Seoul Journal of Business
Volume 24, Number 2 (December 2018)

Regulation FD Disclosure of 8-K filing and Stock Crash Risk*

HYUNKWON (KWON) CHO**
Sejong University
Seoul, Korea

ABSTRACT

This paper tests whether item 7.01 of the Form 8-K filing, which is subject to the regulation FD, mitigates stock crash risk. The regulation FD forces the firm to communicate private information using information channel with broad coverage. Such communications may mitigate the firm's stock crash risk by revealing the negative news in a more timely manner. Consistently, I find a negative association between the frequency of item 7.01 disclosures with the negative news (measured by market reaction surrounding the Form 8-K filing date) and subsequent stock crash risk. On the contrary, the results show that there is no association between the frequency of item 7.01 disclosures with the positive news and subsequent stock crash risk. Such association is more pronounced when the firm's is not followed by equity analysts or do not have high percentage of institutional ownership. I also find that item 7.01 disclosures provide incremental information over other voluntary items or mandatory items of the Form 8-K filing. Finally, I use tone of the item 7.01 disclosures to identify whether the news is positive or negative, and find consistent results to the main findings. Overall, these findings suggest that communications subject to the regulation FD, especially the negative ones, are an important mechanism that mitigate stock crash risk.

Keywords: Stock crash risk; Regulation FD; 8-K filings

---

* Data for this study come from the WRDS subscription provided by Bauer School of Business and public sources listed in this paper. I thank University of Houston for the supports during my study.

** Sejong University, 209, Neungdong-ro, Gwangjin-gu, Seoul, 05006, Republic of Korea. Email address: kwoncho@sejong.ac.kr; Tel.: +82-2-6935-266

INTRODUCTION

This paper investigates the effects of a firm's voluntary communications, captured by item 7.01 of the Form 8-K filing, on stock crash risk. Especially, this paper tests whether more frequent releases of the negative news using the item 7.01 disclosures mitigate the stock crash risk. One of the theoretical explanations of the stock crash is that the manager withholds the negative news and release them all at once, decreasing stock price significantly (*hoarding the negative news explanation*, Jin and Myers, 2006).[1)] The empirical findings based on the *hoarding the negative news explanation* show that better information environments reduce stock crash risk (An et al., 2015; Hutton et al., 2009; Kim et al., 2011, 2016) by decreasing the manager's opportunity to withhold the negative news. While the previous findings provide interesting insights on the role of information environments on stock crash risk, the more direct dimension of the information environments is a firm's voluntary communication of private information, such as conference calls, company presentations, managements forecasts, or press-releases. When the withholding of the negative news increases stock crash risk, more frequent communications, especially the negative ones, will mitigate stock crash risk.

Broad range of the corporate communications is subject to the regulation FD. The regulation FD mandates firms to disclose information to the public using channels with reasonably broad coverage when the firm reveals information to certain parties, and item 7.01 of the Form 8-K filing is one of such channels (Securities and Exchange Commission, 2004). As such, item 7.01 disclosures capture the firm's various voluntary communications including company presentations, management forecasts, press-releases, and conference calls. In this regard, item 7.01 disclosures provide a useful setting to identify the firm's voluntary communication of the private information.

---

1) There are two alternative, not mutually exclusive, explanations for stock price crash. Hong and Stein (2003) suggest that disagreements among investors lead to stock price crash because the pessimistic investors feedback stock price negatively. Also, Blanchard and Watson (1982) suggests that rare events that produce large negative return contributes on the negative skewness of the stock return. In this paper, I focus on the "*hoarding the bad news*" explanation.

This paper uses the frequency of item 7.01 disclosures, identified by computerized algorithm, to capture the voluntary communications subject to the regulation FD. Especially, I separately test the effects of the positive news disclosures (those produce the positive market reaction) and the effects of the negative news disclosures (those produce the negative market reaction) on stock crash risk. The *hoarding the negative news explanation* implies that stock crash risk is lower when firms do not withhold the negative news. On the contrary, the theory predicts that the voluntary disclosure of the positive news does not play such role. In fact, the voluntary disclosure of the positive news may increase stock crash risk by inducing bubble in the stock market (Blanchard and Watson, 1982), especially when the manager opportunistically uses such disclosures to maximize short-term market valuation.

To identify voluntary communications with the positive news and the negative news, I rely on the cumulative market return for three days surrounding the 8-K filing dates (*CAR*). I define an item 7.01 disclosure as the positive (negative) news if the *CAR* is positive (negative). A potential problem of using the item 7.01 disclosure, which is a voluntary item, is that the firm chooses to disclose the private information. Thus, the self-selection problem may bias statistical inferences. To mitigate such problem, I use Heckman's self-selection model (Heckman, 1979) and control for inverse Mill's ratio (*IMR*) in the subsequent regressions.

For the main analysis, I test the association between the frequency of item 7.01 with the positive and negative *CAR* and subsequent stock crash risk. The regression results show that the firm is less likely to suffer from stock crash risk in the subsequent quarter when the firm frequently releases item 7.01 disclosures with the negative news. Further, consistent with the conjecture that communications of the positive news may not mitigate stock crash risk, I find no association between the frequency of item 7.01 disclosures and subsequent stock crash risk.

Furthermore, I test the effects of the firm's information environment on the above association. While the firm's voluntary communications are one of the most important channels of information, the monitoring activities played by equity analysts or institutional investors can substitute the voluntary communications, reducing stock crash risk (An et al., 2015; Hutton et al., 2009). In this regard, using the firm's information environment as a moderator

variable reveals the significance of voluntary communications when there are no other information intermediaries. I expect and find that item 7.01 disclosures reduce subsequent stock crash risk especially when the firm is not followed by analysts or do not have high ratio of institutional owner, supporting the view that the firm's voluntary communications are more important when its information environment is poor.

I further investigate the effects of voluntary items (other than the item 7.01) and mandatory items of the Form 8-K filing on subsequent stock crash risk. While the main finding shows that communications subject to the regulation FD (i.e., item 7.01) mitigate stock crash risk, the Form 8-K filing provides two additional channels of information. The first one is voluntary items of the Form 8-K filing (item 2.02 and item 8.01) and the second one is mandatory items (all other items except items 2.02, 8.01 and 7.01). The firm can use other voluntary items to reveal its private information. Further, the SEC requires firms to disclose information through the Form 8-K filing voluntarily or mandatorily when there are events that need investors' attention. Such requirement forces to deliver the negative news to the information users. In this regard, the robustness tests show whether voluntary communications subject to the regulation FD provides the private information incremental to other voluntary items or mandatory items. The results show that item 7.01 disclosures mitigate stock crash risk, and such effect is incremental to other voluntary or mandatory items of the Form 8-K filing.

Finally, I employ alternative specifications of the news item 7.01 disclosures deliver and of the stock crash risk. First, I use tone of item 7.01 disclosures to capture the positive/negative news an item 7.01 disclosure delivers. Similar to the main results, the negative tone is negatively associated with the future stock crash risk, while the positive tone does not. Second, I use two alternative measures for the stock crash risk, down-up volatility (*DUVOL*) and negative skewness of the stock return (*NCSKEW*). Again, the results are consistent with the main results.

This paper contributes to the literature in two ways. First, this paper provides empirical evidence that communications of the negative information using public channel mitigate stock crash risk. The previous literature suggests that stock crash risk increases when the manager withholds the negative news (Jin and Myers,

2006). The literature also shows that mechanisms that prevent the manager from withholding the negative news reduces stock crash risk (An et al., 2015; Callen and Fang, 2013; Hutton et al., 2009; Kim et al., 2011, 2016). Add on the literature, my findings suggest that the firm's voluntarily communications of the negative news reduce stock crash risk, consistent with the view that withholding the negative news increases stock crash risk.

Second, this paper contributes to the literature on the role of the Form 8-K filing. The literature shows that 8-K filings provide useful information, evidenced by market reaction and return drift following 8-K filings (Segal and Segal, 2016). However, there are relatively little evidence on the role of each item as a channel of information. My results show that item 7.01 of the Form 8-K filing can be an effective channel that deliver warning signal to market participants. Furthermore, the additional analyses that compare the item 7.01 to other voluntary and mandatory items of the Form 8-K filings show the importance item 7.01 as a mechanism of reducing stock crash risk.

The reminder of this paper is organized as follows. Section 2 develops hypothesis, and Section 3 provides research design. Section 4 provides empirical results. Finally, Section 5 concludes the paper.

HYPOTHESIS DEVELOPMENT

The literature shows that stock crashes when the manager withholds the negative news, and then at a certain point, the manager is not able to withhold such negative news anymore and releases the negative news all at once. Due to the cumulation of the negative news, the stock return reduces significantly (Chen et al., 2001; Jin and Myers, 2006). Because withholding the negative news is the underlying latent factor of stock crash risk, the mechanisms that prevent the manager from withholding the negative news mitigate stock crash risk. For instance, high comparability of earnings prevents the manager from withholding the negative news, reducing stock crash risk (Kim et al., 2016). In a similar context, the stock crash risk is negatively associated with the transparency of financial reporting (Hutton et al., 2009) or institutional investors' monitoring activities (Callen and Fang, 2013). In addition, the previous finding shows that IFRS adoption reduces stock crash

risk (DeFond et al., 2015). On the contrary, when there are room to withhold the negative news, such as the opportunity to avoid tax, stock crash risk increases (Kim et al., 2011). Overall, these findings show that the quality of the firm's information environment can be a key determinant of stock crash risk.

One of the most important determinants of the firm's information environment is the voluntary disclosure. For instance, the manager uses voluntary disclosures to complement less readable periodic filings (Guay et al., 2016), and the manager is more likely to provide voluntary forecasts when the firm's earnings is not highly synchronized with industry peers (Gong et al., 2013). Such voluntary disclosures also reduce information asymmetry and increase liquidity (Schoenfeld, 2017). Overall, the previous findings suggest that the firm's voluntary communications are an effective channel that improve the firm's information environment.

More importantly, voluntary disclosures of the negative news may mitigate stock crash risk because such disclosures timely deliver the negative news and reduce the likelihood that the manager withholds the negative news. In other words, frequent disclosures of the negative news mitigate stock crash risk due to the *hoarding of the negative news*. On the contrary, disclosing the positive news may not mitigate stock crash risk because such disclosures do not role as warning signals. Thus, I expect that item 7.01 disclosures, which is a voluntary item of the Form 8-K filing, with the negative (positive) news decrease (do not decrease) subsequent stock crash risk. Formally, I present the following hypothesis.

> **H1:** There is a negative (non-negative) association between the frequency of item 7.01 of the Form 8-K filing with the negative (positive) news and subsequent stock crash risk.

In addition, I investigate the effects of the firm's information environment on the association in *H1*. The literature shows that the better information environments improve the information flow between insiders and outsiders (Loureiro and Taboada, 2015; Shroff et al., 2014), reducing the room to withhold the negative news. Consistent with this argument, the previous findings show that external monitoring mechanism, such as institutional ownership, reduces stock crash risk (Callen and Fang 2013). Such findings imply that the external monitoring mechanism can substitute the

role of item 7.01. In other words, item 7.01 of the Form 8-K filing will be more important when the firm's external monitoring mechanisms are weaker. Based on the argument, I expect that item 7.01 of the Form 8-K filings are more likely to affect stock crash risk when the firm's information environment is opaque, providing the second hypothesis.

> **H2:** The association in H1 is stronger when the firm's information environment is poor.

EMPIRICAL DESIGN

Identifying item 7.01 of the Form 8-K filing and sample selection procedure

The form 8-K filing is the required disclosure from the SEC to provide more timely information of significant corporate events. The new Form 8-K filing is effective from August 23, 2004, and it includes 22 items. The items cover various events, including entry and termination of material agreements, bankruptcy, material impairments, restatements, or departure/election of board members. The complete list of the items is described at Table 1 of Lerman and Livnat (2009). Among the items, three items (2.02. Results of Operations, 7.01. Regulation FD Disclosure, and 8.01. Other Events) are categorized as voluntary items. Especially the two voluntary items (7.01 and 8.01) are disclosed following the firm's voluntary disclosure of important events.

I use item 7.01 of the Form 8-K filing to identify the firm's tendency to communicate the private information. The regulation FD requires firms to disclose material and non-public information to the public using either the Form 8-K filing or other information channels that provide broad and non-exclusive distribution of the information, when the firms disclosed information to certain individuals or entities (Securities and Exchange Commission, 2004). Item 7.01 of the Form 8-K filing is one of such channels. Thus, item 7.01 of the Form 8-K filing, which is subject to the regulation FD, likely captures broad range of the firm's communications, including company presentations, conference calls, or management forecasts.

I identify the frequency of item 7.01 disclosures using following steps. I first obtain all 8-K filings (excluding amendments of 8-K

filings) from August 23, 2004 to 2015 and exclude 8-K filings that do not have link to *Compustat*.[2)3)] This provides 892,198 unique firm-filing observations. Using these filings, I identify item(s) of each 8-K filing using computerized algorithms. Then, I count the number of item 7.01 disclosures from the last earnings announcement date to current earnings announcement date and define *FD* as the natural logarithm of one plus the number of item 7.01 disclosures. I treat *FD* as zero when the firm does not file any item 7.01 between the earnings announcement dates. After excluding firm-quarter observations without required information for the regression analysis, my final sample size reduces to 134,110 firm-quarter observations.

Stock crash risk

I define stock crash risk using weekly stock return following the previous literature (Chen et al., 2001; Kim et al., 2011). I first obtain firm-specific weekly return using the residual from the following equation.[4)]

$$r_t = \beta + \beta_1 r_{m,t-2} + \beta_2 r_{m,t-1} + \beta_3 r_{m,t} + \beta_4 r_{m,t+1} + \beta_5 r_{m,t+2} + \varepsilon_t \quad (1)$$

Where r_t is the weekly return of firm i in week t and $r_{m,t}$ is weekly CRSP value-weighted market return (CRSP item *vwretd*) in week t. Then, I define stock crash risk as an indicator variable (*CRASH*), one if there is at least one incident of a firm's weekly return falls below mean of the firm-specific weekly return more than 3.09 standard deviations of the firm-specific weekly return in quarter τ, zero otherwise. I define the subsequent stock crash risk (*FCRASH*) as *CRASH* at quarter $\tau + 1$.

Heckman's self-selection model

A potential problem in the above empirical specification is that the

2) The list of all SEC filings is obtained from the WRDS repository (www.wrds.us/index.php/repository/view/25).

3) The sample period begins at August 23, 2004 because the regulation for the new Form 8-K filing take place from the date.

4) I omit firm identifier i for simplicity.

firm chooses to communicate with outsiders, implying that there is potential self-selection bias.[5] As stated earlier, I use Heckman's self-selection model (Heckman, 1979) to mitigate such concern. Following equation shows the first-stage regression model.

$$\begin{aligned} K8 = {} & \alpha_1 + \alpha_2 FOLLOW + \alpha_3 INST + \alpha_4 DSALE + \alpha_5 ROA \\ & + \alpha_6 ROASD + \alpha_7 SIZE + \alpha_8 LEV + \alpha_9 MTB + \alpha_{10} RET \\ & + \alpha_{11} LITIGATION + \alpha_{12} CSCORE + \upsilon_\tau \end{aligned} \quad (2)$$

Where *K8* is an indicator variable, one if the firm files 8-K filings that contain item 7.01 at least once in quarter τ (between the last earnings announcements and the current earnings announcements), and zero otherwise.

I choose several variables, *FOLLOW*, *INST*, *DSALE*, and *LITIGATION* as the identifying restrictions because these variables capture the likelihood of the voluntary communication that is subject to the regulation FD. *FOLLOW* is an indicator variable, one if there are at least one analyst following, and zero otherwise. I include *FOLLOW* as an identifying restriction because the analyst following increases the need for communications between analysts and the manager (Anantharaman and Yuan Zhang, 2011; Findlay and Mathew, 2006), increasing the likelihood of filing item 7.01. *INST* is the percentage of institutional ownership. I include the institutional ownership because institutional ownership may increase the likelihood of communications between managements and outsiders (Ajinkya et al., 2005). I also include absolute value of changes in sales from the last quarter (*DSALE*). Sudden changes in sales may increase the demand for information, resulting in higher frequency of voluntary disclosures.

I also include several variables that capture firm-specific characteristics. *ROA* is income before extraordinary item (Compustat item *ibq*) on beginning total assets (Compustat item *atq*), *ROASD* is standard deviation of *ROA* during the previous five years, *SIZE* is the natural logarithm of firms' total assets, *LEV* is total liability (Compustat item *ltq*) divided by total assets, and *MTB* is

5) The number of firm-year observations that do not file 8-K at all during the sample periods is 61,604 (3613 unique firms). This is around 28.5% of total firm-year observations. Thus, this condition does not reduce generalizability of my results. Also, including these firm-year observations generally does not change the results.

market-to-book ratio, defined as firms' market value of common stock (Compustat item *prccq*×*cshoq*) divided by common stock holders' equity (Compustat item *ceqq*). I also include litigation risk (*LITIGATION*) as an additional identifying restriction because firms with higher litigation risks are more likely to communicate with outsiders (Donelson et al., 2012; Francis et al., 1994; Johnson et al., 2001). Specifically, I use litigation risk based on the SIC classification (Ashbaugh-Skaife et al., 2007). *LITIGATION* is an indicator variable, one if firms' SIC code is between 2832 and 2837, between 3569 and 3578, between 3599 and 3675, between 5199 and 5962, between 7370 and 7374, and zero otherwise. Finally, I include the measure for accounting conservatism (*CSCORE*) following Khan and Watts (2009). The literature shows that the conservatism is associated with timely recognition and disclosure of the negative news (Kim and Zhang, 2016). Thus, it may affect the tendency to disclose 8-K filings. I construct inverse Mills ratio (*IMR*) using the estimated result from Equation (2) and include the *IMR* to the subsequent regressions.

Regression model

To investigate the effects of item 7.01 disclosures with the positive and the negative news on subsequent stock crash risk separately, I use following Poisson regression model.[6)]

$$\begin{aligned} RASH_{\tau+1} = {} & \delta_1 + \delta_2 FD\_P_{\tau} + \delta_3 FD\_N_{\tau} + \delta_4 CRASH_{\tau} + \delta_5 ROA_{\tau} \\ & + \delta_6 ROASD_{\tau} + \delta_7 SIZE_{\tau} + \delta_8 LEV_{\tau} + \delta_9 MTB_{\tau} \\ & + \delta_{10} RET_{\tau} + \delta_{11} CSCORE + \delta_{12} IMR + \nu_{\tau} \end{aligned} \quad (3)$$

Where *FD_P* (*FD_N*) is the natural logarithm of one plus the number of item 7.01 disclosures that produce the positive (negative) cumulative abnormal return (CRSP item *ret* minus CRSP item *vwretd*) for three days surrounding the 8-K filing date. All other variables are as defined previously. All continuous variables are winsorized at 1% and 99% to mitigate effects of extreme

6) I use Poisson regression because the stock price crash is rare events that are triggered by the information arrival (i.e., releases of the negative news). The Poisson regression fits with such statistical process, because the Poisson distribution captures random arrival of rare events.

observations.

To capture the quality of the firm's information environment, I use two proxies. First, I use analyst following. Analysts play information discovery role in the financial markets (Clement et al., 2011; De Franco et al., 2009; Mohanram, 2014). Thus, analysts' activities may substitute the role of item 7.01 disclosures as a warning mechanism. Second, I use the percentage of institutional ownership. The institutional owners also play monitoring role (Ajinkya et al., 2005); thus, the firm with institutional owners may have better information environment, substituting the role of item 7.01 disclosures. I divide sample into two subsamples using existence of analysts following and the intensity of institutional ownership. Then, I estimate Equation (3) for each subsample.

RESULTS

Heckman's self-selection estimation

Table 1 shows regression result of Equation (2), which is the first stage of the Heckman's self-selection model. The signs of coefficients are generally consistent with the prediction. The coefficient on *FOLLOW* is positive and significant, implying that analyst following increases the likelihood of item 7.01 disclosures. This is consistent with the notion that analyst following may increases the tendency to reveal the private information (Anantharaman and Yuan Zhang, 2011; Findlay and Mathew, 2006). The coefficient on *INST* is positive and significant, suggesting that institutional ownership also increases the likelihood of voluntary communication, consistent with previous findings that show institutional investors require more public disclosures (Bird and Karolyi, 2016). The coefficient on *DSALE* is positive and significant, suggesting that greater changes in the firm's business increases the needs for voluntary communications. Further, the coefficients on *ROA* is negative and significant, indicating that the firm is more likely to provide information when it perform poorly, consistent with the previous findings show that firms warn their bad performance (Kasznik and Lev, 1995). The coefficient on *ROASD* is positive and significant, consistent with the notion that the firm discloses the private information more frequently when investors face uncertainty. Finally, the coefficients

Table 1. Self-selection of Voluntary Disclosure of Item 7.01

	Dependent = *FD*
FOLLOW	0.1190*** (13.92)
INST	0.1321*** (12.21)
DSALE	0.0679*** (5.96)
ROA	-0.1341*** (-2.92)
ROASD	0.0740** (1.99)
SIZE	0.0863*** (39.16)
LEV	0.2188*** (13.45)
MTB	-0.0000 (-0.92)
RET	0.0067 (0.50)
LITIGATION	-0.0057 (-0.37)
CSCORE	-2.8133*** (-9.66)
Observations	167,496
Pseudo R-squared	0.0752
Year Fixed Effect	Yes
Industry Fixed Effect	Yes

*Table 1 shows the Logit regression results of Equation (1) using whether the firm disclose item 7.01 of the Form 8-K disclosures as dependent variable. Specifically, I define FD, an indicator variable which is one when the firm disclose item 7.01 disclosure at least once in the quarter, zero otherwise. The numbers in parentheses represents *t*-statistics based on the robust standard error (White, 1980). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

on *SIZE* and *LEV* are positive.

Descriptive statistics

Table 2 shows descriptive statistics as well as the correlation among the variables. Note that the table reports the descriptive statistics and correlations of variables used in the main analyses. Panel A of Table 2 shows that the frequency of stock crash in the subsequent quarter (*FCRASH*) is 0.0367 and in the current quarter (*CRASH*) is 0.0373. These two values indicate that there are no significant differences in the frequency of stock crash between periods. The mean of *FD* is 0.304, indicating that the firm discloses item 7.01 around 0.36 times on average ($e^{0.304} - 1$). The mean of *FD_P* is 0.167 and the mean of *FD_N* is 0.171, showing that the firm discloses the item 7.01 with the positive news around 0.18 times ($e^{0.167} - 1$) and the item 7.01 with the negative news around 0.19 times ($e^{0.171} - 1$) on average. Also, the frequency of item 7.01 with the positive and the negative news are similar, reducing the concern that the firm may selectively disclose the positive news and withhold the negative news.

Panel B of Table 2 shows correlation among variables. The correlation between *FCRASH* (*CRASH* at $\tau + 1$) and *CRASH* (*CRASH* at τ) is negative and significant, indicating that there is a negative serial correlation. The correlation between *FCRASH* and *FD* is -0.004 but not significant, implying that overall item 7.01 disclosures do not mitigate stock crash risk. Also, the correlation between *FCRASH* and *FD_P* is positive and but not significant, while the correlation between *FCRASH* and *FD_N* is negative and significant. These univariate results show that item 7.01 disclosures with the negative (positive) news (do not) mitigate the subsequent stock crash risk, supporting *H1*.

Multivariate results

Table 3 shows the regression results using the number of item 7.01 disclosures (*FD*), the number of item 7.01 disclosures with the positive market reaction (*FD_P*), and the number of item 7.01 disclosures with the negative market reaction (*FD_N*) separately. Column (1) shows the Poisson regression result using *FD* as a main independent variable. As predicted, there are no significant

Table 2. Descriptive Statistics and Correlation Matrix

Panel A. Descriptive statistics

	Mean	Standard Deviation	25 Percentile	50 Percentile	75 Percentile
FCRASH	0.037	0.190	0.000	0.000	0.000
CRASH	0.037	0.189	0.000	0.000	0.000
FD	0.304	0.483	0.000	0.000	0.693
FD_P	0.167	0.350	0.000	0.000	0.000
FD_N	0.171	0.355	0.000	0.000	0.000
ROA	0.001	0.047	-0.001	0.007	0.019
ROASD	0.017	0.029	0.003	0.007	0.017
SIZE	6.721	2.005	5.341	6.727	8.034
LEV	0.554	0.266	0.346	0.546	0.757
MTB	2.699	4.013	1.144	1.836	3.118
RET	-0.005	0.238	-0.110	0.011	0.121
CSCORE	0.191	0.257	0.090	0.189	0.294

*Panel A of Table 2 shows the descriptive statistics of the variables for the main analyses.

Panel B: Correlation

		FCRASH	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	*CRASH*	-0.011										
(2)	*FD*	-0.004	0.004									
(3)	*FD_P*	0.002	-0.011	0.799								
(4)	*FD_N*	-0.009	0.018	0.807	0.328							
(5)	*ROA*	0.052	0.037	0.032	0.042	0.009						
(6)	*ROASD*	-0.034	-0.032	-0.044	-0.036	-0.031	-0.379					
(7)	*SIZE*	0.031	0.034	0.194	0.157	0.152	-0.275	-0.375				
(8)	*LEV*	-0.016	-0.013	0.132	0.099	-0.106	-0.081	-0.094	0.392			
(9)	*MTB*	0.015	0.013	-0.022	-0.011	0.022	0.019	0.0138	-0.093	-0.076		
(10)	*RET*	0.027	-0.043	0.008	-0.043	0.029	0.115	-0.034	0.031	-0.013	0.092	
(11)	*CSCORE*	-0.024	-0.025	-0.082	-0.073	-0.058	-0.029	0.019	-0.486	0.040	-0.016	-0.073

*Panel B of Table 2 shows Pearson correlation among the variables for the main analyses. Bold face indicates that the correlation is significant at least 5% level.

association between the number of item 7.01 disclosures and subsequent stock crash risk (*t*-statistic is -1.20). This indicates that overall item 7.01 disclosures do not necessarily mitigate stock crash risk. Column (2) provides result using *FD_P* (the number of item 7.01 disclosures with the positive news) as a main independent variable. Again, the coefficient on *FD_P* is positive but not significant (*t*-statistic is 0.77), indicating that the positive news disclosures do not reduce subsequent stock crash risk. This finding is consistent with the notion that withholding the negative news increases stock crash risk. Column (3) shows the Poisson regression result using *FD_N* (the number of item 7.01 disclosures with the negative news) as a main independent variable. As predicted, there is a negative and significant association between *FD_N* and *FCRASH* (*t*- statistic is -2.68), supporting *H1*. This implies that the firm is less likely to suffer from stock crash risk when it frequently communicates the negative news. Finally, Column (4) provides result including *FD_P* and *FD_N* simultaneously. The result is consistent with column (2) and (3).[7] The coefficient on *FD_P* is not significant, while the coefficient on the *FD_N* is negative and significant at 1% level (*t*-statistic is -3.08). These coefficients also support *H1*.[8]

Across all four columns, the coefficients on *CRASH* are negative and significant, consistent with the correlation between *FCRASH* and *CRASH* in Panel B of Table 2. The coefficients on *ROA* are positive and significant, while the coefficients on *ROASD* are negative and significant. The coefficients on *ROASD* imply that the higher volatility of the firm's performance increases the likelihood of stock crash risk. The coefficients on *RET* are positive and significant, suggesting that higher market return may increase stock crash risk,

---

7) The mean value of VIF from the regression model in column (4) is 16.11. This is higher than the conventional criteria (mean VIF of 10) that raise red flag for the multicollinearity problem. To mitigate concern of the multicollinearity problem, I checked the regression result after excluding *IMR* from the control variable. The untabulated results show consistent result to those of Table 3, mitigating the concern that the multicollinearity may distort the significance of the regression results.

8) I also run OLS model to estimates the coefficients on *FD*, *FD_P*, *FD_N*. The signs and significance of the coefficients are consistent with the Poisson regression. In addition, I also use two alternative measures, up-down volatility (*DUVOL*) and negative skewness (*NCSKEW*), for the stock crash risk. Specifically, to avoid the effects of potential firm-level endogeneity, I use change of the two alternative measures. The results are consistent with the main finding.

Table 3. The Effects of Item 7.01 Disclosures on Stock Crash Risk

	Dependent = *FCRASH*			
FD	-0.0349 (-1.20)			
FD_P		0.0297 (0.77)		0.0688* (1.70)
FD_N			-0.1083*** (-2.68)	-0.1300*** (-3.08)
CRASH	-0.5567*** (-6.83)	-0.5566*** (-6.82)	-0.5539*** (-6.79)	-0.5521*** (-6.77)
ROA	0.4539*** (4.75)	0.4529*** (4.73)	0.4534*** (4.76)	0.4523*** (4.74)
ROASD	-3.2496** (-2.00)	-3.2661** (-2.01)	-3.2327** (-2.00)	-3.2365** (-2.00)
SIZE	0.0132 (0.73)	0.0124 (0.68)	0.0139 (0.77)	0.0136 (0.75)
LEV	-0.7849*** (-8.52)	-0.7874*** (-8.55)	-0.7842*** (-8.52)	-0.7859*** (-8.54)
MTB	0.0000 (0.54)	0.0000 (0.55)	0.0000 (0.55)	0.0000 (0.56)
RET	0.4229*** (9.64)	0.4206*** (9.59)	0.4186*** (9.51)	0.4140*** (9.39)
IMR	-0.2682*** (-3.19)	-0.2708*** (-3.22)	-0.2655*** (-3.16)	-0.2661*** (-3.16)
CSCORE	-1.1199*** (-5.61)	-1.1072*** (-5.55)	-1.1235*** (-5.64)	-1.1155*** (-5.60)
Constant	-0.3057 (-0.34)	-0.3251 (-0.36)	-0.3053 (-0.34)	-0.3194 (-0.36)
Observations	156,407	156,407	156,407	156,407
Pseudo R-squared	0.0357	0.0357	0.0359	0.0359
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes

* Table 3 shows the regression results of Equation (3). The numbers in parentheses represents *t*-statistics based on the robust standard error (White, 1980). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

consistent with previous findings (Chen et al., 2001). Furthermore, the coefficients on *CSCORE* are negative and significant, consistent with the previous literature suggesting that the conservative accounting practice mitigates the stock crash risk (Kim and Zhang, 2016).

In addition to the main analysis, I perform cross-sectional analyses to identify how the above association vary with the firm's information environment (*H2*). Specifically, I test whether item 7.01 disclosures with the negative news reduce stock crash risk especially when the firm's information environment is poor. Panel A of Table 4 shows regression results using analyst following as a proxy for the firm's information environment.[9] In this panel, I divided sample into two subsamples using whether the firm is followed by at least one analyst. Column (1) shows result using the subsample of firms with at least one analyst following in quarter τ, and column (2) shows result using the subsample of firms without analyst following at quarter τ. In column (1), the coefficients on *FD_P* and *FD_N* are both insignificant. These coefficients show that the communications with outsiders (proxied by item 7.01 disclosures) do not play important role on reducing stock crash risk when there are analysts. This is consistent with the view that other information intermediaries may substitute the role of item 7.01 disclosures as an information channel. Column (2) shows that the coefficient on *FD_P* is not significant, while the coefficient on *FD_N* is negative and significant at 1% level (*t*-statistic is -2.70), consistent with the coefficients in Table 3. These coefficients show that the communication with outsider is an important mechanism that mitigates stock crash risk especially when there is no alternative channel of information (i.e., analyst following).

Panel B of Table 4 shows regression results using institutional ownership as a proxy for the opaqueness of the firm's information environment. Similar to panel A, I split the sample into two subsamples using the median split of the percentage of institutional ownership. Column (1) shows the Poisson regression result using the subsample of firms with high institutional ownership and column (2) shows the Poisson regression result using the subsample

9) I use the number of analysts' quarterly forecasts that are announced between 31 days before the quarterly earnings announcement and 1 day before the quarterly earnings announcement as the proxy for analysts following.

Table 4. The Substitution Effects of the Firm's Information Environment

Panel A. The subsamples based on the analyst following

	Dependent = *FCRASH*	
FD_P	0.0653 (1.22)	0.0715 (1.16)
FD_N	-0.0831 (-1.49)	-0.1762*** (-2.70)
CRASH	-0.6247*** (-5.62)	-0.5100*** (-4.26)
ROA	1.3902*** (6.29)	0.4806*** (4.73)
ROASD	-5.9138*** (-4.43)	-2.1574 (-1.51)
SIZE	0.0367 (1.15)	0.0171 (0.61)
LEV	-0.0483 (-0.27)	-1.1661*** (-7.93)
MTB	-0.0003* (-1.74)	0.0002 (1.12)
RET	0.3990*** (4.91)	0.4096*** (7.62)
CSCORE	-0.4337*** (-3.23)	-0.3401*** (-2.81)
IMR	0.4095 (0.81)	-1.7213*** (-4.62)
Constant	-3.7851** (-2.25)	0.8293 (0.53)
Observations	57,866	76,244
Pseudo R-squared	0.0442	0.0494
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes

* Panel A of Table 4 shows the regression results using the subsamples based on whether the firm is followed by analysts. The numbers in parentheses represents t-statistics based on the robust standard error (White, 1980). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

Table 4. (continued)

Panel B. The subsamples based on the percentage of institutional ownership

	Dependent = *FCRASH*	
FD_P	-0.0233 (-0.44)	0.2025*** (3.29)
FD_N	-0.0266 (-0.49)	-0.2693*** (-3.95)
CRASH	-0.6726*** (-6.25)	-0.4373*** (-3.51)
ROA	3.3793*** (7.83)	0.4944*** (4.87)
ROASD	-5.7823*** (-5.57)	-1.8635 (-1.52)
SIZE	-0.0270 (-1.04)	0.0193 (0.68)
LEV	-0.4660*** (-3.32)	-1.2300*** (-8.12)
MTB	0.0000 (0.15)	0.0001 (1.39)
RET	0.4221*** (5.31)	0.4000*** (7.33)
CSCORE	-0.2044 (-1.61)	-0.2800** (-2.37)
IMR	-0.9145*** (-2.75)	-1.8970*** (-4.92)
Constant	-0.6365 (-0.66)	0.8109 (0.57)
Observations	78,203	78,204
Pseudo R-squared	0.0411	0.0416
Year Fixed Effect	YES	YES
Industry Fixed Effect	YES	YES

* Panel B of Table 4 shows the regression results using the subsamples based on the median split using the percentage of institutional ownership. The numbers in parentheses represents t-statistics based on the robust standard error (White, 1980). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

of firms with low institutional ownership. As predicted, column (1) shows that there is no association between the number of item 7.01 disclosures with both the positive and negative news (*FD_P* and *FD_N*, respectively) and subsequent stock crash risk when firms have high institutional ownership. Such coefficients are consistent with the results in panel A of Table 4. On the other hand, column (2) of panel B shows that the coefficient on *FD_N* is negative and significant at 1% level (*t*-statistic is -3.95), consistent with the above results.[10] Overall, the results in Table 4 suggest that the firm's item 7.01 disclosures with the negative news are an important channel of information especially when the firm is less likely to have alternative information channels, such as analyst following or institutional ownership.

Additional analysis

In addition to the cross-sectional tests, I compare the effects of item 7.01 disclosures to other voluntary items as well as to mandatory items of the Form 8-K filing. There are two voluntary items other than item 7.01 (item 2.02 and item 8.01)[11]; all other items of the Form 8-K filing excluding these three voluntary items are mandatory disclosures. Other voluntary items and mandatory items can be alternative channels of information to the regulation FD disclosures (i.e., item 7.01). The manager can use such alternative voluntary items to reveal the negative news. Even though the manager does not willing to reveal the negative news voluntarily, the mandatory requirements may force them to do so. Thus, item 7.01 disclosures may not be the unique channel of information that

10) In column (2), The coefficient on *FD_P* is positive and significant at 1% level (*t*-statistic is 3.29). Even though the coefficient on *FD_P* in panel A of Table 4 is not significant, the positive coefficient suggests that the communication of the positive news is positively associated with future stock crash risk, especially when there is low percentage of institutional ownership. One potential explanation of such significance is that disclosing the positive news may impose investors' overvaluation, resulting in stock crash due to the realization of the overvaluation. Alternatively, disclosure of the positive news may suggest that the managers do not actively discuss the negative news publicly. This is consistent with the previous findings suggesting that the managers withhold the negative news (e.g., Kothari et al., 2009). When managers withhold the negative news, the stock crash risk increases. This may explain the positive coefficient on the *FD_P*.

11) The item 2.02 is "Results of Operations and Financial Condition" and item 8.01 is "Other information".

Table 5. Other Voluntary Items and Mandatory Items of 8-K Filings

Panel A. Other voluntary 8-K filings

	Dependent = *FCRASH*		
FD_P			0.0649 (1.58)
FD_N			-0.1221*** (-2.85)
VOL	-0.0130 (-0.46)		
VOL_P		0.0108 (0.38)	0.0050 (0.17)
VOL_N		-0.0446 (-1.55)	-0.0312 (-1.07)
CRASH	-0.5563*** (-6.82)	-0.5489*** (-6.72)	-0.5469*** (-6.70)
ROA	0.4539*** (4.75)	0.4526*** (4.75)	0.4520*** (4.76)
ROASD	-3.2526** (-2.00)	-3.2303** (-2.00)	-3.2155** (-1.99)
SIZE	0.0128 (0.70)	0.0131 (0.72)	0.0139 (0.76)
LEV	-0.7886*** (-8.54)	-0.7895*** (-8.55)	-0.7883*** (-8.54)
MTB	0.0000 (0.55)	0.0000 (0.55)	0.0000 (0.57)
RET	0.4228*** (9.64)	0.4181*** (9.49)	0.4118*** (9.31)
CSCORE	-0.2700*** (-3.21)	-0.2659*** (-3.16)	-0.2636*** (-3.13)
IMR	-1.1191*** (-5.60)	-1.1200*** (-5.61)	-1.1220*** (-5.62)
Constant	-0.2922 (-0.32)	-0.2901 (-0.32)	-0.2964 (-0.33)
Observations	156,407	156,407	156,407
Pseudo R-squared	0.0357	0.0358	0.0359
Year Fixed Effect	YES	YES	YES
Industry Fixed Effect	YES	YES	YES

* Panel A of Table 5 shows regression result using other voluntary items of 8-K filing. *VOL* is the natural logarithm of one plus the number of voluntary items (other than item 7.01) of 8-K filing between earnings announcement date. *VOL_P* is the natural logarithm of one plus the number of voluntary items (other than item 7.01) of 8-K filing with the positive market reaction for three days surrounding the filing date between earnings announcement date. *VOL_N* is defined similarly. The numbers in parentheses represents t-statistics based on the robust standard error (White, 1980). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

Table 5. (continued)

Panel B. Mandatory 8-K filings

	Dependent = *FCRASH*		
FD_P			0.0735* (1.69)
FD_N			-0.0933** (-1.97)
MAN	-0.0578*** (-3.00)		
MAN_P		-0.0107 (-0.54)	-0.0192 (-0.90)
MAN_N		-0.0753*** (-3.81)	-0.0591*** (-2.72)
CRASH	-0.5539*** (-6.79)	-0.5470*** (-6.70)	-0.5587*** (-6.83)
ROA	0.4552*** (4.85)	0.4514*** (4.84)	0.2802*** (3.01)
ROASD	-3.1540** (-1.98)	-3.1127** (-1.97)	-3.4359** (-2.05)
SIZE	0.0131 (0.72)	0.0141 (0.78)	0.0719*** (4.60)
LEV	-0.7929*** (-8.61)	-0.7892*** (-8.57)	-0.7272*** (-8.55)
MTB	0.0000 (0.57)	0.0000 (0.57)	0.0705*** (7.00)
RET	0.4261*** (9.66)	0.4150*** (9.33)	0.3295*** (6.67)
CSCORE	-0.2607*** (-3.10)	-0.2543*** (-3.02)	-0.1057 (-1.20)
IMR	-1.1675*** (-5.85)	-1.1587*** (-5.80)	-0.5209*** (-3.34)
Constant	-0.1454 (-0.16)	-0.1823 (-0.20)	-2.4655*** (-3.15)
Observations	156,407	156,407	156,407
Pseudo R-squared	0.0359	0.0360	0.0363
Year Fixed Effect	YES	YES	YES
Industry Fixed Effect	YES	YES	YES

* Panel B of Table 5 shows regression result using other voluntary items of 8-K filing. *MAN* is the natural logarithm of one plus the number of mandatory items of 8-K filing between earnings announcement date. *MAN_P* is the natural logarithm of one plus the number of mandatory items of 8-K filing with the positive market reaction for three days surrounding the filing date between earnings announcement date. *MAN_N* is defined similarly. The numbers in parentheses represents t-statistics based on the robust standard error (White, 1980). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

mitigates stock crash risk. Further, other items of the Form 8-K filing, either voluntary of mandatory, may subsume the effect of item 7.01 disclosures.

To test whether item 7.01 disclosures are incrementally effective information channel for reducing stock crash risk over other voluntary items or mandatory items of Form 8-K filing, I count the number of item 2.02 and item 8.01 disclosures. Then I define *VOL*, the frequency of the voluntary items, as the natural logarithms of one plus the number of item 2.02 and 8.01 disclosures. Similar to the definition of *FD_P* and *FD_N*, I also construct the number of item 2.02 and 8.01 disclosures based on whether the cumulative abnormal return surrounding the filing date is positive or negative (*VOL_P* and *VOL_N*, respectively). *MAN*, *MAN_P*, and *MAN_N* is defined similarly using the number of mandatory items of Form 8-K filing. Then, I include these variables as alternative independent variables or additional independent variables to Equation (3).

Panel A of Table 5 shows the regression results that compare the effects of item 7.01 disclosures and other voluntary items (*VOL*, *VOL_P*, and *VOL_N*). Column (1) of panel A shows result using *VOL* as an alternative independent variable. In column (1), the coefficient on *VOL* is not significant, consistent with the argument that the regulation FD disclosures are more important channel of information than other voluntary items of the Form 8-K filing. Column (2) shows result using the positive and negative voluntary items (*VOL_P* and *VOL_N*, respectively) separately. Similar to the result in column (1), the coefficients on *VOL_P* and *VOL_N* are not significant. These are interesting results considering that 8-K filings with item 2.02 and 8.01 are more frequently disclosed than 8-K filings with item 7.01.[12] Such result shows the importance of the regulation FD disclosure (item 7.01). Column (3) of panel A shows result including *FD_P*, *FD_N*, *VOL_P*, and *VOL_N* as main independent variables. In column (3), the coefficient on *FD_N* is negative and significant, while the coefficients on *FD_P*, *VOL_P*, and *VOL_N* are not significant, consistent with column (1) and (2). Overall, panel A of Table 5 provides evidence that the communication of the negative news,

12) The mean of frequency of 8-K filings with item 2.02 and 8.01 is 1.254, while the mean of frequency of 8-K filings with item 7.01 is 0.343. So, the 8-K filings with item 2.02 and 8.01 is approximately 3.7 times more likely than the 8-K filings with item 7.01.

especially the ones subject to the regulation FD, reduces stock crash risk, while other voluntary items are not.[13)]

Panel B of Table 5 shows the regression results that compare the effects between item 7.01 disclosures and mandatory items. In column (1), which uses the number of mandatory items (*MAN*) as an alternative independent variable, the coefficient on *MAN* is negative and significant. Similarly, column (2) shows that the coefficient on *MAN_P* is not significant, while the coefficient on *MAN_N* is negative and significant. Such results are consistent with the result using item 7.01 disclosures and indicate that the mandatory requirements work as an important warning mechanism. Column (3) incorporates both item 7.01 disclosures and mandatory items in the regression model. The result shows that the coefficient on *FD_N* is negative and significant, while the coefficient on *FD_P* is not significant, consistent with the above results. The coefficient on *MAN_N* is negative and significant, but the coefficient is marginally significant at 10 percent level. Such coefficients indicate that item 7.01 disclosures incrementally mitigate stock crash risk over mandatory items by delivering the negative news. Presumably such results indicate the regulation FD disclosures may deliver news that the mandatory items are not designed for.[14)] Overall, Table 5 shows that the Form 8-K filing subject to the regulation FD delivers information that reduces stock crash risk, and such effects are not subsumed by other voluntary or mandatory items of the Form 8-K filing.

Robustness tests

To further validate aforementioned empirical findings, I use two alternative specification. First, I use the tone of item 7.01 disclosures to measure the positive and negative news. Specially, I use dictionary from Loughran and McDonald (2011) to identified the positive and negative words, and programmatically count the

13) The main difference between 8-K filings under the regulation FD (item 7.01) and other types of voluntary 8-K filings is that disclosure of item 7.01 often indicate that the managements had communication with certain outside parties, while the other types of voluntary 8-K filings disclose information to the public. That is, item 7.01 may reflect disclosure of more specific and targeted information, while the other voluntary 8-K filings may deliver more generic information.

14) The mandatory 8-K filings are more frequent than the voluntary 8-K filings with item 7.01. The mean of the frequency of the mandatory 8-K filings is 0.823.

Table 6. Robustness Tests

Panel A. The Effects of Item 7.01 Disclosures on Stock Crash Risk using Tone of Item 7.01 Disclosures

	Dependent = *FCRASH*		
FD_Poisitive Tone	-1.7852 (-1.50)		0.6208 (0.38)
FD_Negative Tone		-2.4363** (-2.46)	-2.7969** (-2.02)
CRASH	-0.5568*** (-6.83)	-0.5564*** (-6.82)	-0.5564*** (-6.82)
ROA	0.4540*** (4.76)	0.4523*** (4.77)	0.4520*** (4.76)
ROASD	-3.2440** (-2.00)	-3.2082** (-1.99)	-3.2064** (-1.99)
SIZE	0.0131 (0.72)	0.0142 (0.78)	0.0142 (0.78)
LEV	-0.7850*** (-8.52)	-0.7827*** (-8.50)	-0.7827*** (-8.50)
MTB	0.0000 (0.54)	0.0000 (0.55)	0.0000 (0.56)
RET	0.4238*** (9.65)	0.4235*** (9.62)	0.4232*** (9.62)
IMR	-0.2687*** (-3.19)	-0.2656*** (-3.16)	-0.2654*** (-3.16)
CSCORE	-1.1223*** (-5.63)	-1.1251*** (-5.64)	-1.1234*** (-5.63)
Constant	-0.3021 (-0.34)	-0.3072 (-0.34)	-0.3111 (-0.35)
Observations	156,407	156,407	156,407
Pseudo R-squared	0.0358	0.0358	0.0358
Year Fixed Effect	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes

* Panel A of Table 6 shows the regression results of Equation (3) using the tone of item 7.01 disclosures as an alternative way to identify the positive/ negative news the 8-K filing provides. The numbers in parentheses represents *t*-statistics based on the robust standard error (White, 1980). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

Table 6. (continued)

Panel B. Alternative Measures for the Stock Crash Risk

	Dependent = $\Delta FDUVOL_{t+1}$	Dependent = $\Delta FNCSKEW_{t+1}$
FD_P	0.002 (1.34)	0.003 (1.15)
FD_N	-0.002** (-1.99)	-0.006** (-2.12)
$\Delta DUVOL_t$	-0.001*** (-9.68)	
$\Delta NCSKEW_t$		-0.001*** (-8.87)
ROA	0.014*** (3.45)	0.036*** (3.55)
ROASD	-0.026*** (-4.46)	-0.062*** (-4.12)
SIZE	-0.001** (-2.27)	-0.002 (-1.36)
LEV	0.002 (0.72)	0.003 (0.55)
MTB	-0.000 (-0.72)	-0.000 (-0.58)
RET	0.018*** (10.88)	0.041*** (10.94)
CSCORE	-0.015*** (-7.27)	-0.035*** (-7.32)
IMR	-0.003 (-0.49)	-0.005 (-0.39)
Constant	0.008 (0.40)	0.013 (0.30)
Observations	101,737	101,866
R-squared	0.278	0.135
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes

* Panel B of Table 6 shows the regression results of Equation (3) using two alternative measures for the stock crash risk. The numbers in parentheses represents *t*-statistics based on the robust standard error (White, 1980). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

positive and negative words for each item 7.01 disclosures. I define *FD_PoisitiveTone* (*FD_NegativeTone*) as the number of positive (negative) words divided by the total number of words in the item 7.01 disclosures, and use them instead of *FD_P* and *FD_N*.[15] Second, I use two alternative measures for the stock crash risk following the previous literature (An et al., 2015; Kim and Zhang, 2016). Specifically, I use changes in the up-down volatility (*DUVOL*) and negative skewness of the stock return (*NCSKEW*) from t to $t + 1$ to mitigate potential time-series correlation.

Table 6 shows the regression results for the robustness tests. Panel A shows the regression results using the tone of item 7.01 disclosures as the alternative measure for the positivity/negativity of the news from the voluntary filing. Consistent with the results from Table 3, the coefficient on *FD_PositiveTone* is not significant in column (1) and (3), while the coefficient on *FD_NegativeTone* is negative and significant in column (2) and (3). These coefficients show that the positive news from the item 7.01 disclosures is not associated with subsequent stock crash risk, while the negative news mitigate the subsequent stock crash risk. Panel B shows the regression results using alternative measure for the stock crash risk. Column (1) uses *FDUVOL*, and column (2) uses *FNCSKEW* as dependent variable. Again, the coefficient on FD_P is positive and significant, while the coefficient on FD_N is negative and significant, supporting the results from Table 3.

CONCLUSION

This paper investigates whether the firm's communications of the negative news using the regulation FD disclosures, captured by item 7.01 of 8-K filing, mitigate stock crash risk. The regulation FD asks firms to disclose item 7.01 of the Form 8-K filing when they disclose information that are subject to the regulation FD (SEC 2004), implying that item 7.01 disclosures capture firms' tendency to communicate with outsiders. Thus, the higher frequency of item 7.01 disclosures with the negative news indicates that the firm does not withhold the negative news. Consistently, I find that when the

15) Note that there are item 7.01 disclosures that do not provide the tone variable, reducing sample size. Example of such documents are available upon request.

firm discloses item 7.01 of the Form 8-K filing with the negative news more frequently, the firm's subsequent stock crash risk is lower. The result also shows that such association is not observed when the firm is followed by analysts or with high percentage of institutional ownership, implying that the communication of the negative news is more important for mitigating stock crash risk when the firm's information environment is poor. Further, I find that item 7.01 disclosures mitigate stock crash risk even after controlling the number of other voluntary items or mandatory items of the Form 8-K filing. Finally, using the tone of item 7.01 disclosures and alternative measure for stock crash risk shows consistent result.

This research contributes to the literature by showing that the communication of the negative news is an important mechanism that mitigates stock crash risk. This is consistent with the previous literature that argues withholding the negative news is a latent factor of stock crash risk (Chen et al., 2001; Jin and Myers, 2006). In addition, the prior studies document the association between stock crash risk and information environments that prevent the manager's hoarding behavior (Callen and Fang, 2013, 2016; Hutton et al., 2009; Kim et al., 2016). The results of this paper supplement such findings by providing the evidence that releases of the negative news reduce stock crash risk especially when the firm's information environment is poor.

REFERENCES

Ajinkya, B., S. Bhojraj, and P. Sengupta (2005), The Association between Outside Directors, Institutional Investors and the Properties of Management Earnings Forecasts. *Journal of Accounting Research*, 43, 343–376. https://doi.org/10.1111/j.1475-679x.2005.00174.x

An, Z., D. Li, and J. Yu (2015), Firm crash risk, information environment, and speed of leverage adjustment. *Journal of Corporate Finance,* 31, 132–151. https://doi.org/10.1016/j.jcorpfin.2015.01.015

Anantharaman, D. and Y. Zhang (2011), Cover Me: Managers' Responses to Changes in Analyst Coverage in the Post-Regulation FD Period. *The Accounting Review,* 86, 1851–1885. https://doi.org/10.2308/accr-10126

Ashbaugh-Skaife, H., D. W. Collins, and W. R. Kinney (2007), The Discovery and Reporting of Internal Control Deficiencies Prior to Sox-Mandated Audits. *Journal of Accounting and Economics,* 44, 166–192. https://doi.

org/10.1016/j.jacceco.2006.10.001

Bird, A., S. A. Karolyi (2016), Do Institutional Investors Demand Public Disclosure? *Review of Financial Studies,* 29, 3245–3277. https://doi.org/10.1093/rfs/hhw062

Blanchard, O. J. and M. W. Watson (1982), Bubbles, rational expectations and financial markets. National Bureau of Economic Research, Cambridge, Mass., USA.

Callen, J. L., X. Fang (2016), Crash Risk and the Auditor-Client Relationship. *Contemporary Accounting Research, 34, 1715-1750.*

Callen, J. L., X. Fang (2013), Institutional Investor Stability and Crash Risk: Monitoring Versus Short-Termism? *Journal of Banking and Finance,* 37, 3047–3063. https://doi.org/10.1016/j.jbankfin.2013.02.018

Chen, J., H. Hong, and J. C. Stein (2001), Forecasting crashes: trading volume, past returns, and conditional skewness in stock prices. *Journal of Financial Economics,* 61, 345–381. https://doi.org/10.1016/S0304-405X(01)00066-6

Clement, M. B., J. Hales, and Y. Xue (2011), Understanding analysts' use of stock returns and other analysts' revisions when forecasting earnings. *Journal of Accounting and Economics,* 51, 279–299. https://doi.org/10.1016/j.jacceco.2010.11.001

De Franco, G., F. P. Vasvari, and R. Wittenberg-Moerman (2009), The informational role of bond analysts. *Journal of Accounting Research*, 47, 1201–1248.

DeFond, M. L., M. Hung, S. Li, and Y. Li (2015), Does Mandatory IFRS Adoption Affect Crash Risk? *The Accounting Review,* 90, 265–299. https://doi.org/10.2308/accr-50859

Donelson, D. C., J. M. McInnis, R. D. Mergenthaler, and Y. Yu (2012), The Timeliness of Bad Earnings News and Litigation Risk. *The Accounting Review,* 87, 1967–1991. https://doi.org/10.2308/accr-50221

Findlay, S. and P. G. Mathew (2006), An Examination of the Differential Impact of Regulation FD on Analysts' Forecast Accuracy. *The Financial Review,* 41, 9–31. https://doi.org/10.1111/j.1540-6288.2006.00130.x

Francis, J., D. Philbrick, and K. Schipper (1994), Shareholder Litigation and Corporate Disclosures. *Journal of Accounting Research*, 32, 137–164.

Gong, G., L. Y. Li, and L. Zhou (2013), Earnings Non-Synchronicity and Voluntary Disclosure. *Contemporary Accounting Research,* 30, 1560–1589. https://doi.org/10.1111/1911-3846.12007

Guay, W., D. Samuels, and D. Taylor (2016), Guiding Through the Fog: Financial Statement Complexity and Voluntary Disclosure. *Journal of Accounting and Economics* Conference papers, 2015 62, 234–269. https://doi.org/10.1016/j.jacceco.2016.09.001

Heckman, J. (1979), Sample Selection Bias as a Specification Error. *Econometrica* 47, 153–61.

Hong, H. and J. C. Stein (2003), Differences of Opinion, Short-Sales Constraints, and Market Crashes. *Review of Financial Studies,* 16, 487–525. https://doi.org/10.1093/rfs/hhg006

Hutton, A. P., A. J. Marcus, and H. Tehranian, (2009), Opaque financial reports, R2, and crash risk. *Journal of Financial Economics,* 94, 67–86. https://doi.org/10.1016/j.jfineco.2008.10.003

Jin, L. and S. C. Myers (2006), R2 around the world: New theory and new tests. *Journal of Financial Economics,* 79, 257–292. https://doi.org/10.1016/j.jfineco.2004.11.003

Johnson, M. F., R. Kasznik, and K. K. Nelson (2001), The impact of securities litigation reform on the disclosure of forward-looking information by high technology firms. *Journal of Accounting Research*, 297–327.

Kasznik, R. and B. Lev (1995), To Warn or Not to Warn: Management Disclosures in the Face of an Earnings Surprise. *The Accounting Review* 70, 113–134.

Khan, M. and R. L. Watts (2009), Estimation and empirical properties of a firm-year measure of accounting conservatism. *Journal of Accounting and Economics,* 48, 132–150.

Kim, J.-B., L. Li, L. Y. Lu, and Y. Yu (2016), Financial statement comparability and expected crash risk. *Journal of Accounting and Economics,* 61, 294–312. https://doi.org/10.1016/j.jacceco.2015.12.003

Kim, J.-B., Y. Li, L. Zhang (2011), Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics,* 100, 639–662. https://doi.org/10.1016/j.jfineco.2010.07.007

Kim, J.-B., Zhang, L. (2016), Accounting conservatism and stock price crash risk: Firm-level evidence. *Contemporary Accounting Research,* 33, 412–441.

Kothari, S. P., S. Shu, and P. D. Wysocki (2009), Do Managers Withhold Bad News? *Journal of Accounting Research*, 47, 241–276. https://doi.org/10.1111/j.1475-679X.2008.00318.x

Loughran, T., B. McDonald (2011), When Is a Liability Not a Liability? Textual Analysis, Dictionaries, and 10-Ks. *The Journal of Finance,* 66, 35–65.

Loureiro, G., A. G. Taboada (2015) Do improvements in the information environment enhance insiders' ability to learn from outsiders? *Journal of Accounting Research*, 53, 863–905.

Mohanram, P. S. (2014), Analysts' Cash Flow Forecasts and the Decline of the Accruals Anomaly. *Contemporary Accounting Research,* 31, 1143–1170. https://doi.org/10.1111/1911-3846.12056

Schoenfeld, J. (2017), The Effect of Voluntary Disclosure on Stock Liquidity: New Evidence from Index Funds. *Journal of Accounting and Economics,* 63, 51–74. https://doi.org/10.1016/j.jacceco.2016.10.007

Securities and Exchange Commission (2004), Financial reporting release nos. 33-8400; 34-49424: Final rule: Additional Form 8-K disclosure requirements and acceleration of filing date (August 23).

Segal, B., Segal, D. (2016), Are Managers Strategic in Reporting Non-Earnings News? Evidence on Timing and News Bundling. *Review of Accounting Studies,* 1–42. https://doi.org/10.1007/s11142-016-9366-y

Shroff, N., R. S. Verdi, and G. Yu (2014), Information Environment and the Investment Decisions of Multinational Corporations. *The Accounting Review,* 89, 759–790. https://doi.org/10.2308/accr-50643

White, H. (1980), A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica,* 48, 817–838. https://doi.org/10.2307/1912934

Received September 7, 2018
Revised November 8, 2018
Accepted December 4, 2018