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Risk Factor Disclosures and CEO Overconfidence

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Risk Factor Disclosures and CEO Overconfidence

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Abstract: This paper examines whether CEO overconfidence influences the information contents of the Risk Factors section in 10-K report. We find that overconfident CEOs are less likely to use risk-associated words in the Risk Factors section. This is because overconfident CEOs perceive less risk or they have the illusion that they can effectively control the risk faced by the firms. This paper also finds that risk factor disclosures significantly increase during the 2008 global financial crisis. Overconfident CEOs, however, do not change their behavior even under the crisis maintaining their illusion. These findings suggest that managers' overconfidence bias may cause a deviation from the optimal level of risk factor disclosures.

Keywords: *Risk Factor Disclosures, Item 1A, CEO Overconfidence, Textual Analysis*

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1. Introduction

Overconfident managers overestimate the outcomes of their firms' projects or underestimate the variance of risky processes. Prior research in finance and accounting documents that CEO overconfidence affects corporate investment, financing policies, and financial reporting policies (e.g., Malmendier and Tate 2005; Graham, Harvey, and Puri 2013; Schrand and Zechman 2012; Malmendier, Tate and Yan 2011; Ahmed and Duellman 2013; Hirshleifer, Low, and Teoh 2012; Ben-David, Graham, and Harvey 2013; Hribar and Yang 2016). Expanding this line of research, we investigate the effects of managerial overconfidence on risk reporting behavior.

In 2005, Securities and Exchange Commission (SEC) mandated firms to include an "Item 1A. Risk Factors" section in quarterly annual reports for offering investors an understanding of the risks faced by individual companies. Firms should describe "the most significant factors that make the company speculative or risky" in the Risk Factors section. While there exist concerns that a Risk Factors section is boilerplate (Johnson 2010), prior literature, however, mainly suggests that the Risk Factors section provides meaningful information of corporate risks and enhances information transparency (e.g., Campbell, Chen, Dhaliwal, Lu, and Steele 2014; Chiu, Guan, and Kim 2017). However, it would be overstated or understated, deviating from the appropriate level of risk factor disclosures (hereafter RFD).

Corporate reporting is influenced by managers' incentive or bias (e.g., Graham, Harvey, and Rajgopal 2005; Libby and Rennekamp 2012; Hribar and Yang 2016). For example, managers withhold bad news due to their career concerns including promotion, opportunities of external hiring, and potential termination (e.g., Graham et al. 2005; Kothari, Shu, and Wysocki 2009). Overconfident managers issue forecasts with optimistic bias, and narrower ranges (Hribar and Yang 2016). Therefore, the RFDs may be suboptimal due to management incentive or bias. This paper specifically focuses on managerial overconfidence bias.

Overconfidence has main facets comprising over-optimism, miscalibration, and an illusion of control (Skala 2008). They overestimate their ability to generate a positive outcome, which results in systematic upward bias for their outcomes, and overestimate their ability to control over uncertain and risky events, and have excess confidence about having accurate information, which results in the underestimation of the variance of future potential outcomes. These dimensions of overconfidence induce managers to inherently perceive corporate risk. Alternatively, while overconfident CEOs perceive the risk, they may not disclose the perceived risk as a risk factor in their filings since they have the illusion that they can effectively control the risk. Overall, overconfident CEOs are likely to underestimate corporate risk. Therefore, we hypothesize that firms with overconfident CEOs disclose fewer risk factors in their annual report.

Testing the predictions about the influence of CEO overconfidence on the amount and content of RFDs, our primary measure of overconfidence is based on

the timing of CEO option exercise following Malmendier and Tate (2005), and Campbell, Gallmeyer, Johnson, Rutherford, and Stanley (2011). Since overconfidence may induce them to believe their stock option value will increase over time, we measure overconfidence either by the percentage in-the-money for option package (Malmendier and Tate 2005) or by the value of the total holdings of the CEO (Li, Minnis, Nagar, and Rajan 2014). Following Campbell et al. (2014), we measure the amount and content of RFDs by counting the total number of risk keywords and risk keywords in each subcategory (i.e., financial, legal, tax, idiosyncratic, and systematic risks) contained in the Risk Factors section in 10-K filings. Risk-words and classification of risk-words into subcategory are provided in Campbell et al. (2014).

As predicted, we find that overconfident CEOs use less risk-associated keywords in the Risk Factors section, suggesting that illusion of control effect leads to less risk factor reporting. Furthermore, we show that overconfidence is negatively related to the number of risk-related keywords in subcategories, except the tax risk-associated keywords. The association between CEO overconfidence and tax risk-associated keywords is consistently insignificant, suggesting that tax risk disclosure is not affected by managerial confidence. Unlike future firm performance, tax-related issues deal with IRS and tax-credit. CEO may not have the illusion of control about IRS and tax-audit.

To provide further comfort in our primary finding, this paper implements other measures for RFDs and overconfidence. As alternative measures for RFDs, we

use fog index and the risk keyword counts in both Risk Factors section and Management Discussion and Analysis (hereafter, MD&A) section. First, since fog index captures text complexity (Li 2008), we predict that overconfident managers will provide concise RFDs. Second, we count the total number of risk keywords in both Risk Factors section (Item 1A) and MD&A section (Item 7) to broadly measure the risk reporting in the financial statement. The results are consistently supporting the main hypothesis. Third, as an alternative measure for overconfidence, excess asset growth is used following Ahmed and Duellman (2013). We also find that excess asset growth is negatively associated with RFDs. These results are consistent with our hypothesis on the relation between CEO overconfidence and RFDs.

Additional analysis investigates whether the 2008 global financial crisis changes overconfident managers' behavior in making the RFDs. Financial crisis can significantly influence risk reporting since overall risks such as liquidity risk, credit risk, and market risk have fundamentally increased during the period. We document that RFDs significantly increase during the crisis, and overconfident managers, however, do not change their tendency to report fewer risk factors. This suggests that their false belief about their ability in controlling the risks is not affected by extremely negative external shock.

This study contributes to the literature in the following ways. First, while prior literature primarily suggests that the Risk Factors section provides meaningful information to stakeholders in an unbiased manner, we find evidence that its statement can be deviated from the optimal level due to management overconfidence.

Hence, we raise concerns that the understated risk factors by overconfident CEOs may mislead corporate information users. Second, while prior literature on overconfidence investigates mainly focus on the corporate decision for investment and financing policy, this study adds to evidence that management overconfidence also affects corporate reporting. More specifically, we show that overconfident CEOs also distort the risk factor reporting by understating it.

The remainder of the paper is organized as follows. Section 2 reviews prior literature and develops the hypothesis. Section 3 describes the data and research design. Section 4 presents descriptive statistics and empirical results. In section 5 and 6, we provide robustness tests and additional test. Section 7 concludes.

2. Literature Review and Hypothesis Development

2.1. Prior Literature on Risk Factor Disclosure

Information users of corporate disclosure have criticized that financial reporting lacks corporate risk related contents and therefore cannot warn future adverse consequence of the corporate risk effectively (Reuters 2005). In 2005, SEC responded to the criticism, mandating companies to include a Risk Factors section in their annual reports. Firms should describe “the most significant factors that make the company speculative or risky” in Item 1A, the section of Risk Factors of their

quarterly and annual reports.¹ Since then, academia has focused on the qualitative information contained in such risk reporting, compared to the prior work which studies quantitative information of risk information (i.e., financial numbers related to risk).

While there exist concerns that description of risk factors is boilerplate, most of the studies suggest that corporate's risk reporting includes meaningful information about corporate risk and information users indeed react to the RFDs. In an early study, Li (2006) documents that an increase in risk sentiment in annual reports, captured by a count of words 'risk' and 'uncertainty', is associated with poor stock returns. Kravet and Muslu (2013) also show that stock return volatility and trading volume are higher for firms with more risk disclosures. These findings show that an element of risk disclosures increases investors' risk perceptions, implying the informativeness of risk reporting.

Recent studies focus on Item 1A section (i.e., Risk Factors section). Campbell et al. (2014), show the positive association between the length of Section 1A of 10-K filings and stock return volatility in the following year. Hope, Hu, and Lu (2016) measure the level of specificity in the Risk Factors section and document that the market reaction is greater for firms with more specific RFDs than firms with

¹ Aligning with the economic cycle, SEC has mandated companies to disclose their quantitative and qualitative assessments about risks and uncertainties. In 1997, SEC issues FRR No. 48 to focus on the risk reporting and mandate companies to disclose the information about market risk factors (i.e., stock prices, interest rates, exchange rates, and commodity prices). This is the first explicit risk-disclosure section in 10-K filing, "Qualitative and Quantitative Market Risks" (Item 7A). After experiencing stock market declines from 2000 to 2002, risk information has been provided more broadly in "Risk Factors" section in Item 1A. SEC mandated to disclose the risk information in a descriptive and qualitative way for conveying comprehensive information regarding unfavorable risks and uncertainties of the firm.

less specificity in the RFDs. Overall, they suggest that RFDs contribute to a better understanding of the fundamental risk of the firm, and are informative to equity market participants. In addition, Chiu et al. (2017) explore the information role of RFDs in debt markets, focusing on the pricing of credit instruments, CDS. They document that the CDS spreads decrease after RFDs are made suggesting the improvement of corporate risk transparency. More specifically, Chiu, Kim, and Wang (2018) show that customers' RFDs affect the investment efficiency of suppliers. Overall, prior studies provide evidence that the RFDs convey meaningful information about real corporate risk to various corporate stakeholders.

2.2. Prior Literature on CEO Overconfidence

Overconfidence has main facets comprising over-optimism, miscalibration, and the illusion of control (Skala 2008). Over-optimistic individuals are unrealistically optimistic about future outcomes (Weinstein 1980). This is related to an overestimation of the mean, where the overconfident individual believes that future outcomes will be better than what would be predicted by an unbiased individual. Regarding miscalibrated individuals, they have excess confidence in having accurate information (e.g., Ronis and Yates 1987; Gervais and Odean 2001). They overestimate the precision of their own information or underestimate the variance of future potential outcomes. The illusion of control illustrates that people overestimate their ability to control over uncertain events which they have limited influence and do not fully account for random or uncontrollable events (e.g., Langer

1975; Larwood and Whittaker 1977). Hence, overconfident individuals are viewed as less risk-averse.

Based on these dimensions of overconfidence, prior literature in accounting and finance have examined the effect of managerial overconfidence on corporate decision-making. Overconfident CEOs overestimate the future returns of firms' project, so they believe that their firms are undervalued in the external market and view external funds as unduly costly. Therefore, they use more internal funds but curtail investment when they require external financing (Malmendier and Tate 2005). For financing, they issue less equity compared to their peers and use more short-term debt (e.g., Graham et al. 2013; Malmendier et al. 2011). Moreover, since overconfident CEOs underestimate the negative result of their behavior and overestimate future outcomes, they overpay for target companies and undertake value-destroying mergers (Malmendier and Tate 2008). Based on either overestimation of future outcomes or underestimation of risk, however, Hirshleifer et al. (2012) suggest that firms with overconfident managers accept greater risk, invest more heavily in innovative projects, and achieve greater innovation. This suggests that overconfident managers can make success in the innovative industry by accepting good but risky projects. These findings suggest that managers' bias can greatly influence corporate decision-making including financing policies, acquisitions, and firm investment.

In addition, overconfidence can affect financing reporting behavior. Overconfident CEOs are more likely to make an initial misstatement suggesting a

greater possibility of earnings management since they have the optimistic bias for their future outcomes (Schrand and Zechman 2012). Ahmed and Duellman (2013) show evidence that overconfident CEOs delay recognition of losses, which results in less conservatism. Also, Hribar and Yang (2016) suggest that overconfidence is positively associated with issuing voluntary forecasts and is negatively associated with the width of the range since they view the future outcome as positive and have the confidence of having accurate information. Overall studies suggest that managers' personal characteristic can greatly influence companies in various aspects.

2.3. Hypothesis Development

Prior research suggests that the RFDs reflect real corporate risk, and so provide meaningful information to corporate stakeholders (e.g., Campbell et al. 2014; Chiu et al. 2017; Chiu et al. 2018). Our study, however, argues that there is a possibility that its statement can be deviated from the optimal level due to management overconfidence.

Prior research suggests that management incentive and bias can influence corporate financial reporting (e.g., Graham et al. 2005; Libby and Rennekamp 2012; Hribar and Yang 2016). For example, managers withhold bad news due to their career concerns including promotion, opportunities for external hiring, and potential termination (e.g., Graham et al. 2005; Kothari et al. 2009). Managers with an optimistic bias are more likely to make an initial misstatement (Schrand and Zechman 2012) and issue a forecast frequently (Libby and Rennekamp 2012). Also,

overconfident managers issue upwardly-biased forecasts, and narrower ranges (Hribar and Yang 2016). In this context, the hypothesis specifically focuses on whether CEO's overconfidence bias has an impact on the RFDs.

As aforementioned, overconfident managers overestimate their ability to generate a positive outcome, and so overestimate the probability of success and firms' prospects (i.e., over-optimism). Therefore, overconfident managers systematically overestimate future stock returns from the firm's projects and systematically overestimate the impact of favorable events on firm's cash flows (e.g., Heaton 2002; Malmendier and Tate 2005, 2008). In addition, they believe that they can effectively control corporate risk and uncertainty due to their illusion of control. Langer (1975) documents that an overconfident CEO who hand-picks a risky investment project believe he/she can control its outcome and to underestimate the likelihood of failure. Their strong belief about positive future outcomes and their superiority in risk-control may lead to the underestimation of the corporate risk and uncertainty.

Given that the RFDs are designed to provide information regarding corporate risk² but to allow discretion in its amount and content since it is a narrative style, risk-estimation bias of overconfident managers is likely to significantly affect the amount and content of RFDs. We predict that CEO overconfidence is negatively associated with the decision to disclose risk related information because of both over-

² Our hypothesis assumes that risk factors illustrate the "uncertainty" about future firm performance. According to Knight (1921), risk occurs where the future is not known, but the probability distribution of possible futures is known, and uncertainty occurs where the probability distribution is itself unknown. As proven by the SEC's guideline, the newly created Risk Factors section of the 10-K filings relates to "uncertainty" about future firm performance.

optimism and illusion of control. On the over-optimism dimension, overconfident CEOs have strong confidence to generate positive future outcomes. They believe that even in a risky and uncertain business environment, they can deal with difficulties and bring greater performance. Therefore, it is possible that overconfidence makes managers blind to corporate risks, which results in understating the risk reporting. On the illusion of control dimension, overconfident CEOs have the illusion that they can effectively control the risk. Even though they perceive corporate risk, they are less likely to disclose their risk perception on the Risk Factors section since they have a strong belief that they can effectively control the risk. Therefore, overconfident CEOs underestimate corporate risk, which consequently understate the risk reporting. Accordingly, we develop the following hypothesis.

Hypothesis: The level of RFDs is negatively associated with CEO overconfidence.

3. Research Design and Data

3.1. Risk Factor Disclosure Measure

The literature on textual risk disclosure presents various approaches to measure the risk disclosures. First, Li (2006) counts the frequencies of the risk-related words in the annual report. The words that Li (2006) used are risk, risks, risky, uncertain, uncertainty, and uncertainties. In a follow-up study, Kravet and Muslu

(2013) quantify the number of sentences that contain risk-related words to avoid unnecessary multiple counts of the same word. Campbell et al. (2014) count the total words in the Risk Factors section of the 10-K filings and total risk-words predefined.

Similarly, we measure risk disclosures by counting the number of keywords associated with risks as defined in Campbell et al. (2014), but more focus on Item 1A Risk Factors section. As risk-related keywords, Campbell et al. (2014) designate the words that can provide information about future risks and uncertainties that companies confront. Risk-related words are presented in Appendix B.

We adopt two main measures which are (1) total keyword counts and (2) keyword counts by subcategory in Risk Factors section by using the programming language Python. Due to its size, we use the natural logarithm of total keyword counts. The subcategory is used to classify the keywords associated with (1) financial risk, (2) litigation risk, (3) tax risk, (4) idiosyncratic risk, and (5) systematic risk. Financial risk category contains the keywords associated with liquidity, debt, covenants, or capital structure. Litigation risk has the keywords related to legal matters and tax risk contains the words related to tax avoidance. For idiosyncratic risk and systematic risk category, they include keywords related to firm-specific risk or economy-wide risk, respectively. So, *Riskfactor* is variable capturing RFDs which varies as *Total_count*, *Fin_count*, *Legal_count*, *Tax_count*, *Idio_count*, and *System_count*.

Total_count is the variable of total keyword counts defined as the log of the total number of keywords that appear in the Risk Factors section. For the variable of

keyword counts by subcategory, *Fin_count* is defined as the percentage of the number of keywords associated with financial risks that appear in the Risk Factors section. Similarly, *Legal_count*, *Tax_count*, *Idio_count*, and *System_count* are defined as the percentage of the total number of keywords associated with litigation risks, tax risks, idiosyncratic risks, or systematic risks in the Risk Factors section, respectively.

3.2. CEO Overconfidence Measure

Traditionally, the CEOs' overexposure to the idiosyncratic risk of their firm is used to measure the managers' overconfidence. To maximize the incentive effects of CEO compensation contracts with large quantities of stock and option grants, CEOs are not allowed to hedge their risk by short-selling company stock and their options are usually non-tradeable. Also, since bad performance in the company will negatively influence CEOs reputation and future employment, the value of CEOs' human capital is intimately linked to their firm performance. Therefore, managers are highly exposed to the idiosyncratic risk of their company.

Early exercise of stock options can decrease the idiosyncratic risk by reducing holdings of company stock (e.g., Lambert, Larcker, and Verrecchia 1991; Hall and Murphy 2000). Thus, risk-averse CEOs try to reduce idiosyncratic risk by exercising the option early given a sufficiently high stock price (e.g., Lambert et al. 1991; Hall and Murphy 2002). Overconfident CEOs, however, overestimate the future stock returns and consider that the firm is undervalued currently. Therefore,

they may postpone option exercise to enjoy expected abnormal gains in the future and hold options that are deep in-the-money.

Following Campbell et al. (2011), we compute one of our overconfidence measures as follows.³ To estimate the average exercise price of the aggregated options, we compute the realizable value per option and subtract the stock price at the fiscal year-end. Using Execucomp, the per-option realizable value can be obtained as an estimated aggregate value of in-the-money vested options at fiscal year-end divided by the aggregate number of unexercised options held by the executive at fiscal year-end. Then, option in-the-money is calculated as per-option realizable value divided by the estimated average exercise price. If this option in-the-money is more than 67% at some point in year 5, CEO is classified as overconfident. One of our overconfidence measures, *Conf_67*, is an indicator variable which equals 1 if CEOs hold options that are more than 67% in-the-money, and 0 otherwise.

The second measure of overconfidence is based on Li et al. (2014). Since Malmendier and Tate (2005) create measures on the extent to which CEOs delay to exercise their options, they need accumulated data over many years. To avoid missing data, recent studies create measures by using only end-of-year information (e.g., Schrand and Zechman 2012; Li et al. 2014). To calculate the overconfidence

³ This study adopts one of the Malmendier and Tate (2005)'s measures, *Holder67*. Malmendier and Tate (2005, 2008) compute the percentage in-the-money for option package and classify the CEO as overconfident if an option is more than 67% in-the-money in year 5. Since the private data that Malmendier and Tate's use is not disclosed, we follow Campbell et al. (2011) which develop overconfidence measure with publicly available data following Malmendier and Tate.

measure following Li et al. (2014), we measure the value of the total holdings of the CEO, which is the sum of the value of unexercised exercisable options, unexercisable options, and shares of stock. Our second overconfidence measure *Conf_hold* is measured as the value of the unexercised exercisable options divided by the value of the total holdings of the CEO. While *Conf_67* excludes unexercisable options to identify CEOs who chose to hold options that could have been exercised, *Conf_hold* includes both exercisable options and unexercisable options to capture the total holdings of the CEO.

3.3. Model Specification

To test the impact of CEO overconfidence on the RFDs, we estimate the following regression model:

$$\begin{aligned}
 Riskfactor_{i,t} = & \beta_0 + \beta_1 Overconf_{i,t} + \beta_2 Size_{i,t} + \beta_3 BTM_{i,t} + \beta_4 Annret_{i,t} + \beta_5 Lev_{i,t} + \\
 & \beta_6 Earn_{i,t} + \beta_7 ETR_{i,t} + \beta_8 Spread_{i,t} + \beta_9 Skew_{i,t} + \beta_{10} Turn_{i,t} + \beta_{11} BigN_{i,t} + \\
 & \beta_{12} Num_Analyst_{i,t} + \beta_{13} Stderet_{i,t} + \beta_{14} Vol_earn_{i,t} + Year\ effects + \\
 & Industry\ effects + \varepsilon_{i,t}
 \end{aligned} \tag{1}$$

where *Riskfactor_{i,t}* is a variable capturing RFDs including number of total risk-related words (*Total_count*), number of financial risk-related words (*Fin_count*), number of litigation risk-related words (*Legal_count*), number of tax risk-related words (*Tax_count*), number of idiosyncratic risk-related words (*Idio_count*), and number of systematic risk-related words (*System_count*).

Following Campbell et al. (2014), we control for the determinants of Risk Factors section using market capitalization (*Size*), book-to-market (*BTM*), annual stock returns (*Annret*), leverage (*Lev*), earnings (*Earn*), effective tax rate (*ETR*), bid-ask spread (*Spread*), stock return skewness (*Skew*), turnover (*Turn*), Big N auditor (*BigN*), number of analyst following (*Num_Analyst*), stock return volatility (*Stderet*), and earnings volatility (*Vol_earn*). In Appendix A, detailed definitions of the variables are presented.

The model includes firm size since large firms have a lower risk (Fama and French 1993) while they also face greater litigation risk (Watts and Zimmerman 1986). Book-to-market is used to control growth opportunity (Bamber and Cheon 1998) which can influence firm risk either positively or negatively. The annual stock return could have an impact on firm risk. When stock returns are high, investor's expected rate of return increases and when stock returns are low, firm risks can increase fundamentally. Leverage is included to control for default risk. Since low profit can increase firm risk, we include earning as a control measure. Because tax avoidance is subject to audit risk (Guedhami and Pittman 2008), the effective tax rate is included in the regression model.

Bid-ask spread is used since the spread is a proxy for information asymmetry (Khan and Watts 2009). Information asymmetry can significantly increase the firm risk by making costlier external financing. Stock return skewness is included to control large and positive stock price movement and turnover is controlled for information uncertainty (Jiang, Lee, and Zhang 2005). Big N auditor

is associated with high audit quality which leads to lower risk. Preventing litigation risk, Big N auditor can require clients to provide more risk disclosures (Lennox 1999). The number of analyst following is used to control for investors' demands for transparency disclosure (Lang and Lundholm 1996). Stock return volatility and earnings volatility are also essential for controlling the operating risk and business risk environment of the company (Kothari, Li, and Short 2009).

To mitigate the concerns about generic disclosures and control for macroeconomic factors across time and industry, we include year fixed effects and industry fixed effects where the industry is defined at the two-digit SIC codes.

3.4. Data

Since we are interested in the effects of CEO overconfidence on the Risk Factors section, we begin the sample selection with the first year in which the SEC mandated this disclosure. Accordingly, we analyze a sample of 6,618 firm-year observations from the years 2005 to 2017. We obtain financial information in Compustat, equity market data from CRSP, analyst following data from I/B/E/S, overconfidence data from Execucomp, and "Risk Factors" disclosure data from SEC's Electronic Data Gathering and Retrieval (EDGAR) database.⁴

⁴ To measure the RFDs, we conduct textual analysis by using Python. In the EDGAR database, annual Form 10-K filings which contain Risk Factors section can be downloaded. After downloading 10-K filings for fiscal years between 2005 and 2017, we extract the "Item 1A. Risk Factors" section and analyze the contents of this disclosure.

We remove all observations that lack necessary data from various databases and truncate all necessary data at the top and bottom 1% to mitigate the influence of outliers.

4. Empirical Results

4.1. Descriptive Statistics and Univariate Analysis

Table 1 presents descriptive statistics for the 6,618 firm-year observations. Panel A shows the sample descriptive statistics for the RFDs variables used in our analysis. Our main dependent variable among proxy for RFDs, *Total_count*, has a median of 5.704 and a mean of 5.647. The untabulated mean (median) of the raw data of *Total_count* is 283 (300). This is slightly greater than Campbell et al. (2014)⁵ since RFDs increase over time and our sample period is 2005 to 2017 while Campbell et al. (2014) have 2005 to 2008. The table shows that our sample is distributed evenly. Most of the keywords relate to idiosyncratic risk (62.7%) and systematic risk (23.1%) which is consistent with Campbell et al. (2014).

Panel B of Table 1 shows the descriptive statistics for other variables. *Conf_67* has a mean of 0.316 which is consistent with prior literature.⁶ *Conf_hold* has a median of 0.206 and a mean of 0.186. The results of all other variables are

⁵ Campbell et al. (2014) find that, on average, 293 of the keywords appear in the Item 1A.

⁶ Campbell et al. (2011) find that 34.1% of firm-years can be classified as having an overconfident CEO. Ahmed and Duellman (2013) find that 35.1% of firm-years have an overconfident CEO.

mostly in accordance with those of other prior studies (e.g., Campbell et al. 2014; Huang, Teoh, and Zhang 2014).

[Insert Table 1]

Table 2 presents the Pearson correlations for the variables used in our analysis. While the correlation between overconfidence and number of keywords are significantly negative, we employ a multivariate regression model, equation (1), to test our hypothesis.

[Insert Table 2]

4.2. Total keyword counts and keyword counts in subcategories and CEO Overconfidence

Table 3 presents multivariate evidence regarding our hypothesis. All p-values are based on two-tailed tests and firm-clustered standard errors are reported. In panel A, *Conf_67* and *Conf_hold* are used as main variables of interest for the first and the second column, respectively. For all 2 specifications, we find negative and statistically significant coefficients on overconfidence measures. The results are consistent regardless of whether *Conf_67* or *Conf_hold* is used. These results support the hypothesis that CEO overconfidence and RFDs are negatively correlated, suggesting that overconfident CEOs disclose less risk. Specifically, the coefficient on *Conf_67* is significantly negative at the 5% level and the coefficient on *Conf_hold* is significantly negative at the 1% level.

[Insert Table 3]

The estimates of the coefficients of other control variables generally exhibit expected signs. Firms increase their RFDs when they have higher annual returns, more leverage, higher spread, higher turnover, the greater number of analyst following, and higher earnings volatility. Additionally, results show that firms increase their RFDs when they have a smaller size and lower earnings.

Panel B of Table 3 presents multivariate regression results across five identified risk subcategories. Among 10 specifications, we find negative and statistically significant coefficients on overconfidence measures for 8 regression results, indicating that CEO overconfidence is associated with less RFDs. This is because the illusion of control does not disappear under a different situation (Langer 1977). However, there is no statistically significant evidence that overconfident CEOs report less tax risk-related keywords. That could be because tax risk associated keywords are composed of ‘I.R.S.’, and ‘Tax audit’. The risk is closely related to compliance. Unlike other pure uncertainty issues, tax related risk is quite predictable with limited scope for risk analysis.

For the additional control variables, *Size* is negatively related with the *Idio_count* and positively related with the *Legal_count*. This is reasonable since large firms are more stable and thus can diversify their risks (Fama and French 1993), and SEC mandates stricter regulations for larger firms.⁷ *Lev* is positively associated with

⁷ In 2008, the SEC amended Regulation S-K to expand the number of firms that qualify for scaled (by size) disclosure requirements (SEC 2008). In 2010 the Dodd-Frank Act (Public Law No: 111-203) provided smaller (non-accelerated) filers with a permanent exemption from Sect. 404 of the Sarbanes–

the *Fin_count*, indicating that a level of debt increases a firm's default risk. There is a negative and significant association between *ETR* and *Tax_count*, suggesting that firms engaged in greater tax avoidance are subject to greater audit risk from Internal Revenue Service (Guedhami and Pittman 2008). All these results suggest that RFDs provide meaningful information on firms.

Combining the results from Table 3, we conclude that CEO overconfidence is less likely to disclose risk factors. Overconfident CEOs disclose less risk-associated keywords because they have the illusion that they can effectively control the risks.

5. Robustness Tests

5.1. Alternative Risk Factor Disclosure Measure

5.1.1. Fog Index of Risk Factors Section and CEO Overconfidence

As an alternative measure of RFDs, we use the fog index of the Risk Factors section⁸ which captures text complexity (Li 2008). Since overconfident managers have the illusion of control, they may hesitate to elaborate on the firms' risk exposures. Therefore, we predict that overconfident managers provide concise RFDs.

Oxley Act of 2002. Ettredge, Johnstone, Stone, and Wang (2011) document that firm size is positively associated with regulatory compliance.

⁸ Fog Index is a function of the number of words per sentence plus the percentage of words that are complex. This sum is scaled by a constant (0.4) and Li (2008) find a negative relationship between profitability and Fog (i.e., profitable firms have less complex reports).

We observe a negative and statistically significant association between *Conf_67* and RFDs, while *Conf_hold* is not significant. While the results are mostly similar to those of previous variable specifications, less significant results for *Conf_hold* may be due to omitted variables such as earnings management engagement. The prior study shows that managers provide more complex reports when they have engaged in earnings management (Lo, Ramos, and Rogo 2017). While the additional specification for the regression model is needed to incorporate readability variable in disclosure, we may partially conclude that overconfident CEOs report more readable disclosure. These results are basically consistent with our primary hypothesis that CEO overconfidence is negatively associated with RFDs.

[Insert Table 4]

5.1.2. Risk Factor Disclosures including MD&A section and CEO Overconfidence

Given that MD&A section has been mandated to provide business operations and the prospect of firms ‘through the eyes of management’ to information users, MD&A section, compared to other sections, is expected to reflect CEOs’ voice about their business relatively better. Thus, we include the MD&A section and use a count of risk-words contained in Risk Factors (hereafter RF) and MD&A section as a dependent variable.⁹

⁹ Campbell et al. (2014) also include both RF and MD&A section for risk-words counting.

In panel A of Table 5, an association between managerial overconfidence and total risk keywords in RF and MD&A section is significantly negative, consistent with our main analysis. For fog index, the results are similar with the results in table 4 showing a negative association between the fog index and overconfidence, but *Conf_hold* is not significant. Panel B documents results of the sub-categorical risk-word counts. We find significantly negative results for all sub-categorical word counting except for tax-related word counting. Insignificant results on *Tax_count* can be interpreted using the same reasoning described earlier. Overall, overconfident CEOs is less likely to disclose corporate risk factors.

[Insert Table 5]

5.2. Alternative CEO Overconfidence Measure: Over-Investment

Ahmed and Duellman (2013) utilize two alternative measures of overconfidence based on the investment decisions of the CEO (e.g., Malmendier and Tate 2005, 2008; Ben-David et al. 2013). Overconfident managers tend to overinvest in assets relative to their sales growth since they have optimistic expectation of their investments' outcome. It results in above-average growth in assets relative to sales growth. Following Ahmed and Duellman (2013), we regress total asset growth on sales growth and create an indicator variable, *Over_invest*, that equals one if the residual is greater than zero, otherwise zero.

Table 6 presents results from estimating equation (1) using *Over_invest* as

the alternative measure of CEO overconfidence. Since *Over_invest* is measured by using Compustat data, it has 27,426 firm-year observations which are far greater than the observations of *Conf_67* and *Conf_hold*. Even when we use *Over_invest*, the results remain unchanged. Taken together, the results from Table 3 to Table 6 indicate that CEO overconfidence lowers RFDs.

[Insert Table 6]

6. Additional Test

Managers of firms facing large economic changes provide more in-depth discussion and analysis than before (Brown and Tucker 2011). The global financial crisis in 2008 and the following recession led to severe hardship for all entities, significantly increasing corporate risk (e.g., Harrington 2009; Campello, Graham, and Harvey 2010). Hence, the crisis can affect managers' reporting decision about RFDs. Figure 1 documents that there is an increasing trend in RFDs over time and the slope for 2007-2009 is slightly steeper than other periods.¹⁰

Given that the financial crisis is the biggest shock to the worldwide financial system and overall risks such as liquidity risk, credit risk, and economic uncertainty significantly increased during the period, even overconfident CEOs may

¹⁰ Similarly, Brown and Tucker (2011) show that the length of MD&A consistently increases from 1997 to 2006, except the period from 2004 to 2005. This possibly triggered by more regulations as well as a more litigious environment after the Enron and WorldCom scandals.

reestimate their corporate risk and describe their risk factors in their annual filings. We investigate whether the global financial crisis changes overconfident managers' behavior in reporting the risk factors.

[Insert Figure 1]

Following Badertscher, Burks, and Easton (2012), we classify the period as the pre-crisis (2005 and 2006) and post-crisis (2007 and 2008) periods and add an interaction term between managerial overconfidence and a post-crisis dummy variable.¹¹ So, we estimate following regression model by using 1,874 firm-year observations:

$$\begin{aligned}
 Total_count_{i,t} = & \beta_0 + \beta_1 Overconf_{i,t} + \beta_2 Post_{i,t} + \beta_3 Overconf_{i,t} * Post_{i,t} + \beta_4 Size_{i,t} + \\
 & \beta_5 BTM_{i,t} + \beta_6 Annret_{i,t} + \beta_7 Lev_{i,t} + \beta_8 Earn_{i,t} + \beta_9 ETR_{i,t} + \beta_{10} Spread_{i,t} + \\
 & \beta_{11} Skew_{i,t} + \beta_{12} Turn_{i,t} + \beta_{13} BigN_{i,t} + \beta_{14} Num_Analyst_{i,t} + \beta_{15} Stderet_{i,t} + \\
 & \beta_{16} Vol_earn_{i,t} + Year\ effects + Industry\ effects + \varepsilon_{i,t} \quad (2)
 \end{aligned}$$

There can be three possible results. Despite underestimation of risk by overconfident CEOs, then the interaction term will be significantly positive if overconfident CEOs are overwhelmed by the global financial crisis and adjust their assessment of corporate risk. If the underestimation of risk is more strengthened even

¹¹ To balance the sample between pre-period and post-period, we use observations only from 2005 to 2008.

during the global crisis, implying that managers overestimate their ability even more under the unfavorable situation compared to the peers, then the interaction term will be negative and significant. In addition, it is possible that the effect of overconfidence on RFDs would not be changed under the recession since overconfidence is the inborn character (Langer 1977).

Table 7 shows the positive coefficient on *Post* suggesting that the RFDs indeed increase during the crisis. However, the coefficient on *Overconf* Post* is not significant, indicating that overconfident CEOs do not change their reporting behavior in the risk factors. In other words, overconfident managers still maintain their attitude toward risk even around the financial crisis. This suggests that their illusion of control and optimism are not eroded by even extremely negative external shock. This result is consistent with the argument of Langer (1977) that since overconfidence, particularly illusion of control, is the inborn character, overconfidence-driven behaviors are not affected by other external factors.

[Insert Table 7]

7. Conclusion

This paper examines how managerial overconfidence impacts the amount and content of RFDs. Since overconfident managers underestimate risk due to their over-optimism, illusion of control, and miscalibration, we predict that overconfidence and RFDs will be negatively related. Using 6,618 firm-year

observations from 2005 to 2017, we find that CEO overconfidence is negatively and significantly associated with the risk-word counts and subcategorical risk-word counts except for tax-related risk keywords. These results are consistent with our prediction.

Our result is robust to the alternative measurements of RFDs and managerial overconfidence. Furthermore, we investigate the effects of CEO overconfidence on RFDs during the 2008 global financial crisis. Corporate risk significantly increased around the global financial crisis, which may change the risk reporting behavior of overconfident CEOs. Even in the crisis, however, overconfident CEOs disclose fewer risk factors, suggesting that their underestimation of risk is not affected by extremely negative external shock.

Our results are subject to certain limitations. First, although we attempt to control for many alternative variables, the possibility of omitted variables remains. For example, the less significant results for *Conf_hold* variable may be due to omitted variables such as earnings management engagement. Second, one may suspect whether the risk-related words are really associated with corporate risks. For mitigating this concern, we try to count keywords following the prior literature, Campbell et al. (2014). Chiu et al. (2017) quantify the contents of RFDs following Campbell et al. (2014), suggesting that the consensus on risk-related words' appropriacy has gradually emerged.

This study contributes to the literature in the following ways. First, while prior literature primarily suggests that the Risk Factors section provides meaningful

information to stakeholders in an unbiased manner, we find evidence that its statement can be deviated from the optimal level due to management overconfidence. Hence, we raise concerns that the understated risk factors by overconfident CEOs may mislead corporate information users. Second, while prior literature on overconfidence mainly focuses on the corporate decision for investment and financing policy, this study adds to evidence that management overconfidence also affects corporate reporting and eventually leads to suboptimal decision makings by stakeholders. More specifically, we show that overconfident CEOs also distort the risk factor reporting by understating it. Managers characteristics is an important factor for consideration because it could bias the supposedly optimal reporting and disclosure which in turn have a significant impact on subsequent economic decision makings by various stakeholders.

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Appendix A

Definitions of Variables

This appendix lists the variables used in our analyses

Main Variable	Definition
Keywords	
Total_count	Log of the total number of keywords in the Item 1A
Fin_count	Percentage of the number of financial risk-related keywords Keyword counts in the Risk Factors section referring to financial risk exposure divided by total keyword counts
Legal_count	Percentage of the number of litigation risk-related keywords Keyword counts in the Risk Factors section referring to litigation risk exposure divided by total keyword counts
Tax_count	Percentage of the number of tax risk-related keywords Keyword counts in the Risk Factors section referring to tax risk exposure divided by total keyword counts
Idio_count	Percentage of the number of idiosyncratic risk-related keywords Keyword counts in the Risk Factors section referring to idiosyncratic risk exposure divided by total keyword counts
System_count	Percentage of the number of systematic risk-related keywords Keyword counts in the Risk Factors section referring to systematic risk exposure divided by total keyword counts
Fog_index	(Words per sentence + percent of complex words)*0.4
Overconf	
Conf_67	Indicator variable which equals 1 if CEOs hold options that are more than 67% in-the-money, and 0 otherwise
Conf_hold	Value of the unexercised exercisable options divided by the value of the total holdings of the CEO
Over_invest	Indicator variable which equals 1 if the residual from the excess investment regression (total asset growth on sales growth) is greater than zero, and 0 otherwise
Control Variable	Definition
Size	Log of the market value of equity (PRCC_F*CSHO)

BTM	Book value of equity divided by the market value of equity
Annret	12-month stock return beginning in the fourth month of the fiscal year and ending in the third month after fiscal year-end A continuous stream of 12 monthly returns is required
Lev	Firm's book value of debt (DLTT + DD1) divided by total assets Missing values of debt due in one year (DD1) are replaced with zero
Earn	Earnings before extraordinary items scaled by total assets
ETR	Total tax expense divided by pre-tax income
Spread	Firm's average ending bid-ask spread divided by ending stock price for the 250 trading day period ending two trading days before the 10-K release
Skew	Skewness of daily stock returns for the 250 trading day period ending two trading days before the 10-K release
Turn	Average daily share turnover expressed as a percentage for the 250 trading day period ending two trading days before the 10-K release
BigN	Dummy variable taking on a value of one for firms with a Big N auditor
Num_Analyst	Number of analysis following the firm as reported by I/B/E/S
Stderet	Standard deviation of daily abnormal stock returns for the 250 trading day period ending two trading days before the 10-K release Abnormal stock returns are calculated using the error term from the market model, with a firm-specific coefficient on market returns
Vol_earn	Standard deviation of earnings before extraordinary items scaled by total assets calculated over the last 5 years, with at least three years of data is required

Appendix B

Keywords List by Risk Category

This appendix lists the keywords used in our analyses

Panel A. <i>Financial</i> Risk Category Keyword			
Anti-takeover	Bank debt	Covenant(s)	Capital expenditure(s)
Collateral	Capital lease(s)	Credit	Concentrated ownership
Credit rating	Credit risk	Debt burden	Decline in stock price
Default	Defined Benefit	Dilution	Dividends
Downgrade	Family	Financing costs	Financial condition
Funded status	Illiquid market	Improvements	Indebtedness
Insider sales	Lease(Leasing)	Investment in plant	Investment in equipment
Leverage	Leveraged lease(s)	Limited trading	Liquidity
Loan	Locked-in	Maturity	Mandatory contribution
New financing	Obligations	OPEB(O.P.E.B.)	Refinance
Operating losses	Penny stock	Rating	Sale of productive assets
Refinancing	Reserves	Stock market listing	Underfunded pensions
Revolver	Stock price drop	Stock price volatility	Volatility of revenues
Underwriting	Volatility of sales	Working capital	
Volatility of operating results		Negative operating cash flow	
Panel B. <i>Litigation</i> Risk Category Keyword			
Anti-trust	Adverse judgment	Casualty	Charged
Class action	Compliance	Comply	Conflict(s) of interest
Contamination	Defendant	Deregulation	Enforcement
Environmental	Enforceability of judgments	Possibility of restatement(s)	Effects of implementing new method(s)
FDA approval	Federal	Fines	Fraud
Government policy	Government approval	Government investigation	Effects of implementing new standard(s)
IFRS(I.F.R.S.)	Infringe	Injury	Inquiry(Inquiries)
Investigation(s)	Legislation	Litigation	Intellectual property

Hazardous	Penalty(Penalties)	Pending lawsuit(s)	Pay damages
Plaintiff	Product liability	Regulation(s)	Potential lawsuit(s)
Regulatory	Regulatory change	Regulatory approval	Regulatory compliance
Related party	Remediation	Restatement(s)	Regulatory environment
Safety	Superfund	Uncertainties regarding accounting estimates	

Panel C. *Tax* Risk Category Keyword

Aggressive tax	Back taxes	Deferred tax asset(s)	Deferred tax liability
Excise tax(es)	FIN 48	IRS(I.R.S.)	Internal Revenue Service
IRS audit	IRS judgment	Loss carryback(s)	Loss carryforward(s)
Property tax(es)	State tax(es)	Tax(es)	Tax penalty(penalties)
Tax audit	Tax authority	Tax liability	Taxable
Provision for income tax(es)			

Panel D. *Idiosyncratic* Risk Category Keyword

Acquisition	Adequate staffing	Asset securitization	Asset impairment(s)
Assimilation	Advertising	Backlog	Brand recognition
Brand	Certification	Clinical trial(s)	California power crisis
Commercialize	Concentration	Consolidation	Construction
Contract(s)	Copyright(s)	Corporate culture	Customer service
Cost control	Delivery	Distribution	Customer concentration
Distributors	Downsizing	Economies of scale	Embargo
Enron	Expand	Expanding	Expansion
Export(s)	Facilities	Franchise	Franchisee
Goodwill	Impairment	Intangible	Integrate(integration)
Intellectual	Internal control(s)	Internet	Investment in subsidiary
Innovation	IT(I.T.)	Insurance coverage	Information technology
Joint venture(s)	Key personnel	Labor cost(s)	Labor relations
Labor union(s)	License(s)	Maintenance	Preclinical

Marketing	Market acceptance	Material weakness	Management retention
MBS(M.B.S.)	MSR(M.S.R.)	Natural disasters	Product development
Merger	Online	New construction	New product acceptance
Orders	Reliance on key customer(s)	Limited operating history	New product development
Product mix	Proprietary	Personnel	No current operations
Publicity	Redundancy	Reporting controls	Product performance
Patent	Restructuring	SARS	Sarbanes-Oxley
Secret(s)	Security	Shortages	Reliance on key supplier
Single supplier	Software	Sole supplier	Single customer
Strike	Supply chain	Synergy(Synergies)	SPE(S.P.E.)
Systems	Training	Trademark(s)	Special purpose entity
Trade	Tariff(s)	Technologies	Union election
Vendor(s)	VIE(V.I.E.)	Weather	Variable interest entity
Web security	Website(s)	Technological obsolescence	

Panel E. *Systematic* Risk Category Keyword

Afghanistan	Aggregate demand	Asian crisis	Business conditions
Call	Capacity	Coal	Consumer spending
Competitor(s)	Competition	Complement	Consumer confidence
Consumption	Commodity	Concentration	Currency fluctuation(s)
Cyclical	Demand	Derivative(s)	Discounting
Economic(s)	Economic growth	Economic condition	Economic downturn(s)
Economy	Electricity	Energy	Economic uncertainties
EU(E.U.)	Euro	European Union	Exchange rate(s)
Financial crisis	Fiscal policy	Foreign currency	Foreign exchange
Forward(s)	Fuel	Future	Gas
Gasoline	GDP(G.D.P.)	GNP(G.N.P.)	General business risks
Gold	Growth rate(s)	General conditions	Housing starts
Hedge	Hedging	Housing	Industry environment

Inflation	Iraq	Industry condition	Materials
Market demand	Market supply	Marketplace	Mining
Metal(s)	Middle East	Mineral(s)	Monetary policy
Mortgage	Natural gas	Obsolescence	Operating environment
Oil	Option	Ore	Overstocked
Peso	Petroleum	Political climate	Prices
Pound	Political instability	Price pressure	Pricing power
Raw material(s)	Real	RMB	Recession
REIT(R.E.I.T.)	Renminbi	Ruble	Rupee
Seasonal	Saving	September 11 th	Substitute(s)
Swap	Terrorism	U.S. dollar	
Real estate investment trust		General economic conditions	

Figure 1

Risk Factor Disclosures over Time, 2005-2017

This figure presents the trends of RFDs over the sample period, 2005-2017. It plots the mean of the variable in the period. The left axis applies to the “Keyword counts” plot.

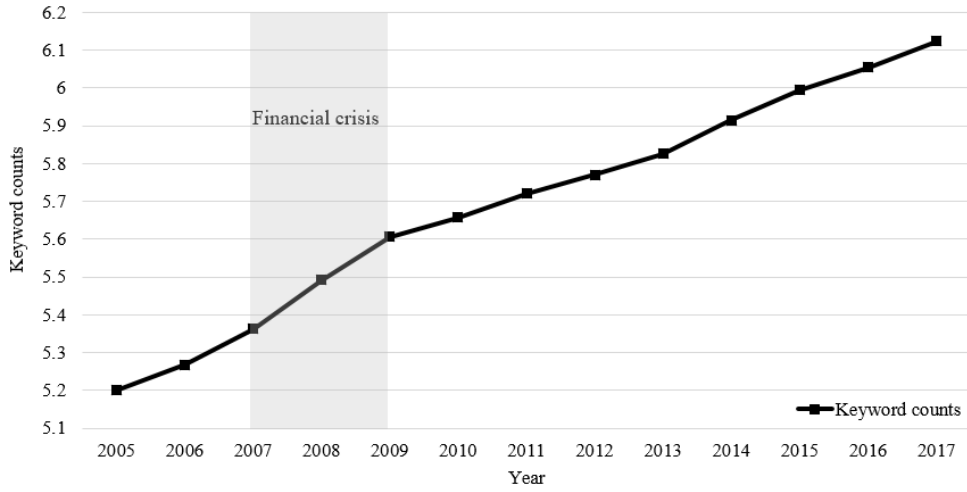


TABLE 1**Descriptive Statistics**

This table presents descriptive statistics for the variables used in our analyses. Detailed definitions of variables are included in Appendix A. The sample includes 6,618 firm-year observations from 2005 to 2017. All variables are winsorized each year at 1% and 99%.

Panel A. Descriptive statistics for RFDs (N = 6,618)							
	Mean	Std	P10	Q1	Median	Q3	P90
Total_count	5.647	0.794	4.754	5.215	5.704	6.151	6.534
Fog_index	20.424	2.182	18.539	19.384	20.281	21.238	22.198
Fin_count	0.060	0.030	0.027	0.039	0.055	0.076	0.099
Legal_count	0.067	0.032	0.026	0.044	0.064	0.088	0.109
Tax_count	0.014	0.015	0.001	0.004	0.009	0.020	0.035
Idio_count	0.627	0.067	0.531	0.584	0.638	0.675	0.704
System_count	0.231	0.061	0.162	0.190	0.223	0.265	0.318
Panel B. Descriptive statistics for other variables (N = 6,618) (*N = 27,426 for <i>Over_invest</i>)							
	Mean	Std	P10	Q1	Median	Q3	P90
Conf_67	0.316	0.465	0.000	0.000	0.000	1.000	1.000
Conf_hold	0.186	0.278	0.117	0.154	0.206	0.348	0.392
Over_invest	0.356	0.511	0.000	0.000	0.000	1.000	1.000
Size	7.817	1.528	5.912	6.730	7.721	8.875	9.885
BTM	0.429	0.319	0.123	0.225	0.364	0.564	0.818
Annret	0.186	0.474	-0.320	-0.088	0.134	0.370	0.697
Lev	0.217	0.186	0.000	0.044	0.201	0.328	0.462
Earn	0.068	0.090	-0.011	0.031	0.066	0.108	0.160
ETR	0.237	0.405	0.003	0.219	0.322	0.373	0.406
Spread	0.032	0.015	0.017	0.022	0.029	0.038	0.051
Skew	0.198	1.142	-0.907	-0.254	0.153	0.612	1.377
Turn	2.322	1.539	0.918	1.290	1.924	2.869	4.282
BigN	0.911	0.284	1.000	1.000	1.000	1.000	1.000
Num_Analyst	5.744	4.173	2	3	5	8	12
Stderet	0.025	0.012	0.013	0.016	0.022	0.030	0.039
Vol_earn	0.060	0.079	0.009	0.016	0.031	0.067	0.142

TABLE 2**Correlations**

This table presents the Pearson correlations for the variables used in our analyses. Detailed definitions of variables are included in Appendix A. The sample includes 6,618 firm-year observations from 2005 to 2017. All variables are winsorized each year at 1% and 99%. Significance levels are presented in italic below the correlations.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Conf_67	1.000	-0.0820 <i><.0001</i>	-0.0711 <i><.0001</i>	0.1450 <i><.0001</i>	0.0316 <i>0.0101</i>	0.0137 <i>0.2669</i>	-0.1311 <i><.0001</i>	-0.0494 <i><.0001</i>	0.0831 <i><.0001</i>	0.0480 <i><.0001</i>	0.0653 <i><.0001</i>	0.0310 <i>0.0116</i>	0.0303 <i>0.0137</i>	0.0702 <i><.0001</i>	0.0194 <i>0.1137</i>
2. Total_count	-0.0820 <i><.0001</i>	1.000	-0.0426 <i>0.0005</i>	0.0238 <i>0.0526</i>	0.0411 <i>0.0008</i>	0.0354 <i>0.0039</i>	-0.1190 <i><.0001</i>	-0.0704 <i><.0001</i>	0.0714 <i><.0001</i>	-0.0049 <i>0.6915</i>	0.1058 <i><.0001</i>	-0.0491 <i><.0001</i>	0.0284 <i>0.0186</i>	0.0758 <i><.0001</i>	0.1321 <i><.0001</i>
3. Size	-0.0711 <i><.0001</i>	-0.0426 <i>0.0005</i>	1.000	-0.3717 <i><.0001</i>	0.0484 <i><.0001</i>	0.1896 <i><.0001</i>	0.2374 <i><.0001</i>	0.0757 <i><.0001</i>	-0.5525 <i><.0001</i>	-0.0768 <i><.0001</i>	-0.0144 <i>0.2411</i>	0.2991 <i><.0001</i>	0.4133 <i><.0001</i>	-0.5139 <i><.0001</i>	-0.2902 <i><.0001</i>
4. BTM	0.1450 <i><.0001</i>	0.0238 <i>0.0526</i>	-0.3717 <i><.0001</i>	1.000	-0.2299 <i><.0001</i>	-0.1117 <i><.0001</i>	-0.3572 <i><.0001</i>	-0.0277 <i>0.0243</i>	0.3698 <i><.0001</i>	-0.0278 <i>0.0238</i>	0.0660 <i><.0001</i>	-0.0586 <i><.0001</i>	-0.0652 <i><.0001</i>	0.3684 <i><.0001</i>	0.0006 <i>0.9627</i>
5. Annret	0.0316 <i>0.0101</i>	0.0411 <i>0.0008</i>	0.0484 <i><.0001</i>	-0.2299 <i><.0001</i>	1.000	-0.0164 <i>0.1830</i>	0.1026 <i><.0001</i>	-0.0277 <i>0.0149</i>	-0.1175 <i><.0001</i>	0.3213 <i><.0001</i>	-0.0484 <i><.0001</i>	-0.0159 <i>0.1970</i>	-0.0382 <i>0.0019</i>	-0.1224 <i><.0001</i>	0.0528 <i><.0001</i>
6. Lev	0.0137 <i>0.2669</i>	0.0354 <i>0.0039</i>	0.1869 <i><.0001</i>	-0.1117 <i><.0001</i>	-0.0164 <i>0.1830</i>	1.000	-0.2126 <i><.0001</i>	-0.0077 <i>0.5289</i>	-0.0443 <i>0.0009</i>	-0.0227 <i>0.0653</i>	0.0615 <i><.0001</i>	0.1646 <i><.0001</i>	0.0097 <i>0.4297</i>	-0.0434 <i>0.0004</i>	-0.1161 <i><.0001</i>
7. Earn	-0.1311 <i><.0001</i>	-0.1190 <i><.0001</i>	0.2374 <i><.0001</i>	-0.3572 <i><.0001</i>	0.1026 <i><.0001</i>	0.6881 <i><.0001</i>	1.000	0.0370 <i>0.0026</i>	-0.2901 <i><.0001</i>	-0.0080 <i>0.5132</i>	-0.0352 <i>0.0041</i>	-0.0297 <i>0.0156</i>	0.0658 <i><.0001</i>	-0.2769 <i><.0001</i>	-0.0850 <i><.0001</i>
8. ETR	-0.0494 <i><.0001</i>	-0.0704 <i><.0001</i>	0.0757 <i><.0001</i>	-0.0277 <i>0.0243</i>	-0.0299 <i>0.0149</i>	-0.0078 <i>0.5289</i>	0.0370 <i>0.0026</i>	1.000	-0.1129 <i><.0001</i>	-0.0309 <i>0.0119</i>	-0.0319 <i>0.0094</i>	0.0164 <i>0.1835</i>	0.0568 <i><.0001</i>	-0.1128 <i><.0001</i>	-0.2160 <i><.0001</i>
9. Spread	0.0831 <i><.0001</i>	0.0714 <i><.0001</i>	-0.5525 <i><.0001</i>	0.3698 <i><.0001</i>	-0.1175 <i><.0001</i>	-0.0443 <i>0.0003</i>	-0.2901 <i><.0001</i>	-0.1129 <i><.0001</i>	1.000	0.0802 <i><.0001</i>	0.4216 <i><.0001</i>	-0.1609 <i><.0001</i>	-0.0618 <i><.0001</i>	0.9573 <i><.0001</i>	0.3713 <i><.0001</i>
10. Skew	0.0480 <i><.0001</i>	-0.0049 <i>0.6915</i>	-0.0768 <i><.0001</i>	-0.0278 <i>0.0238</i>	0.3213 <i><.0001</i>	-0.0227 <i>0.0653</i>	-0.0352 <i>0.0041</i>	-0.0309 <i>0.0119</i>	0.0802 <i><.0001</i>	1.000	-0.0188 <i>0.1256</i>	-0.0212 <i>0.0848</i>	-0.0220 <i>0.0738</i>	0.1091 <i><.0001</i>	0.0789 <i><.0001</i>
11. Turn	0.0653 <i><.0001</i>	0.1058 <i><.0001</i>	-0.0144 <i>0.2411</i>	0.0660 <i><.0001</i>	-0.0484 <i><.0001</i>	0.0615 <i><.0001</i>	-0.0080 <i>0.5132</i>	-0.0319 <i>0.0094</i>	0.4216 <i><.0001</i>	-0.0188 <i>0.1256</i>	1.000	0.0647 <i><.0001</i>	0.2660 <i><.0001</i>	0.4529 <i><.0001</i>	0.2330 <i><.0001</i>
12. BigN	0.0310 <i>0.0116</i>	-0.0491 <i><.0001</i>	0.2991 <i><.0001</i>	-0.0586 <i><.0001</i>	-0.0159 <i>0.1970</i>	0.1646 <i><.0001</i>	-0.0297 <i>0.0156</i>	0.0164 <i>0.1835</i>	-0.1609 <i><.0001</i>	-0.0212 <i>0.0848</i>	0.0647 <i><.0001</i>	1.000	0.2089 <i><.0001</i>	-0.1371 <i><.0001</i>	-0.1824 <i><.0001</i>

13. Num_Analyst	0.0303 <i>0.0137</i>	0.0284 <i>0.0186</i>	0.4133 <i><.0001</i>	-0.0652 <i><.0001</i>	-0.0382 <i>0.0019</i>	0.0097 <i>0.4297</i>	0.0658 <i><.0001</i>	0.0568 <i><.0001</i>	-0.0618 <i><.0001</i>	-0.0220 <i>0.0738</i>	0.2660 <i><.0001</i>	0.2089 <i><.0001</i>	1.000	-0.0481 <i><.0001</i>	-0.0382 <i>0.0019</i>
14. Stderet	0.0702 <i><.0001</i>	0.0758 <i><.0001</i>	-0.5139 <i><.0001</i>	0.3684 <i><.0001</i>	-0.1224 <i><.0001</i>	-0.0434 <i>0.0004</i>	-0.2769 <i><.0001</i>	-0.1128 <i><.0001</i>	0.9573 <i><.0001</i>	0.1091 <i><.0001</i>	0.4529 <i><.0001</i>	-0.1371 <i><.0001</i>	-0.0481 <i><.0001</i>	1.000	0.3596 <i><.0001</i>
15. Vol_earn	0.0194 <i>0.1137</i>	0.1321 <i><.0001</i>	0.2902 <i><.0001</i>	0.0006 <i><.0001</i>	0.0528 <i><.0001</i>	-0.1161 <i><.0001</i>	-0.0850 <i><.0001</i>	-0.2160 <i><.0001</i>	0.3713 <i><.0001</i>	0.0789 <i><.0001</i>	0.2330 <i><.0001</i>	-0.1824 <i><.0001</i>	-0.0384 <i>0.0019</i>	0.3596 <i><.0001</i>	1.000

TABLE 3

Risk Factor Disclosures and CEO Overconfidence: Keywords

This table reports the coefficient estimates from regressing total keyword counts and subcategory-keyword counts (i.e., financial, tax, litigation, systematic, and idiosyncratic risks) on CEO overconfidence and control variables. Detailed definitions of variables are included in Appendix A. Please refer to Campbell et al. (2014) for the list of risk-related keywords and classification of keywords in subcategories. The sample includes 6,618 firm-year observations from 2005 to 2017. All variables are winsorized each year at 1% and 99%. All regression models include year fixed effects and industry fixed effects. Standard errors are reported in parentheses and are clustered by firm. ***, **, and * indicate statistical significance at 1 percent, 5 percent, and 10 percent (two-tailed), respectively.

Panel A. Total risk keywords and CEO overconfidence			
		Dependent variable	
	Prediction	Total_count	Total_count
Conf_67_{i,t}	-	-0.0983** (0.0490)	
Conf_hold_{i,t}	-		-0.2308*** (0.1048)
Size _{i,t}	-	-0.0433* (0.0237)	-0.0445* (0.0242)
BTM _{i,t}	-	0.1112 (0.0777)	0.1263 (0.0820)
Annret _{i,t}	+	0.1052*** (0.0228)	0.0972*** (0.0229)
Lev _{i,t}	+	0.1979** (0.1122)	0.2249** (0.1125)
Earn _{i,t}	-	-0.5326*** (0.1684)	-0.5323*** (0.1658)
ETR _{i,t}	-	-0.0015 (0.0245)	0.0021 (0.0244)
Spread _{i,t}	+	3.1883* (1.3905)	4.0494** (1.5161)
Skew _{i,t}	-	-0.0068 (0.0081)	-0.0068 (0.0079)
Turn _{i,t}	+	0.0483*** (0.0146)	0.0493*** (0.0141)
BigN _{i,t}	+	-0.0104 (0.0756)	-0.0057 (0.0754)
Num_Analyst _{i,t}	+	0.0022*** (0.0008)	0.0023*** (0.0007)
Stderet _{i,t}	+	2.9747 (1.2438)	2.2625* (1.4684)

Vol_earn _{i,t}	+	0.8567*** (0.2274)	0.9279*** (0.2339)
<i>YEAR & INDUSTRY FE</i>		INCLUDED	INCLUDED
<i>CLUSTERING BY</i>		FIRM	FIRM
Number of observations		6,618	6,618

Panel B. Risk keywords by subcategories and CEO overconfidence

	Dependent variable									
	Fin_count		Legal_count		Tax_count		Idio_count		System_count	
Conf_67_{i,t}	-0.0007* (0.0017)		-0.0035* (0.0019)		0.0016 (0.0009)		-0.0061** (0.0035)		-0.0055** (0.0034)	
Conf_hold_{i,t}		-0.0006* (0.0039)		-0.0134** (0.0042)		0.0061 (0.0021)		-0.0156* (0.0083)		-0.0124* (0.0071)
Size _{i,t}	0.0007 (0.0008)	0.0006 (0.0008)	0.0021*** (0.0009)	0.0024*** (0.0009)	0.0021*** (0.0004)	0.0022*** (0.0004)	-0.0089*** (0.0016)	-0.0081*** (0.0016)	0.0024* (0.0015)	0.0013 (0.0016)
BTM _{i,t}	0.0007* (0.0026)	0.0032* (0.0027)	0.0032 (0.0024)	0.0055*** (0.0026)	0.0022* (0.0011)	0.0018 (0.0013)	-0.0087* (0.0055)	-0.0096* (0.0056)	0.0012 (0.0046)	0.0007 (0.0050)
Annret _{i,t}	0.0009 (0.0008)	0.0007 (0.0008)	-0.0006 (0.0008)	-0.0011 (0.0011)	-0.0007* (0.0004)	-0.0006* (0.0004)	0.0035** (0.0017)	0.0043*** (0.0017)	0.0023** (0.0015)	0.0032** (0.0016)
Lev _{i,t}	0.0459*** (0.0045)	0.0475*** (0.0046)	0.0115*** (0.0044)	0.0111*** (0.0044)	-0.0005 (0.0021)	-0.0007 (0.0021)	-0.0208*** (0.0087)	-0.0215*** (0.0087)	-0.0278*** (0.0082)	-0.0295*** (0.0082)
Earn _{i,t}	0.0079 (0.0058)	0.0086* (0.0058)	0.0021 (0.0066)	-0.0008 (0.0068)	-0.0055* (0.0034)	-0.0044* (0.0035)	0.0088 (0.0176)	0.0032 (0.0122)	-0.0196* (0.0131)	0.0103 (0.0107)
ETR _{i,t}	0.0002 (0.0008)	0.0003 (0.0008)	0.0020*** (0.0008)	0.0027*** (0.0090)	-0.0019*** (0.0005)	-0.0019*** (0.0005)	0.0019 (0.0018)	0.0020 (0.0019)	-0.0018* (0.0017)	-0.0026* (0.0018)
Spread _{i,t}	0.0332 (0.1304)	-0.0293 (0.1851)	-0.1111 (0.1562)	0.0426 (0.2263)	0.0543 (0.0554)	0.1352*** (0.0579)	0.3939** (0.2881)	-0.2842 (0.3435)	0.3222** (0.2317)	0.1115 (0.4708)
Skew _{i,t}	0.0002* (0.0003)	0.0001 (0.0004)	-0.0002 (0.0003)	-0.0001 (0.0003)	-0.0001 (0.0002)	-0.0001 (0.0001)	-0.0011** (0.0006)	-0.0011** (0.0006)	0.0013*** (0.0005)	0.0013** (0.0079)
Turn _{i,t}	0.0010** (0.0005)	0.0009** (0.0005)	0.0009* (0.0005)	0.0007* (0.0005)	0.0001 (0.0002)	0.0001 (0.0002)	-0.0005 (0.0010)	-0.0004 (0.0010)	0.0007* (0.0009)	0.0005 (0.0009)
BigN _{i,t}	0.0005 (0.0026)	0.0012 (0.0026)	-0.0010* (0.0029)	-0.0002 (0.0031)	-0.0011 (0.0013)	-0.0009 (0.0013)	0.0012 (0.0056)	0.0007 (0.0055)	-0.0002 (0.0048)	-0.0017 (0.0049)

Num_Analyst _{i,t}	-0.0001*** (0.0002)	-0.0001*** (0.0001)	-0.0001 (0.0001)	0.0001* (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	0.0002*** (0.0001)	0.0002*** (0.0001)	0.0001* (0.0001)	0.0001* (0.0001)
Stderet _{i,t}	0.0149 (0.1534)	0.804 (0.1957)	0.1185 (0.1701)	-0.0059 (0.2364)	-0.0802* (0.0633)	-0.1734*** (0.0671)	0.1700** (0.1470)	0.1591* (0.3579)	0.2222** (0.1317)	0.0801* (0.3776)
Vol_earn _{i,t}	0.0103** (0.0076)	0.0095* (0.0078)	-0.0079 (0.0086)	-0.0054 (0.0090)	0.0033 (0.0036)	0.0035 (0.0039)	0.0550*** (0.0160)	0.0533*** (0.0166)	0.0415** (0.0131)	0.0418*** (0.0134)
<i>YEAR & INDUSTRY FE</i>	INCLUDED		INCLUDED		INCLUDED		INCLUDED		INCLUDED	
<i>CLUSTERING BY</i>	FIRM		FIRM		FIRM		FIRM		FIRM	
Number of observations	6,618		6,618		6,618		6,618		6,618	

TABLE 4**Risk Factor Disclosures and CEO Overconfidence: Fog Index**

This table reports the coefficient estimates from regressing alternative measure for RFDs, fog index, on CEO overconfidence and control variables. Detailed definitions of variables are included in Appendix A. The sample includes 6,618 firm-year observations from 2005 to 2017. All variables are winsorized each year at 1% and 99%. Regression model includes year fixed effects and industry fixed effects. Standard errors are reported in parentheses and are clustered by firm. ***, **, and * indicate statistical significance at 1 percent, 5 percent, and 10 percent (two-tailed), respectively.

	Prediction	Dependent variable	
		Fog_index	Fog_index
Conf_67_{i,t}	-	-0.1718* (0.1012)	
Conf_hold_{i,t}	-		-0.0553 (0.0424)
Size _{i,t}	-	0.2610*** (0.0474)	0.3021*** (0.0512)
BTM _{i,t}	-	0.0600 (0.1384)	-0.0845 (0.1421)
Annret _{i,t}	+	-0.1024** (0.0464)	-0.1038** (0.0447)
Lev _{i,t}	+	0.0412 (0.2326)	-0.1311* (0.2311)
Earn _{i,t}	-	-2.1865*** (0.5588)	-2.2149*** (0.5555)
ETR _{i,t}	-	-0.0267 (0.0479)	-0.0459 (0.0471)
Spread _{i,t}	+	2.2530 (0.5233)	2.0789 (0.5777)
Skew _{i,t}	-	0.0138 (0.0237)	0.0099 (0.0159)
Turn _{i,t}	+	-0.0349* (0.0294)	-0.0336 (0.0306)
BigN _{i,t}	+	0.2099* (0.1269)	0.1840* (0.1278)
Num_Analyst _{i,t}	+	-0.0001 (0.0015)	-0.0002 (0.0015)
Stderet _{i,t}	+	1.3036 (0.7677)	-1.2346 (0.6762)
Vol_earn _{i,t}	+	0.4646 (0.4742)	0.4462 (0.6451)

<i>YEAR & INDUSTRY FE</i>	INCLUDED	INCLUDED
<i>CLUSTERING BY</i>	FIRM	FIRM
Number of observations	6,618	6,618

TABLE 5

Risk Factor Disclosures including MD&A and CEO Overconfidence

This table reports the coefficient estimates from regressing additional measure for risk disclosure, risk keywords counts in RF and MD&A section, on CEO overconfidence and control variables. Detailed definitions of variables are included in Appendix A. The sample includes 6,556 firm-year observations from 2005 to 2017. All variables are winsorized each year at 1% and 99%. Regression model includes year fixed effects and industry fixed effects. Standard errors are reported in parentheses and are clustered by firm. ***, **, and * indicate statistical significance at 1 percent, 5 percent, and 10 percent (two-tailed), respectively.

	Dependent variable			
	MD&A_total		MD&A_fog	
Conf_67_{i,t}	-0.0876* (0.0520)		-0.1422* (0.0928)	
Conf_hold_{i,t}		-0.0853* (0.0578)		-0.0299 (0.0398)
Size _{i,t}	-0.0351* (0.0239)	-0.0532*** (0.0203)	0.3807*** (0.0459)	0.3822*** (0.0459)
BTM _{i,t}	0.1354** (0.0710)	0.0675* (0.0417)	0.1200 (0.1272)	0.1379 (0.1265)
Annret _{i,t}	0.0786*** (0.0233)	0.0385** (0.0168)	-0.0927** (0.0429)	-0.0869** (0.0431)
Lev _{i,t}	0.2668** (0.1174)	0.3032*** (0.0893)	-0.6029 (0.2102)	-0.5911* (0.2101)
Earn _{i,t}	-0.3585** (0.1706)	-0.2454** (0.1147)	-1.8838*** (0.4822)	-1.9878*** (0.4782)
ETR _{i,t}	-0.0049 (0.0194)	-0.0155 (0.0146)	-0.0382 (0.0442)	-0.0432 (0.0442)
Spread _{i,t}	2.7167 (0.4735)	2.5936 (0.1864)	2.5253* (0.5745)	2.8716** (0.5028)
Skew _{i,t}	-0.0111* (0.0009)	-0.0037** (0.0061)	-0.0144 (0.0163)	-0.0138 (0.0162)
Turn _{i,t}	0.0249* (0.0151)	0.0293*** (0.0108)	-0.0603** (0.0261)	-0.0636** (0.0261)
BigN _{i,t}	0.0792 (0.0821)	0.0844 (0.0595)	0.2608* (0.1385)	0.2560* (0.1384)
Num_Analyst _{i,t}	0.0018** (0.0008)	0.0018*** (0.0006)	-0.0007 (0.0014)	-0.0007 (0.0014)
Stderet _{i,t}	2.1067 (0.3568)	2.1220 (0.5967)	1.8045 (0.4785)	1.2689 (0.5058)
Vol_earn _{i,t}	0.8826*** (0.2266)	0.8583*** (0.1711)	0.6061* (0.4011)	0.6197* (0.4003)

<i>YEAR & INDUSTRY FE</i>	INCLUDED	INCLUDED
<i>CLUSTERING BY</i>	FIRM	FIRM
Number of observations	6,556	6,556

Panel B. *Sub-categorical* RFDs including *MD&A* measures and CEO Overconfidence

	Dependent variable									
	MD&A_Fin		MD&A_Legal		MD&A_Tax		MD&A_Idio		MD&A_System	
Conf_67_{i,t}	-0.0012* (0.0013)		-0.0010* (0.0015)		0.0021 (0.0019)		-0.0026** (0.0032)		-0.0038** (0.0032)	
Conf_hold_{i,t}		-0.0036* (0.0007)		-0.0077** (0.0031)		0.0037 (0.0024)		-0.0102** (0.0081)		-0.0025* (0.0071)
Size _{i,t}	-0.0003 (0.0007)	-0.0003 (0.0006)	0.0015*** (0.0007)	0.0014** (0.0007)	0.0008** (0.0004)	0.0009** (0.0004)	-0.0075*** (0.0015)	-0.0073*** (0.0015)	0.0048*** (0.0015)	0.0047*** (0.0015)
BTM _{i,t}	0.0020 (0.021)	0.0024 (0.0025)	0.0016 (0.0019)	0.0024 (0.0019)	0.0023* (0.0013)	0.0021* (0.0013)	-0.0074* (0.0050)	-0.0083* (0.0052)	0.0011 (0.0044)	0.0009 (0.0046)
Annret _{i,t}	0.0017* (0.0008)	0.0011** (0.0007)	-0.0002 (0.0006)	-0.0004 (0.0006)	-0.0003 (0.0005)	-0.0002 (0.0005)	0.0022* (0.0015)	0.0025** (0.0015)	0.0028** (0.0014)	0.0029** (0.0014)
Lev _{i,t}	0.0393*** (0.0033)	0.0396*** (0.0039)	0.0061* (0.0034)	0.0065*** (0.0003)	0.0002 (0.0022)	0.0001 (0.0023)	-0.00170** (0.0082)	-0.0175** (0.0008)	-0.0294*** (0.0078)	-0.0296*** (0.0079)
Earn _{i,t}	0.0018 (0.0053)	0.0009 (0.0048)	-0.0047 (0.0052)	-0.0062 (0.0052)	0.0037 (0.0037)	-0.0038* (0.0036)	-0.0129 (0.0118)	-0.0115 (0.0115)	0.0144* (0.0104)	0.0153* (0.0103)
ETR _{i,t}	0.0007 (0.0005)	0.0006 (0.0006)	0.0015*** (0.0006)	0.0015*** (0.0006)	-0.0016*** (0.0005)	-0.0016*** (0.0005)	0.0024* (0.0015)	0.0024 (0.0016)	-0.0031** (0.0015)	-0.0030** (0.0015)
Spread _{i,t}	-0.0263 (0.1193)	-0.0185 (0.1189)	-0.1703* (0.1050)	-0.1562* (0.1038)	0.0701 (0.0711)	0.0664 (0.0721)	0.6478*** (0.2621)	0.6543** (0.2617)	0.7758*** (0.2192)	0.7732*** (0.2193)
Skew _{i,t}	0.0001 (0.0003)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0012** (0.0006)	-0.0012** (0.0005)	0.0013*** (0.0005)	0.0014*** (0.0005)
Turn _{i,t}	0.0009** (0.0004)	0.0008*** (0.0004)	-0.0003 (0.0004)	-0.0004 (0.0004)	-0.0001 (0.0002)	-0.0001 (0.0003)	-0.0014* (0.0009)	-0.0014 (0.0009)	0.0009* (0.0014)	0.0010 (0.0008)
BigN _{i,t}	0.0013 (0.0021)	0.0014 (0.0021)	-0.0031 (0.0024)	-0.0031 (0.0024)	0.0012 (0.0014)	0.0012 (0.0013)	0.0008 (0.0053)	0.0007 (0.0054)	0.0004 (0.0048)	0.0003 (0.0048)

Num_Analyst _{i,t}	-0.0001*** (0.0001)	-0.0001*** (0.0001)	-0.0001 (0.0001)	0.0001* (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	0.0002*** (0.0001)	0.0002*** (0.0001)	0.0001* (0.0001)	-0.0001 (0.0001)
Stderet _{i,t}	-0.0137 (0.1342)	0.0153 (0.1346)	0.1812* (0.1159)	0.1828* (0.1151)	-0.1267* (0.0002)	-0.1336* (0.0804)	0.4743* (0.3082)	0.4675* (0.3084)	0.5195** (0.2546)	0.5055** (0.2542)
Vol_earn _{i,t}	0.0129** (0.0059)	0.0124** (0.0061)	-0.0050 (0.0067)	-0.0039 (0.0067)	0.0083** (0.0044)	0.0079* (0.0042)	0.0462*** (0.0158)	0.0449*** (0.0157)	0.0401*** (0.0152)	0.0382*** (0.0134)
<i>YEAR & INDUSTRY FE</i>	INCLUDED		INCLUDED		INCLUDED		INCLUDED		INCLUDED	
<i>CLUSTERING BY</i>	FIRM		FIRM		FIRM		FIRM		FIRM	
Number of observations	6,556		6,556		6,556		6,556		6,556	

TABLE 6

Risk Factor Disclosures and CEO Overconfidence: Over-Investment

This table reports the coefficient estimates from regressing RFDs on the alternative measure of CEO overconfidence, over-investment, and control variables. Detailed definitions of variables are included in Appendix A. The sample includes 27,426 firm-year observations from 2005 to 2017. All variables are winsorized each year at 1% and 99%. Regression model includes year fixed effects and industry fixed effects. Standard errors are reported in parentheses and are clustered by firm. ***, **, and * indicate statistical significance at 1 percent, 5 percent, and 10 percent (two-tailed), respectively.

Panel A. <i>Non-categorical</i> RFDs measures and Over-Investment			
		Dependent variable	
	Prediction	Total_count	Fog_index
Over_invest_{i,t}	-	-0.0289*** (0.0108)	-0.0542* (0.0424)
Size _{i,t}	-	-0.0083 (0.0121)	0.2988*** (0.0507)
BTM _{i,t}	-	0.0719** (0.0184)	-0.0566 (0.1361)
Annret _{i,t}	+	0.0368*** (0.0093)	-0.1085** (0.0451)
Lev _{i,t}	+	0.3708*** (0.0468)	-0.1140 (0.2286)
Earn _{i,t}	-	-0.1635*** (0.0466)	-2.2377*** (0.5553)
ETR _{i,t}	-	-0.0701*** (0.0100)	-0.0465 (0.0470)
Spread _{i,t}	+	3.2027*** (1.0652)	2.6986 (0.4842)
Skew _{i,t}	-	-0.0029 (0.0034)	0.0090 (0.0159)
Turn _{i,t}	+	0.0373*** (0.0062)	-0.0355* (0.0305)
BigN _{i,t}	+	0.1215*** (0.0283)	0.1871 (0.1278)
Num_Analyst _{i,t}	+	0.0017*** (0.0004)	-0.0001 (0.0015)
Stderet _{i,t}	+	1.5292* (1.1248)	-1.3504 (0.6016)
Vol_earn _{i,t}	+	0.1561*** (0.0466)	0.4824 (0.4634)

<i>YEAR & INDUSTRY FE</i>	INCLUDED	INCLUDED
<i>CLUSTERING BY</i>	FIRM	FIRM
Number of observations	27,426	27,426

Panel B. *Sub-categorical* RFDs measures and Over-Investment

	Dependent variable					
	Prediction	Fin_count	Legal_count	Tax_count	Idio_count	System_count
Over_invest_{i,t}	-	-0.0004* (0.0004)	-0.0006** (0.0004)	-0.0007 (0.0002)	-0.0004** (0.0008)	-0.0005** (0.0007)
Size _{i,t}	-	-0.0003 (0.0004)	0.0019** (0.0005)	0.0017*** (0.0002)	-0.0060*** (0.0008)	0.0023*** (0.0007)
BTM _{i,t}	-	0.0043** (0.0007)	0.0012* (0.0006)	0.0022** (0.0004)	-0.0089*** (0.0014)	0.0011 (0.0012)
Annret _{i,t}	+	0.0020*** (0.0003)	-0.0004 (0.0004)	-0.0005*** (0.0002)	0.0006* (0.0007)	0.0014** (0.0006)
Lev _{i,t}	+	0.0436*** (0.0020)	0.0042** (0.0018)	0.0065*** (0.0012)	-0.0246*** (0.0038)	-0.0295*** (0.0033)
Earn _{i,t}	-	0.0060*** (0.0014)	-0.0054*** (0.0018)	-0.0014** (0.0008)	0.0189*** (0.0032)	-0.0166*** (0.0031)
ETR _{i,t}	-	-0.0002 (0.0004)	0.0014*** (0.0004)	-0.0021*** (0.0003)	-0.0003 (0.0001)	-0.0013** (0.0007)
Spread _{i,t}	+	0.0211 (0.0351)	0.0019 (0.0408)	0.0239* (0.0189)	-0.1501** (0.0733)	0.1717** (0.0694)
Skew _{i,t}	-	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0002)	0.0002 (0.0002)
Turn _{i,t}	+	0.0008*** (0.0002)	0.0005** (0.0002)	-0.0006 (0.0001)	-0.0008* (0.0004)	0.0016*** (0.0004)
BigN _{i,t}	+	0.0010 (0.0009)	-0.0013 (0.0011)	0.0004 (0.0006)	0.0021 (0.0021)	-0.0015 (0.0019)
Num_Analyst _{i,t}	+	0.0001*** (0.0001)	0.0001 (0.0001)	-0.0001 (0.0001)	0.0001*** (0.0001)	0.0001*** (0.0001)

Stderet _{i,t}	+	0.0303 (0.0362)	0.0136 (0.0407)	-0.0081* (0.0207)	0.0451*** (0.0770)	0.0561** (0.0703)
Vol_earn _{i,t}	+	0.0043*** (0.0012)	-0.0012 (0.0013)	0.0014** (0.0006)	0.0045** (0.0029)	0.0003** (0.0031)
<i>YEAR & INDUSTRY FE</i>		INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED
<i>CLUSTERING BY</i>		FIRM	FIRM	FIRM	FIRM	FIRM
Number of observations		27,426	27,426	27,426	27,426	27,426

TABLE 7

Risk Factor Disclosures and CEO Overconfidence: Under Financial Crisis

This table reports the coefficient estimates from regressing RFDs on the interaction term of CEO overconfidence and post-financial crisis. Our variable of interest is the interaction term $Overconf_{i,t} * Post_{i,t}$, which captures CEO overconfidence's incremental change in RFDs following the 2008 global financial crisis. Detailed definitions of variables are included in Appendix A. The sample includes 1,874 firm-year observations from 2005, 2006, 2007, and 2008. All variables are winsorized each year at 1% and 99%. Regression model includes year fixed effects and industry fixed effects. Standard errors are reported in parentheses and are clustered by firm. ***, **, and * indicate statistical significance at 1 percent, 5 percent, and 10 percent (two-tailed).

	Dependent variable	
	Total_count	Total_count
Conf_67_{i,t}	-0.1368** (0.0737)	
Conf_hold_{i,t}		-0.1863* (0.0971)
Post_{i,t}	0.1842** (0.0974)	0.1173* (0.0444)
Conf_67_{i,t} * Post_{i,t}	-0.1018 (0.0795)	
Conf_hold_{i,t} * Post_{i,t}		0.0620 (0.0914)
Size _{i,t}	-0.0877*** (0.0310)	-0.0799*** (0.0201)
BTM _{i,t}	-0.0291 (0.0918)	0.0221 (0.0538)
Annret _{i,t}	0.1689*** (0.0541)	0.1574*** (0.0408)
Lev _{i,t}	0.1751** (0.1448)	0.2479*** (0.1012)
Earn _{i,t}	-0.7635*** (0.4495)	-0.6908*** (0.2842)
ETR _{i,t}	-0.2904** (0.1361)	-0.1556** (0.0770)
Spread _{i,t}	-2.0847 (1.2967)	-2.6334 (2.7462)
Skew _{i,t}	-0.0213 (0.0207)	-0.0217* (0.0138)
Turn _{i,t}	0.0662*** (0.0196)	0.0640*** (0.0133)
BigN _{i,t}	0.0015 (0.0909)	0.0277 (0.0585)

Num_Analyst _{i,t}	0.0018* (0.0011)	0.0024*** (0.0007)
Stderet _{i,t}	2.4309 (1.9991)	2.2760 (1.1238)
Vol_earn _{i,t}	0.9728** (0.4416)	1.4778*** (0.4369)
<i>YEAR & INDUSTRY FE</i>	INCLUDED	INCLUDED
<i>CLUSTERING BY</i>	FIRM	FIRM
Number of observations	1,874	1,874

국문초록

본 연구는 최고경영자의 자기과신 성향이 10-K 보고서의 위험 공시에 미치는 영향을 분석한다. 분석 결과, 자기과신 성향이 강한 경영자는 위험 공시를 함에 있어 공시 정도가 유의하게 낮은 것으로 나타났다. 이는 자기과신 성향이 강한 경우 선천적으로 위험을 낮게 인지하거나, 위험을 인지하더라도 회사가 마주한 위험을 효과적으로 통제할 수 있다는 통제감의 착각을 가지고 있기에 인지된 위험을 재무제표에 공시하지 않음을 의미한다. 2008년의 세계 금융위기 시기에 위험 공시는 유의하게 증가한 반면, 자기과신 성향이 강한 경영자의 공시 경향은 변하지 않는 것으로 나타났다. 이는 자기과신 성향이 강한 경우, 경영자가 가진 통제감의 착각이 외부 충격에 영향을 받지 않음을 의미한다. 본 연구의 결과는 위험 공시가 경영자의 자기과신 성향으로 인하여 최적수준에서 이루어지지 않을 수 있음을 시사한다.

주요어: 위험 공시, Item 1A, 최고경영자 자기과신 성향, 텍스트 분석

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