



Information Disclosure Quality, Earnings Management and Stock Price Cash Risk: Evidence from China

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Abstract. Information disclosure plays an important role in financial market, which has a substantial impact on the earnings management and stock price crash risk. The quality of information disclosed is manipulated by insider's selective disclosure, rendering falsifications in earnings management and increasing the stock price crash risk. Whether this phenomenon exists in emerging markets such as China is an imperative empirical question. Therefore, we examine two hypotheses based on the managerial entrenchment theory. Our data is collected from China Stock Market and Accounting Research dataset (CSMAR). Referring to previous literature, we construct two measurements to capture the stock price crash risk for each listed firm, where one is NCSKEW and the other one is DUVOL. Also, we use a two-way fixed effect model (FEM) to estimate the parameters after controlling the individual-specific effect at the firm-level and the time effect. According to the regression result we find that the information quality is negatively related to the earnings management. Furthermore, we find that the higher the quality of disclosure is, the lower the risk of stock price crash is. Our findings make contributions to corporate governance and provide the direct enlightenment that managers need to enhance the quality of information disclosure.

Keywords: information disclosure · earnings management · corporate governance · Emerging Market · stock price crash risk

1 Introduction

The quality of information disclosure is an important topic in corporate governance realm. In this paper we examine the impact of information disclosure quality on earnings management and stock price crash risks. We find both the stock price crash risk and earnings management are negatively related to information disclosure quality.

The extent of information disclosure reflects the financial and management status of listed companies and is helpful for the public to take timely measures and make apt investment decisions based on the information obtained. It is also beneficial to the shareholder and the public to supervise listed companies. Scholars have conducted many

studies about information disclosure. Some have found the relationship between economic policy uncertainty, information disclosure and stock liquidity (Wang et al., 2022); or disclosure quality, price efficiency, and expected returns (Ho et al., 2022); the other studied the effect of the COVID-19 pandemic on information disclosure (Zhao & Tian, 2022). Recently, researchers also increase attention in earnings management and stock price risk. Earnings management has a considerably positive impact on stock price crash risk post cross-delisting when compared to a control group of firms that remain cross-listed (Loureiro & Silva, 2022). Some scholars also investigated stock repurchase as an earnings management method and its effect on different types of firms (Hribar et al., 2006).

However, little is about the effect of high-quality information disclosure on earnings management and stock price crash risks. Our research focus on the effect of information disclosure quality on these two topics separately.

The reminders of the paper are as follows. Subsequently, we review the prior pertinent literature relating to our topic in Sect. 2. We develop hypothesis in Sect. 3. Then, we design research based on two measurements and regression model in Sect. 4. Finally, we give the analysis of regression results and conclusion in Sect. 5 and Sect. 6, respectively.

2 Literature Review

The issue of information disclosure has been one of the main focuses of academic research, especially in the field of accounting and auditing. Among them, the relationship between the quality of information disclosure and earnings management. Some researchers have found that earnings management affects the value of the firm when there is asymmetric information between managers and investors who are targeting private interests (Chaney & Lewis, 1995).

Subsequently, researchers have also studied the relationship between the corporate disclosure and earnings management. Most of the studies hope to uncover a clear logical relationship that exists between the two. For example, the empirical analysis of Lobo & Zhou (2001) indicates that corporate disclosure and earnings management are significantly negatively related, which provides the basis of our conjecture.

In fact, empirical studies also focus on the problem of imperfect information disclosure caused by negative news concealment. For example, the impact of management teams' concealment of bad news on the earnings management and the corporate financial crash risk has been one of the latest research focuses (Habib et al., 2018).

Recent studies have also focused on the analysis of disclosure content and stock price risk. For example, some researchers have found a clear relationship between publicly available private information, the quality of information and the stock price crash risks. Researchers have found that improvements in information quality reduce the impact of information asymmetry while improving investors' understanding of the corporate. In contrast, the public availability of private information reduces the transparency of companies, thereby increasing their stock price and financial risk (SALEEM & USMAN, 2021).

3 Hypothesis

3.1 The Quality of Information Disclosure on the Relationship of the Extent of Earnings Management

Our hypothesis rests on the managerial entrenchment theory (Salehi & Alkhyoon, 2021). This theory helps us to understand in the case of high concentration of enterprise share, major shareholders is beneficial to the realization of operation incentive mechanism (John & Senbet, 1998). This aligns the interests of managers more closely with those of shareholders, and they will take self-interested actions to maximize returns. Simultaneously, corporate decision-makers are able to control the corporate disclosures. This will foster earnings management without the outside world knowing and help shareholders to achieve higher returns. The quality of information disclosure can reflect a company's attitude to decision-making. Similarly, earnings management is generally aimed at maximizing profit, which is often used as a measure of information transparency (Xie et al., 2003). Enterprise hides negative information through earnings management. Therefore, we finally give hypothesis as below:

Hypothesis 1: The high-quality information disclosure decreases the extent of earnings management.

3.2 The Quality of Information Disclosure on the Relationship of the Stock Price Crash Risk

Extant research is often based on the information asymmetry theory when analyzing the risk of stock price crash (Bartov & Bodnar, 1996). Specifically, the vast majority of outside investors have no channel advantage, which means that they do not have access to private insider information. Investors who lack access to information will delay trading. Once the stock price fluctuates sharply, it will trigger investors to sell shares on a large scale. At the corporate level, according to the agency theory (Jensen, 1976), due to the separation of executives and ownership, there may be inconsistent interest pursuit between shareholders and managers. Managers may choose not to disclose or delay the disclosure of negative information, resulting in the accumulation of negative information. The bad news hoarding theory reflects this problem (Li et al. 2020). Managers keep bad news for a long time and cannot guarantee the quality of information disclosure. When the accumulation of bad news exceeds the limit, it is immediately disclosed to the market, causing stock price to fall sharply, increase the risk of stock price crash, vice versa. We finally postulate as below:

Hypothesis 2: The high-quality information disclosure decreases the stock price crash risk.

4 Research Design

4.1 Variable Definition

Following prior research (Dimson, 1979; Chen et al., 2001; Hutton et al., 2009), we construct two measurements to capture the stock price crash risk for each listed firm, where one is NCSKEW and the other one is DUVOL.

We refer to the Kim et al. (2011) to calculate the NCSKEW, which is using the negative coefficient of skewness to measure the deviation of stock return adjusted by stock market. The detail is shown below:

$$R_{i,t} = \beta_0 + \beta_1 RM_{t-2} + \beta_2 RM_{t-1} + \beta_3 RM_t + \beta_4 RM_{t+1} + \beta_4 RM_{t+2} + \epsilon_{i,t} \quad (1)$$

$$NCSKEW_{i,t} = -\frac{n(n-1)^{\frac{3}{2}} \sum W_{i,t}^3}{(n-1)(n-2) \left(\sum W_{i,t}^2\right)^{\frac{3}{2}}} \quad (2)$$

where the RM_t is market-level weighted average stock return in year t, and we firstly regress as formulation (1) and interpret the residual as the stock return adjusted by market level ($W_{i,t}^1$). And then we use the formulation (2) to calculate the negative coefficient of skewness of adjusted stock return (NCSKEW). The higher NCSKEW means the existence of potential greatly negative minus stock return, namely, the higher stock price crash risk.

$$DUVOL_{i,t} = \ln\left(\frac{(n_{up} - 1) \sum_{down} R_{down}^2}{(n_{down} - 1) \sum_{up} R_{up}^2}\right) \quad (3)$$

The second measurement is DUVOL, which measures the discrepancy of volatility of upward and downward. We firstly divide the samples into two subsamples, where one is the R_{up} ($W_{i,t}$ that is bigger than the mean of $W_{i,t}$) and the other one is R_{down} ($W_{i,t}$ that is smaller than the mean of $W_{i,t}$). And then, calculating the DUVOL as per the formulation (3). Due to the entrenchment motivation, the managers tend to treat the good news and bad news differently. Therefore, the distribution of adjusted stock return may appear skewness so that the DUVOL will tend to be bigger.

Furthermore, we use KV1 and KV2 to generate the proxy for the quality of information disclosure for the two primary explanatory variables using two distinct approaches.

According to Kim & Verrecchia (2001), if more firm-specific information is disclosed, the natural log of the proportion of change of subsequent closing price shows that the closing price responds to the difference between daily trading volume and yearly average daily trading volume by a small amount. This finding supports the idea that the coefficient of regression is small when high-quality information is disclosed. They increase the coefficient with 1000000 as a KV1 proxy, though, because of the numerical scale.

$$\ln|\Delta P_t/P_{t-1}| = \beta_0 + \beta_1 (Vol_t - Vol_0) + \epsilon_i \quad (4)$$

$$KV1 = \beta_1 * 1000000 \quad (5)$$

Later Chinese scholars find that some changes in prior calculation can better measure the quality of information disclosure in Chinese stock market

$$\ln|(P_t - P_{t-1})/P_{t-1}| = \alpha_0 + \alpha_1 \left(\frac{Vol_t}{Vol_0} - 1\right) + \epsilon_i \quad (6)$$

$$KV2 = \alpha_1 * 1000000 \tag{7}$$

Moreover, according to prior scholar (Dechow & Dichev, 2002), we construct the earnings management model based on cash flow. Compared to the Modified Jones Model, we believe the D&D model can capture the extent of earnings management better because of the multiple periods' cash flow. The model is shown below, we interpret the absolute value of residual as the degree of earnings management.

$$\frac{TA_{i,t}}{Asset_{i,t-1}} = \partial_0 \frac{1}{Asset_{i,t-1}} + \partial_1 \frac{CFO_{i,t-1}}{Asset_{i,t-1}} + \partial_2 \frac{CFO_{i,t}}{Asset_{i,t-1}} + \partial_3 \frac{CFO_{i,t+1}}{Asset_{i,t-1}} + \epsilon_{i,t} \tag{8}$$

To make our empirical results more robust, we adopt another model proposed by McNichols (2002), which combined the traditional Jones model and D&D model for estimation of earnings management.

Where, each variable's definition is the same as it was in the formulae used as examples above. All variables have been scaled by the total assets in a lagged year to remove the impact of company size. We use the regression formulation (6) and read the residual as an assessment of the level of earnings management. Similar to this, we emphasize the degree rather than the deviance in our studies. So, we use the absolute value of the residual as the last and most accurate proxy for audit quality (McNichols).

$$\begin{aligned} \frac{TA_{i,t}}{Asset_{i,t-1}} = & \partial_0 \frac{1}{Asset_{i,t-1}} + \partial_1 \frac{CFO_{i,t-1}}{Asset_{i,t-1}} + \partial_2 \frac{CFO_{i,t}}{Asset_{i,t-1}} + \partial_3 \frac{CFO_{i,t+1}}{Asset_{i,t-1}} \\ & + \partial_4 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{Asset_{i,t-1}} + \partial_5 \frac{\Delta PPE_{i,t}}{Asset_{i,t-1}} \epsilon_{i,t} \end{aligned} \tag{9}$$

Simultaneously, we refer the Kim et al. (2014) and control other covariates that may have an influence on stock crash risk. The detail about variables is shown in Table 1.

Table 1. Variable Definition

Symbol	Definition
RM_t	Market-level stock return in year t
$W_{i,t}$	The residual from regression based on formulation (1) for firm i in year t
Vol_t	Trading volume in year t
$CFO_{i,t}$	Cash flow from operation for firm i in year t
$TA_{i,t}$	Total accruals for firm i in year t
$Dturn_{i,t}$	The change of stock turnover for firm i in year t
$Ret_{i,t}$	The return of stock for firm i in year t
$Sigma_{i,t}$	The standard deviation of $W_{i,t}$ after being adjusted by market level stock return
$Size_{i,t}$	The log of total assets for firm i in year t
$MB_{i,t}$	The market to book ratio for firm i in year t
$Level_{i,t}$	The proportion of total liabilities that the total assets for firm i in year t
$ROA_{i,t}$	The return of assets for firm i in year t

Table 2. Descriptive Statistics

Variable	N	p5	p25	p50	Mean	SD	p75	p95
NCSKEW	13000	-1.586	-0.694	-0.257	-0.296	0.772	0.132	0.827
DUVOL	13000	-0.987	-0.517	-0.198	-0.194	0.498	0.120	0.610
DD	13000	0.00500	0.0220	0.0520	0.135	0.613	0.108	0.316
McNicol's	13000	0.00400	0.0220	0.0520	0.127	0.503	0.107	0.307
Dturn	13000	-2.195	-0.736	-0.0630	-0.346	1.032	0.347	0.646
Ret	13000	-0.0100	-0.00400	0.00200	0.00300	0.0100	0.00900	0.0220
Sigma	13000	0.0320	0.0450	0.0580	0.0650	0.0280	0.0760	0.123
Size	13000	20.59	21.50	22.24	22.41	1.315	23.13	24.82
MB	13000	1	1	1.110	1.401	0.803	1.502	2.737
Level	13000	0.0420	0.130	0.264	0.311	0.217	0.454	0.732
ROA	13000	-0.0470	0.0270	0.0500	0.0510	0.0780	0.0810	0.153
KV1	13000	0.00900	0.0270	0.0560	0.0980	0.132	0.115	0.324
KV2	13000	0.247	0.376	0.492	0.516	0.192	0.631	0.877

4.2 Sample Collection and Descriptive Statistics

Using the sample collected from China Stock Market and Accounting Research dataset (CSMAR), we merge data with by year and stock symbol and drop the observation with missing value in any variables. Finally, we collect 13,000 observations in total.

The descriptive statistics is shown in Table 2, where we find that the observations proxied by NCSKEW show more divergency than that proxied by DUVOL due to the higher standard deviation. Also, the earnings management under the different measurement show little difference as well. In general, the earnings management calculated by DD is significantly bigger than that calculated by McNichols method. Furthermore, since KV2's scale of information quality is obviously better than KV1's, we conjecture that KV2's influence may be more important than KV1's effect.

The Table 3 shows the correlation between the primary variables and shows that, at a 99 percent level of confidence, there is no evidence of multicollinearity between the variables.

4.3 Empirical Model

We use a two-way fixed effect model (FEM) to estimate the parameters in order to control the individual-specific impact at the firm-level and the time effect. For the individual-specific effect, we control each firm, and for the time effect, we control the varying years. The regression model is created in the following way:

$$DD/McNicol's_{i,t} = \beta_0 + \beta_1 Dturn_{i,t} + \beta_2 Ret_{i,t} + \beta_3 Sigma_{i,t} + \beta_4 MB_{i,t} + \beta_5 Size_{i,t} + \beta_6 Level_{i,t} + \beta_7 ROA_{i,t} + \beta_8 KV_{i,t} + \sum_k \pi_k Year + \sum_l \delta_l Firm + \epsilon_{i,t} \quad (10)$$

Table 3. Correlation Matrix

	NCSKEW	DUVOL	DD	McNicolis	Dturn	Ret	Sigma	Size	MB	Level	ROA	kv1	kv2
NCSKEW	1												
DUVOL	0.878***	1											
DD	-0.00200	-0.00800	1										
McNicolis	-0.00300	-0.0130	0.758***	1									
Dturn	-0.072***	-0.075***	-0.0140	-0.029***	1								
Ret	-0.140***	-0.159***	0.00500	-0.015*	0.397***	1							
Sigma	-0.112***	-0.119***	0.085***	0.079***	0.341***	0.596***	1						
Size	-0.075***	-0.107***	-0.028***	-0.032***	-0.0130	-0.102***	-0.234***	1					
MB	0.036***	0.039***	0.064***	0.042***	-0.062***	0.028***	0.042***	-0.098***	1				
Level	-0.050***	-0.053***	-0.029***	-0.045***	-0.030***	-0.231***	-0.223***	0.675***	0.076***	1			
ROA	0.00500	0	-0.00300	-0.00100	-0.050***	0.115***	-0.111***	0.079***	0.120***	-0.181***	1		
kv1	0.155***	0.161***	0.00100	0	-0.280***	-0.130***	-0.219***	-0.286***	0.219***	-0.150***	0.148***	1	
kv2	0.172***	0.126***	0.064***	0.075***	-0.081***	-0.0130	-0.076***	0.135***	-0.00700	-0.091***	0.170***	0.275***	1

$$NCSKEW/ DUVOL_{i,t} = \beta_0 + \beta_1 Dturn_{i,t} + \beta_2 Ret_{i,t} + \beta_3 Sigma_{i,t} + \beta_4 MB_{i,t} + \beta_5 Size_{i,t} + \beta_6 Level_{i,t} + \beta_7 ROA_{i,t} + \beta_8 KV_{i,t} + \sum_k \pi_k Year + \sum_l \delta_l Firm + \epsilon_{i,t} \quad (11)$$

The model (10) is used for investigating the relationship between the earnings management and information disclosure quality via proxies DD and McNichols. And the model (11) is estimated for exploring the association between the stock price crash risk and information quality via proxies NCSKEW and DUVOL.

Table 4. Disclosure & Earnings Management

	(1)	(2)	(3)	(4)
VARIABLES	DD-1	DD-2	McNichols-1	McNichols-2
Dturn	0.014*** (2.93)	0.010** (2.04)	0.013*** (2.93)	0.010** (2.21)
Ret	-5.358*** (-4.66)	-5.149*** (-4.55)	-5.812*** (-5.00)	-5.639*** (-4.95)
Sigma	1.682*** (3.46)	1.649*** (3.50)	1.399*** (3.24)	1.387*** (3.34)
Size	0.045** (2.00)	0.025 (1.14)	0.040** (2.21)	0.023 (1.25)
MB	0.043 (1.31)	0.045 (1.37)	0.022 (1.27)	0.023 (1.35)
Level	0.083 (0.71)	0.143 (1.18)	-0.066 (-0.90)	-0.014 (-0.18)
ROA	0.180* (1.68)	0.183* (1.70)	0.181** (1.96)	0.183** (1.99)
kv1	0.253*** (2.86)		0.204*** (2.73)	
kv2		0.178*** (3.38)		0.155*** (3.37)
Constant	-1.087** (-2.17)	-0.723 (-1.49)	-0.885** (-2.26)	-0.577 (-1.48)
Observations	12,662	12,662	12,662	12,662
R-squared	0.039	0.040	0.051	0.052
Number of Firms	3,091	3,091	3,091	3,091
Firm Fixed	YES	YES	YES	YES
Year Fixed	YES	YES	YES	YES

5 Empirical Result

According to the regression result below, we find that the information quality is negatively related to the earnings management. As we have mentioned above, the high KV proxy indicates the lower information quality, and the KV proxy is positively associated with the degree of earnings management, which elucidates that the higher information quality curbs the high earnings management. All KV proxies below are significantly positive, which testifies the robustness of our empirical design. Simultaneously, we find the estimation of such a suppression of information quality is conspicuously different

Table 5. Disclose & Stock Price Crash Risk

	(1)	(2)	(3)	(4)
VARIABLES	NCSKEW-1	NCSKEW-2	DUVOL-1	DUVOL-2
Dturn	-0.005 (-0.48)	-0.012 (-1.18)	-0.005 (-0.71)	-0.010 (-1.53)
Ret	-14.729*** (-11.00)	-14.199*** (-10.50)	-11.537*** (-13.38)	-11.220*** (-12.89)
Sigma	-6.666*** (-10.50)	-6.385*** (-10.25)	-3.477*** (-8.86)	-3.380*** (-8.72)
Size	0.083*** (2.82)	0.018 (0.60)	-0.006 (-0.27)	-0.042** (-2.01)
MB	0.005 (0.22)	0.006 (0.26)	-0.001 (-0.08)	0.000 (0.03)
Level	-0.521*** (-3.90)	-0.303** (-2.23)	-0.150* (-1.77)	-0.031 (-0.36)
ROA	-0.358* (-1.95)	-0.355* (-1.91)	-0.099 (-0.91)	-0.096 (-0.87)
kv1	0.521*** (5.06)		0.336*** (5.05)	
kv2		0.655*** (15.39)		0.353*** (12.77)
Constant	-1.498** (-2.37)	-0.396 (-0.63)	0.267 (0.60)	0.893** (2.00)
Observations	12,662	12,662	12,662	12,662
R-squared	0.111	0.130	0.117	0.130
Number of Firms	3,091	3,091	3,091	3,091
Firm Fixed	YES	YES	YES	YES
Year Fixed	YES	YES	YES	YES

between KV1 and KV2 proxy. Under the premise that the KV2 is more adequate for estimation of Chinese market, the result may tell us that though the high-quality information can decrease the extent of earnings management, it cannot make a great difference as main developed countries. Because the KV1 has been testified the robustness, however, it seems baselessly higher than estimation of KV2. In detail, based on the DUVOL model, the estimation of the effect of alleviation from high-quality information disclosure on stock price crash risk is apparently weaker than that based on the NCSKEW. But, overall, all the regression results show the qualitatively identical estimation of those kind of effect. The adoption of multiple proxies also attests the robustness of our empirical results (Table 4).

Furthermore, we use the regression model (10) to test our hypothesis 2. Similarly, the positive estimation of coefficient of KV shows the adverse relationship between the dependent variable and independent variable. Namely, identical with our hypothesis, we find that the higher the information disclosure quality is, the lower the stock price crash risk (Table 5).

6 Conclusion

In this paper, the gist is to assess the influence of information disclosure on earnings management and stock price crash risk in Chinese market. We find that there exists negative relation between the information quality and the earnings management. We also determine that high-quality information disclosure mitigates stock price crash risk.

Concretely, our finding provides stronger evidence for the significantly negative association between corporate disclosure and earnings management. Our research has been developed depending on the managerial entrenchment theory, and we eliminate the influence of the company and use more appropriate model to capture the effect. Furthermore, we find that high disclosure quality come with lower earnings management which explains how company's decision be affected by manager. Typically, the malignant disclosure quality gives the proclivity to make more earnings management.

Also, our finding testifies the relationship between the quality of disclose and stock price crash risk. Our research has depending on information asymmetry and agency theory, finding that there exists negative relation between the two, which means high-quality information disclosure diminish stock price crash risk.

Our research provides the direction for further investigation in information disclosure quality and corporate governance, which offers the future research basis and is also our further research endeavor.

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