of risk factors (Panel A) and the median ratio of the word count of risk factors divided by the word count of MD&A (Panel B) for the *High* and *Low Risk* samples.

Figure 2
Resemblance Score of Risk Factors by Year

Panel A: Resemblance score



Panel B: Relative to MD&A

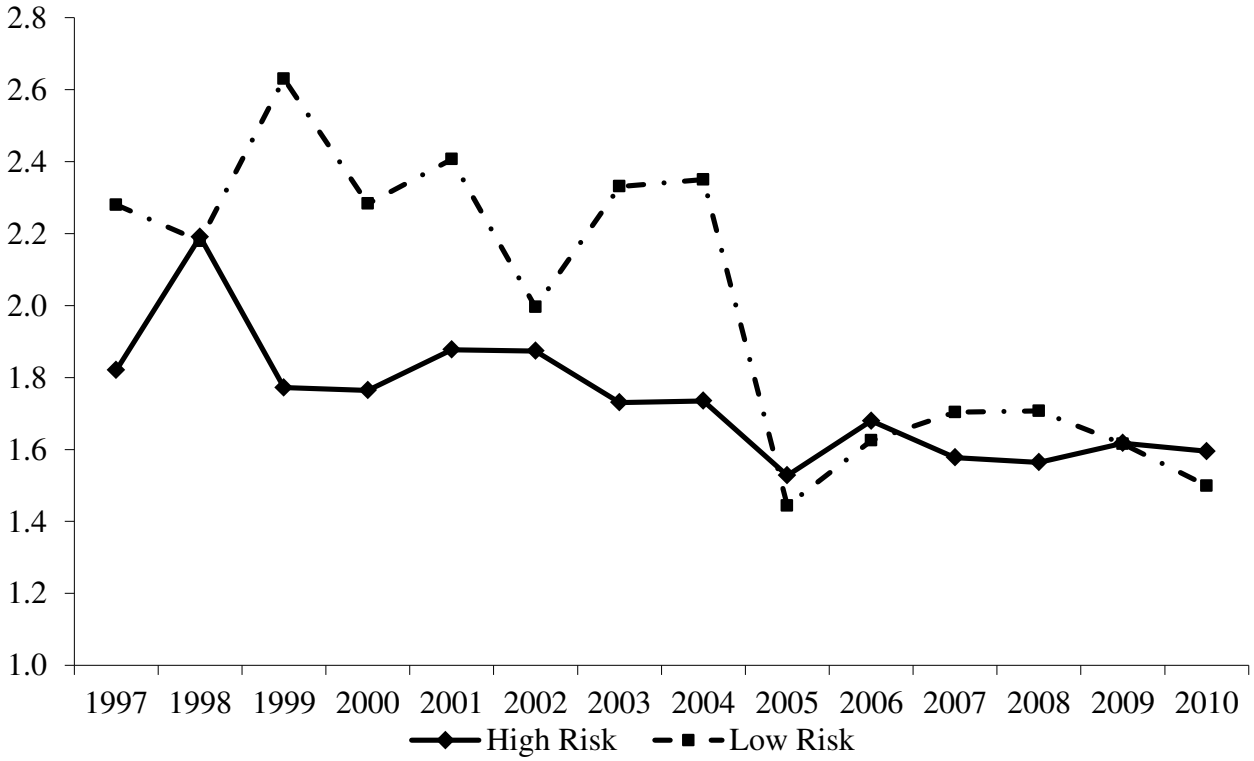
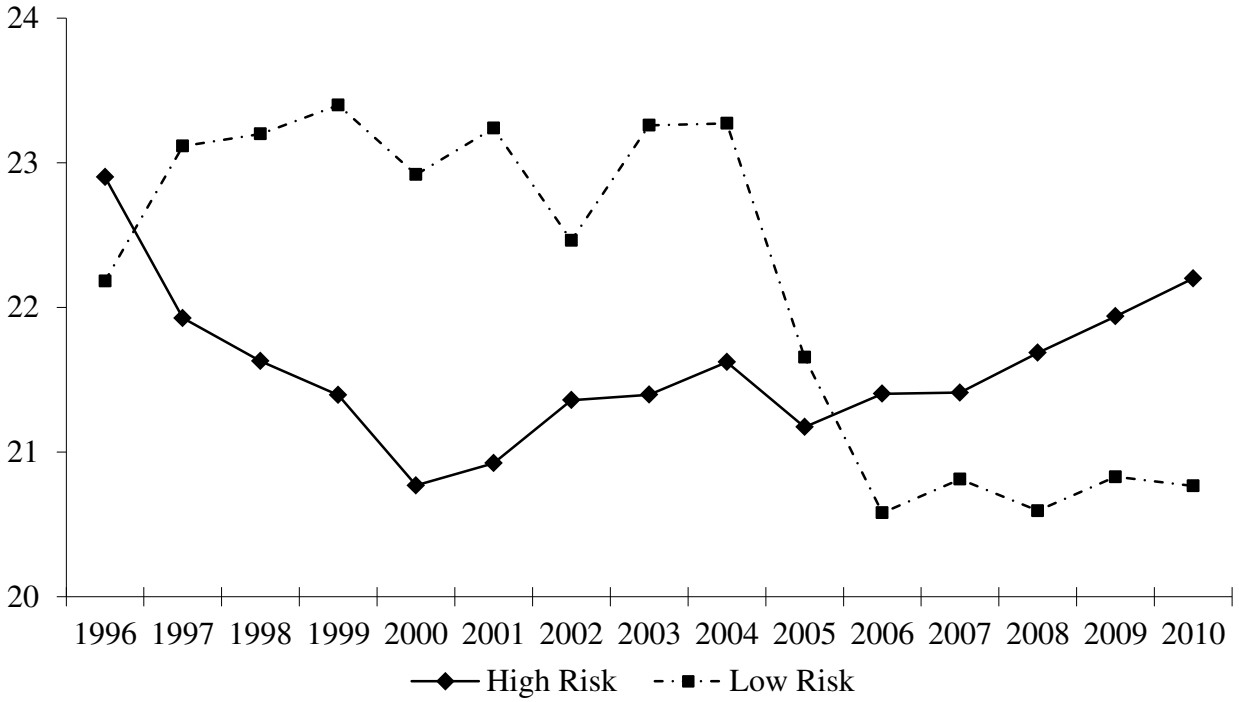


FIGURE 2 (continued)
Resemblance Score of Risk Factors by Year

This figure presents the median resemblance score of risk factors (Panel A) and the median ratio of the resemblance score of risk factors divided by the resemblance score of MD&A exclusive of any risk factor language (Panel B) for the *High* and *Low Risk* samples. The resemblance score is calculated as $\frac{|S(A) \cap S(B)|}{|S(A) \cup S(B)|}$, where S(A) is the set of word trigrams (i.e., sequence of three adjacent words) in the reference document A and S(B) is the set of trigrams in the comparison document B. The figure shows one-year resemblance scores, i.e., a comparison of risk factor disclosures for firm *i* in year *t* relative to year $t - 1$.

Figure 3
Fog Index of Risk Factors by Year

Panel A: Fog index



Panel B: Relative to MD&A

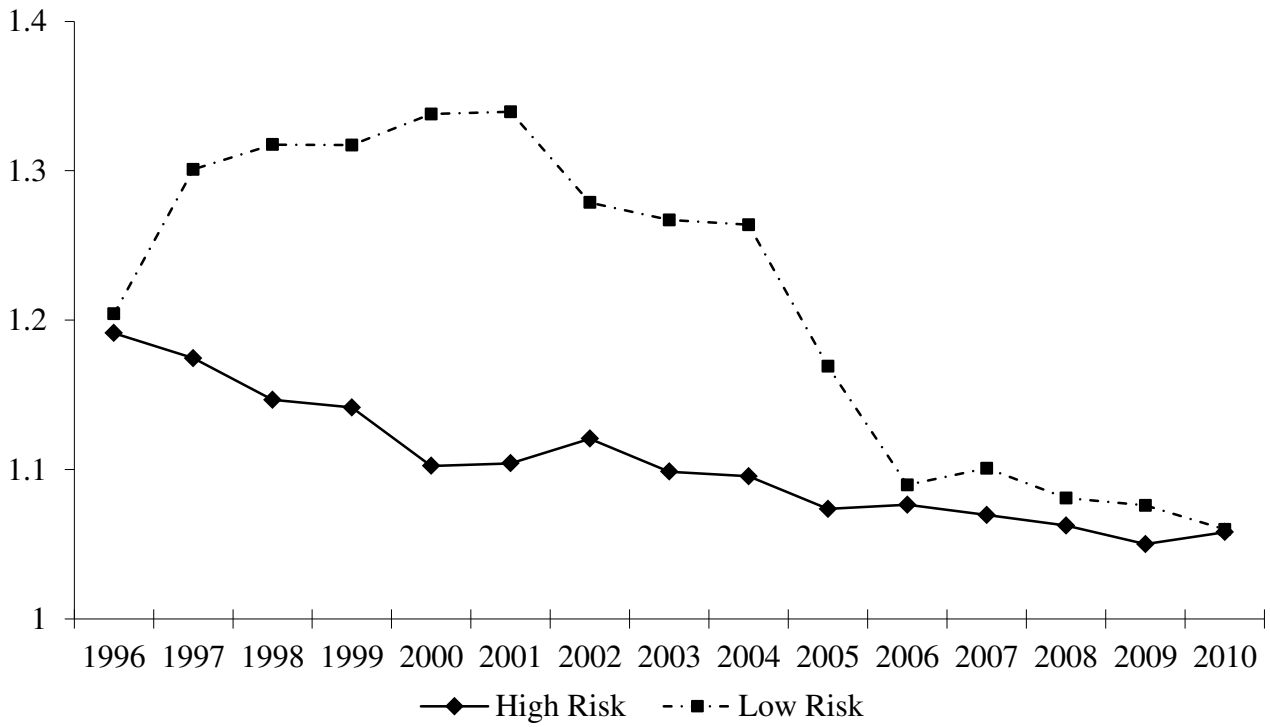


FIGURE 3 (continued)
Fog Index of Risk Factors by Year

This figure presents the median Fog Index of risk factors (Panel A) and the median ratio of the Fog Index for risk factors divided by the Fog Index for MD&A exclusive of any risk factor language (Panel B) for the *High* and *Low Risk* samples. The Fog Index indicates the number of years of formal education a reader of average intelligence would need to understand the text after reading it once, and is calculated as (words per sentence + percentage of complex words) × 0.40, where complex words are defined as words with three syllables or more.

Table 1
Sample Observations by Litigation Risk Decile

Litigation Risk Decile	Voluntary Disclosure Period (1996-2004)		Mandatory Disclosure Period (2005-2010)	
	Low Risk	High Risk	Low Risk	High Risk
1	117	31	46	27
2	137	44	47	24
3	104	51	34	26
4	85	69	28	23
5	57	79	18	28
6	37	95	18	39
7		120	9	37
8		132	11	60
9		189	6	57
10		267	4	77
Total	537	1,077	221	398

This table reports the number of observations in each litigation risk decile. The sample is constructed by first estimating firm-specific litigation risk annually for each year of the voluntary disclosure period (1996-2004) using the model specified in equation (A1) of the Appendix. *High Risk* firms are defined as those that rank in decile 10 in at least one year in the voluntary disclosure period. *Low Risk* firms are defined as those that never rank above decile 6 in any year in the voluntary disclosure period. A random sample of 181 (112) *High Risk* (*Low Risk*) firms is selected, representing approximately 5% of the firms in each risk group. The sample is then followed through the mandatory disclosure period (2005-2010).

Table 2
Descriptive Statistics

Panel A: Distributional Statistics – Voluntary Disclosure Period

	Low Risk				High Risk				Test of Differences *p*-value	
Variable	Nobs.	Mean	Median	Std. Dev.	Nobs.	Mean	Median	Std. Dev.	Mean	Median
Count	537	5.03	5.48	2.57	1,077	7.04	7.72	1.91	< 0.01	< 0.01
Resemblance	345	0.70	0.78	0.28	863	0.55	0.59	0.28	< 0.01	< 0.01
Fog	445	24.22	22.98	5.67	1,041	23.49	21.42	7.54	0.04	< 0.01
Count_MDA	537	7.92	7.88	0.72	1,077	8.60	8.60	0.69	< 0.01	< 0.01
Resemblance_MDA	345	0.34	0.36	0.12	863	0.32	0.32	0.13	0.02	0.01
Fog_MDA	445	18.46	18.38	1.55	1,041	19.28	19.22	1.47	< 0.01	< 0.01
Forward_MDA	537	0.01	0.01	0.01	1,077	0.02	0.02	0.01	< 0.01	< 0.01
ScaledDisclosure	537	0.13	0.00	0.33	1,077	0.05	0.00	0.22	< 0.01	< 0.01
BigN	524	0.86	1.00	0.35	1,040	0.90	1.00	0.31	0.04	0.03
LogMVE	524	4.05	3.93	1.48	1,040	5.76	5.72	2.20	< 0.01	< 0.01
MTB	524	2.34	1.49	3.56	1,039	3.19	2.52	8.60	0.01	< 0.01
Delaware	524	0.47	0.00	0.50	1,040	0.72	1.00	0.45	< 0.01	< 0.01
Restructure	524	0.06	0.00	0.24	1,040	0.17	0.00	0.37	< 0.01	< 0.01
Segments	524	1.79	1.00	1.18	1,040	1.79	1.00	1.47	0.61	< 0.01

Table 2 (continued)
Descriptive Statistics

Panel B: Distributional Statistics – Mandatory Disclosure Period

	Low Risk				High Risk				Test of Differences *p*-value	
Variable	Nobs.	Mean	Median	Std. Dev.	Nobs.	Mean	Median	Std. Dev.	Mean	Median
Count	221	7.39	7.87	1.91	398	8.50	8.59	0.57	< 0.01	< 0.01
Resemblance	220	0.63	0.75	0.30	397	0.62	0.64	0.20	0.62	< 0.01
Fog	220	20.75	20.85	5.88	398	21.83	21.67	2.19	< 0.01	< 0.01
Count_MDA	221	8.71	8.69	0.55	398	9.22	9.26	0.46	< 0.01	< 0.01
Resemblance_MDA	220	0.43	0.43	0.10	397	0.39	0.39	0.10	< 0.01	< 0.01
Fog_MDA	220	19.23	18.98	1.49	398	20.22	20.26	1.22	< 0.01	< 0.01
Forward_MDA	221	0.02	0.02	0.01	398	0.02	0.02	0.00	0.17	0.35
ScaledDisclosure	221	0.31	0.00	0.46	398	0.09	0.00	0.28	0.01	< 0.01
BigN	218	0.56	1.00	0.50	391	0.83	1.00	0.38	< 0.01	< 0.01
LogMVE	218	4.64	4.43	1.43	391	6.63	6.83	2.08	< 0.01	< 0.01
MTB	218	1.94	1.50	1.89	391	2.71	2.04	6.39	0.41	< 0.01
Delaware	218	0.46	0.00	0.50	391	0.76	1.00	0.43	< 0.01	< 0.01
Restructure	218	0.16	0.00	0.36	391	0.41	0.00	0.49	< 0.01	< 0.01
Segments	218	1.16	1.00	0.64	391	1.23	1.00	0.86	0.26	0.66

Table 2 (continued)
Descriptive Statistics

Panel C: Pearson Correlation Matrix

	Count	Resemblance	Fog	Risk	Count_MDA	Resemblance_MDA	Fog_MDA	Forward_MDA	ScaledDisclosure	BigN	LogMVE	MTB	Delaware	Restructure
Resemblance	**–0.13**													
Fog	**–0.24**	**0.09**												
Risk	**0.36**	**–0.17**	–0.01											
Count_MDA	**0.60**	**–0.19**	–0.03	**0.38**										
Resemblance_MDA	**0.15**	**0.42**	**–0.12**	**–0.12**	**0.06**									
Fog_MDA	**0.40**	**–0.11**	**0.06**	**0.24**	**0.50**	**0.10**								
Forward_MDA	**0.31**	**–0.09**	**–0.12**	**0.09**	**0.21**	**0.10**	**0.18**							
ScaledDisclosure	**–0.08**	0.05	**–0.16**	**–0.19**	**–0.19**	**0.06**	**–0.07**	–0.04						
BigN	**0.10**	–0.04	**0.10**	**0.14**	**0.12**	**–0.07**	**0.06**	**0.09**	**–0.39**					
LogMVE	**0.27**	**–0.10**	**0.09**	**0.39**	**0.48**	**–0.07**	**0.29**	**0.07**	**–0.35**	**0.34**				
MTB	0.02	0.02	–0.01	**0.11**	–0.01	0.01	0.03	**0.10**	0.01	–0.00	**0.19**			
Delaware	**0.18**	**–0.06**	0.02	**0.26**	**0.22**	–0.03	**0.12**	0.03	**–0.09**	**0.09**	**0.18**	0.04		
Restructure	**0.24**	–0.06	**–0.06**	**0.18**	**0.39**	–0.03	**0.20**	0.02	**–0.07**	**0.07**	**0.21**	–0.03	**0.12**	
Segments	**–0.08**	**–0.08**	**0.11**	0.00	**0.14**	–0.19	0.01	**–0.09**	**–0.10**	0.04	**0.10**	**–0.08**	0.03	**0.09**

Table 2 (continued)
Descriptive Statistics

This table reports descriptive statistics for the *Low Risk* and *High Risk* samples in the voluntary (1996-2004) (Panel A) and mandatory (2005-2010) (Panel B) disclosure periods. *Risk* is and indicator variable equal to one (zero) for *High* (*Low*) *Risk* firms; *Count* is the natural log of the number of words in the risk factor disclosure; *Resemblance* is calculated as $\frac{|S(A) \cap S(B)|}{|S(A) \cup S(B)|}$, where S(A) and S(B) are the set of trigrams (a sequence of three adjacent words in a sentence) in texts A and B; *Fog* is the number of years of formal education a reader of average intelligence would need to understand the text after reading it once, and is calculated as (words per sentence + percentage of complex words) × 0.40, where complex words are defined as words with three syllables or more; *Count_MDA* , *Resemblance_MDA*, and *Fog_MDA* are calculated in an analogous fashion using MD&A, exclusive of any risk factor disclosure; *Forward_MDA* is the number of forward-looking words in the firm's MD&A (identified in Appendix B), divided by the total number of words in MD&A; *ScaledDisclosure* is an indicator variable equal to one for firms able to adopt the reduced disclosure requirements under the Smaller Reporting Company rule or its predecessor, Regulation S-B; *BigN* equals one if the firm is audited by a top-tier auditor, and zero otherwise; *LogMVE* is the natural log of the market value of equity; *MTB* is the market value of the firm divided by the book value of common equity; *Delaware* equals one if the firm is incorporated in Delaware, and zero otherwise; *Restructure* equals one if the firm engaged in restructuring activity, and zero otherwise; and *Segments* is the number of reported business segments.
Pearson correlations in Panel C significant at or below the 0.01 level (two-tailed) in Panel C are highlighted in boldface font. All reported *p*-values are two-tailed.

Table 3
Association between Amount of Risk Factor Disclosure and Litigation Risk

	Dependent Variable = Count			
	(1)		(2)	
Variable	Coeff. Est.	*p*-value	Coeff. Est.	*p*-value
Risk	1.14	< 0.01		
Risk_Voluntary			1.31	< 0.01
Risk_Mandatory			0.67	< 0.01
Count_MDA	0.71	< 0.01	0.74	< 0.01
Forward_MDA	62.82	< 0.01	61.22	< 0.01
ScaledDisclosure	0.09	0.48	0.08	0.54
BigN	0.57	< 0.01	0.62	< 0.01
LogMVE	–0.06	< 0.01	–0.07	< 0.01
MTB	0.01	0.09	0.00	0.08
Delaware	0.17	0.03	0.17	0.02
Restructure	–0.12	0.23	–0.09	0.37
Segments	–0.14	< 0.01	–0.14	< 0.01
Year Fixed Effects	Yes		Yes	
Adj. R^2	0.95		0.95	
Nobs.	2,174		2,174	
p-value for Voluntary = Mandatory: Risk				< 0.01

See Table 2 for variable definitions. The voluntary (mandatory) disclosure period is 1996-2004 (2005-2010). All reported *p*-values are two-tailed.

Table 4
Association between Boilerplate Risk Factor Disclosure and Litigation Risk

	Dependent Variable = Resemblance			
	(1)		(2)	
Variable	Coeff. Est.	*p*-value	Coeff. Est.	*p*-value
Risk	–0.05	< 0.01		
Risk_Voluntary			–0.13	< 0.01
Risk_Mandatory			0.07	< 0.01
Resemblance_MDA	1.23	< 0.01	1.19	< 0.01
Forward_MDA	–3.74	< 0.01	–3.73	< 0.01
ScaledDisclosure	0.07	< 0.01	0.06	< 0.01
BigN	0.04	0.04	0.02	0.37
LogMVE	0.01	< 0.01	0.01	< 0.01
MTB	–0.00	0.21	–0.00	0.21
Delaware	–0.00	0.95	–0.00	0.81
Restructure	0.00	0.81	–0.01	0.73
Segments	0.00	0.56	0.00	0.86
Year Fixed Effects	Yes		Yes	
Adj. R^2	0.86		0.86	
Nobs.	1,780		1,780	
p-value for Voluntary = Mandatory: Risk				< 0.01

See Table 2 for variable definitions. The voluntary (mandatory) disclosure period is 1996-2004 (2005-2010). All reported *p*-values are two-tailed.

Table 5
Association between Readability of Risk Factor Disclosure and Litigation Risk

	Dependent Variable = Fog			
	(1)		(2)	
Variable	Coeff. Est.	*p*-value	Coeff. Est.	*p*-value
Risk	–1.41	< 0.01		
Risk_Voluntary			–1.84	< 0.01
Risk_Mandatory			–0.36	0.53
Fog_MDA	1.10	< 0.01	1.07	< 0.01
Forward_MDA	–155.36	< 0.01	–151.63	< 0.01
ScaledDisclosure	–1.66	< 0.01	–1.62	< 0.01
BigN	0.29	0.51	0.17	0.70
LogMVE	0.28	< 0.01	0.29	< 0.01
MTB	–0.02	0.58	–0.02	0.58
Delaware	0.12	0.69	0.12	0.70
Restructure	–0.99	0.01	–1.05	< 0.01
Segments	0.23	0.05	0.23	0.05
Year Fixed Effects	Yes		Yes	
Adj. R^2	0.93		0.93	
Nobs.	2,049		2,049	
p-value for Voluntary = Mandatory: Risk				0.02

See Table 2 for variable definitions. The voluntary (mandatory) disclosure period is 1996-2004 (2005-2010). All reported *p*-values are two-tailed.

Table 6
Association between Changes in Risk Factor Disclosure and Changes in Litigation Risk

	Dependent Variable					
	ΔCount		ΔResemblance		ΔFog	
Variable	Coeff. Est.	*p*-value	Coeff. Est.	*p*-value	Coeff. Est.	*p*-value
IncRisk_Voluntary	1236.69	0.05	0.16	0.40	0.95	0.75
IncRisk_Mandatory	6844.22	0.09	–0.62	0.26	–12.70	0.16
DecRisk_Voluntary	397.11	0.63	–0.18	0.46	–3.63	0.35
DecRisk_Mandatory	1694.59	0.70	–0.50	0.11	–2.64	0.60
ΔCount_MDA	0.18	< 0.01				
ΔResemblance_MDA			0.99	< 0.01		
ΔFog_MDA					0.61	< 0.01
ΔForward_MDA	399.62	< 0.01	–0.00	< 0.01	–0.00	0.13
ScaledDisclosure	–58.36	0.55	–0.01	0.75	–0.40	0.39
BigN	52.70	0.50	0.00	0.94	–0.31	0.39
LogMVE	16.50	0.23	0.00	0.92	–0.03	0.57
MTB	6.57	0.34	–0.01	0.74	–0.02	0.59
Delaware	66.26	0.26	–0.01	0.82	0.07	0.78
Restructure	–117.11	0.13	0.01	0.66	–0.06	0.87
Segments	–34.62	0.12	–0.01	0.06	–0.01	0.92
Year Fixed Effects	Yes		Yes		Yes	
Adj. R^2	0.16		0.15		0.01	
Nobs.	1,645		1,520		1,765	

Δ*Count* is the change in the number of words in the risk factor disclosure; Δ*Resemblance* is the change in the Resemblance score; Δ*Fog* is the change in the fog score; number of words in the MD&A; *Count_MDA* , *Resemblance_MDA*, and *Fog_MDA* are calculated in an analogous fashion using MD&A, exclusive of any risk factor disclosure; *IncRisk* (*DecRisk*) is the change in the estimated probability of litigation for positive (negative) changes in litigation risk; Δ*Forward_MDA* is the change in the ratio of forward-looking words in the firm's MD&A to the total number of words in MD&A. All other variables are defined in Table 2. To avoid the confounding effects of changes in disclosure associated with the risk factor disclosure mandate, we exclude the transition period from 2004-2006. Hence, the voluntary (mandatory) disclosure period is 1996-2004 (2006-2010). All reported *p*-values are two-tailed.

Table 7
Risk Factor Disclosures and Future Market-Based Measures of Firm Risk

	Dependent Variable = $Beta_{t+1}$				Dependent Variable = Std_AbRet_{t+1}			
	(1)		(2)		(3)		(4)	
Variable	Coeff. Est.	*p*-value	Coeff. Est.	*p*-value	Coeff. Est.	*p*-value	Coeff. Est.	*p*-value
$Count_{HighRisk}$	0.0369	0.01			0.0008	< 0.01		
$Count_{LowRisk}$	0.0120	0.21			–0.0003	0.40		
$Count_{HighRisk}\_Voluntary$			0.0435	< 0.01			0.0006	0.05
$Count_{HighRisk}\_Mandatory$			0.0142	0.48			0.0018	< 0.01
$Count_{LowRisk}\_Voluntary$			–0.0020	0.85			–0.0010	< 0.01
$Count_{LowRisk}\_Mandatory$			0.0162	0.45			0.0014	0.04
Count_MDA	0.0275	0.01	0.0287	0.01	0.0044	< 0.01	0.0046	< 0.01
Forward_MDA	0.0199	0.38	0.0164	0.47	–0.0001	0.91	0.0001	0.98
ScaledDisclosure	0.0103	0.85	–0.0027	0.96	0.0079	< 0.01	0.0085	< 0.01
BigN	–0.0250	0.57	0.0024	0.70	–0.0039	< 0.01	–0.0036	0.01
LogMVE	0.0293	< 0.01	0.0278	< 0.01	–0.0035	< 0.01	–0.0036	< 0.01
MTB	0.0133	< 0.01	0.0137	< 0.01	0.0001	0.40	0.0001	0.40
Delaware	0.0149	0.63	0.0154	0.61	0.0001	0.94	0.0001	0.96
Restructure	0.0782	0.06	0.0958	0.02	–0.0017	0.19	–0.0014	0.30
Segments	–0.0114	0.36	–0.0116	0.35	–0.0006	0.13	–0.0006	0.11
$Beta_t$	0.4934	< 0.01	0.4722	< 0.01				
Std_AbRet_t					0.6004	< 0.01	0.5922	< 0.01
Year Fixed Effects	Yes		Yes		Yes		Yes	
Adj. R^2	0.79		0.79		0.85		0.85	
Nobs.	2,015		2,015		1,949		1,949	
p-value for $Count_{HighRisk} = Count_{LowRisk}$:								
Pooled		< 0.01				< 0.01		
Voluntary				< 0.01				< 0.01
Mandatory				0.79				0.14

Table 7 (continued)
Risk Factor Disclosures and Future Market-Based Measures of Firm Risk

Beta$_{t+1}$ is the slope coefficient from a regression of daily returns on the *CRSP* equal-weighted market index and *Std_AbRet*$_{t+1}$ is the standard deviation of daily abnormal stock returns, both measured over the 250 trading days beginning two days after the release of the 10-K. Count$_{HighRisk}$ (Count$_{LowRisk}$) is the natural log of the number of words in the risk factor disclosure for *High Risk* (*Low Risk*) firms. All other variables are defined in Table 2. The voluntary (mandatory) disclosure period is 1996-2004 (2005-2010). All reported *p*-values are two-tailed.