



EARNINGS QUALITY AND STOCK CRASH RISK: A STUDY IN INDONESIA

Jessica Clara Alverina

University of Surabaya, Indonesia

e-mail: jessicatan2662@gmail.com

ORCID: 0009-0005-3449-3872

Felizia Arni Rudiawarni

University of Surabaya, Indonesia

e-mail: felizia@staff.ubaya.ac.id

ORCID: 0000-0003-1116-4804

Senny Harindahyani

University of Surabaya, Indonesia

e-mail: senny.h@staff.ubaya.ac.id

ORCID: 0000-0001-9892-6044

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Abstract

Research background: Earnings is essential information for investors. Therefore, the quality of earnings influences optimal investment decisions. Poor earnings quality leads to wrong investment decisions and increases the risk of stock crashes, which are detrimental to shareholder prosperity. The Indonesia Stock Exchange (IDX), as a stock exchange in a developing country, faces issues with the quality of its reported earnings. This research seeks to provide empirical evidence regarding earnings quality and stock crash risk.

Purpose: This study aims to empirically examine the impact of earnings quality, which is proxied by earnings management and transparency, on stock price crash risk in Indonesia.

Research methodology: This study investigates all firms listed on the Indonesia Stock Exchange from 2019 to 2021 using a multivariate regression analysis.

Results: The results provide evidence that firms with higher earnings management are positively associated with higher stock crash risk. However, this study reveals interesting findings about the impact of earning transparency on stock crash risk in this time frame. Earnings transparency has a significantly positive impact on stock crash risk instead of a negative one. This study focuses on the 2019–2021 period, which coincides with the COVID-19 pandemic, so caution should be exercised when generalizing the findings to non-pandemic conditions.

Novelty: The results imply additional, potentially interesting extensions. In emerging countries, many external factors beyond the firm's control affect stock crash risks, and these conditions strongly prove the existence of an inefficient stock market in Indonesia.

Keywords: stock price crash risk, earnings management, earnings transparency, earnings quality

JEL classification: G12, M40, M41

Introduction

The stock market plays a critical role in facilitating the economy by providing a platform for trading between issuers and investors. Investors can take advantage of the stock market through dividends and capital gains (Fauzi, Wahyudi, 2016). However, investing in the stock market also carries high risks, especially during times of crisis and potential stock market crashes. The literature also suggests that stock market crashes result in a negative skewness of the return distribution for individual stocks, indicating risk asymmetry in stock prices. Research has shown that information asymmetry between managers and shareholders, as well as managers' self-interest, can affect the risk of falling stock prices. Overall, the stock market presents both opportunities and risks for investors (Kothari et al., 2005).

The quality of a firm's earnings is a key determinant of its financial performance and impacts the risk of a stock market crash. The selective disclosure of information by internal agents can mislead earnings figures, leading to less information transparency and increasing the risk of stock market crashes (Warrad, 2017). Research from Hutton et al. (2009) has shown that U.S. firms that disclose poor financial information tend to have lower information transparency, which increases the risk of a stock crash. Earnings quality reflects the extent to which financial statements can be relied upon as accurate information about future prospects. When earnings quality is low, it becomes difficult to predict future cash flows and reduce the risk of a stock crash. Therefore, market participants need to pay attention to a firm's earnings quality when evaluating its prospects or fundamentals (Qamar et al., 2015).

The quality of a firm's earnings can be assessed by looking at earnings management and transparency. Earnings management is an action taken based on the management's considerations by changing information in financial reports with the aim of misleading several stakeholders and prioritizing the interests of the management concerned (Healy, 1999).

Earnings that are managed tend to be of lower quality, but a low level of earnings management does not necessarily guarantee that earnings are of high quality (Cug, Cugova, 2021). Earnings management significantly impacts earnings quality in countries with smaller markets, weaker investor protection, lower levels of disclosure, higher ownership concentration, and weaker law enforcement. To minimize asymmetric information, firms should provide high-quality, transparent, and comprehensive financial reports that provide fair information to all stakeholders (Barth, 2003). Earnings transparency is also a factor that influences earnings quality. Research shows that firms with high earnings transparency are less likely to experience falling stock prices. By minimizing the withholding of bad news, the possibility of falling stock prices can be reduced (Habib et al., 2022).

Low earnings quality and low earnings informativeness are essential issues in Indonesia (Fan, Wong, 2002; Sulistiawan et al., 2014). It is believed that low earnings quality and informativeness will lead to a stock crash. Given the importance of earnings quality and stock crash risk in Indonesia, it is necessary to conduct in-depth research to understand the relationship between earnings quality and the likelihood of stock crashes in the Indonesian stock market. This study was conducted during the unique economic period of the COVID-19 pandemic (2019–2021). It is crucial to acknowledge that the extreme market volatility, widespread economic uncertainty, and significant government stimulus measures enacted during these years created an unparalleled environment for financial markets. Therefore, while this research provides critical insights into firm behavior during a crisis, it is hard to fully disentangle whether the observed results represent a genuine, persistent emerging market phenomenon or are anomalies specific to the pandemic era. Caution is needed in interpreting the findings.

1. Literature review

1.1. Two dimensions of earnings quality measures

Researchers in finance and accounting have categorized earnings quality measures into two main types: earnings management and earnings transparency. Earnings management measures focus on the manipulation of accrued earnings by listed firms. The total accrued earnings method, introduced by Healy in 1985, separates the manipulable and non-manipulable parts of accruals in financial statements. Since earnings consist of accrued items and cash flows from operating activities, the manipulation of these items may indicate the reliability of the reported earnings figures. Extending this principle, Jones (1991) developed the concept of non-

discretionary earnings by calculating earnings related to items that cannot be manipulated. The impact of trade receivables on total sales was then included in measuring nondiscretionary accruals with a modified Jones model proposed by Dechow et al. (1995). The concept of earnings quality can be measured in various ways, one of which is earnings transparency. Earnings transparency refers to the extent to which reported earnings figures are reflected in stock market valuations. A study conducted by Barth (2003) tested earnings transparency by examining the explanatory power of earnings in relation to changes in the economic value of the firm. The study used a regression model developed by Francis et al. (2004) which combined stock returns, changes in current earnings, and current earnings. An indicator of earnings transparency is the R^2 value of the regression model, with higher R^2 values indicating higher earnings transparency and therefore better earnings quality. Barth also developed a more comprehensive model in 2013, which considers industry effects and uses the R^2 value of the regression between earnings and stock returns as a measure of the explanatory power of earnings information on firm value, thus embracing the concept of earnings transparency.

1.2. Earnings quality and stock price crash risk

Undesirable stock price crashes can be attributed to certain characteristics. One of these is excessive and unpredictable stock price volatility without any support from publicly available fundamental firm information. Another contributing factor is the higher probability of negative stock volatility compared to positive volatility. This can impact earnings quality. Previous research suggests that earnings quality plays a significant role in explaining the risk of stock crashes. Hutton et al. (2009) found that firms that reduce transparency in their financial reporting experience spread less bad news, resulting in lower information about the stock price. This can cause the stock price to be overvalued, eventually leading to a crash. Additionally, studies by Benmelech et al. (2010) and Kim et al. (2011) propose that CEOs may be motivated to hide bad news to enhance the long-term performance of the firm. Consequently, an increase in stock price can lead to overinvestment and overvaluation, ultimately resulting in a subsequent decline in the stock price. Research from Kothari et al. (2005) shows that there is management motivation to maintain the firm's financial performance by withholding bad news to the public. So that when the bad news is spread to the public, the stock price is falling. This happens when management reverses accruals.

The authors of the research paper, Chen et al. (2001), used Negative Coefficient of Skewness (NCSKEW) metrics to measure stock price crash risk. Extending this research (Kim et al., 2011; Kim, Zhang, 2014), improved upon the methodology by introducing W_{it} as

a replacement for $R_{i,t}$ and calculating NCSKEW values based on this new variable. In contrast, Hutton et al. (2009) defined a “Crash” as a binary variable, with a value of 1 indicating a stock that experienced at least one crash in a given year, and 0 indicating no crashes. They determined the week of a stock price crash by comparing the weekly return ($R_{(i,d)}$) to the stock-specific average weekly return minus 3.09 times the standard deviation. This threshold represents extreme deviations from the normal distribution, where stock returns are considered highly abnormal and likely to result in stock price crashes. Kim et al. (2011a) and Kim et al. (2011b) later adjusted this threshold to 3.2 standard deviations for a more stringent indicator of stock price crash risk.

Earnings quality is an important factor in explaining stock price crash risk. Hutton et al. (2009) conducted a study investigating how non-transparent financial reporting affects information transparency and stock price crash risk. Their findings suggest that reduced transparency leads to lower efficiency in news distribution that results in overvalued stock prices and a higher probability of crashes. Similarly, Kim and Zhang (2016) analyzed a large sample of US stocks and found that corporate accounting conservatism, which involves less earnings manipulation, is negatively correlated with the risk of future stock price crashes. This relationship is especially pronounced for firms facing greater asymmetric information problems. Furthermore, Francis et al. (2004) discovered that earnings management, often used by insiders to serve their self-interest, significantly increases the risk of stock price crashes. Thus, these studies highlight the importance of transparent financial reporting and conservative accounting practices in reducing the risk of stock price crashes.

Prior research in Asian markets consistently demonstrates that earnings quality influences stock crash risk. For instance, a study by Haider et al. (2022) across six Asian countries – Pakistan, India, China, Japan, Hong Kong, and Singapore – investigated this relationship using earnings management as a proxy for earnings quality. Their findings revealed a significant and positive association between earnings management and stock price crash risk in both developing and developed economies. This result indicates that a higher degree of earnings management corresponds to an increased likelihood of a future stock price crash.

Moreover, research by Su et al. (2023) demonstrates that informative risk disclosures within the Management Discussion and Analysis (MD&A) section of annual reports can mitigate stock price crash risk by alleviating information asymmetry. This finding supports the broader principle that enhanced corporate transparency and high-quality disclosure are crucial mechanisms for reducing the likelihood of stock price crashes.

However, the relationship is not always straightforward. The seemingly paradoxical positive relationship between earnings transparency and stock price crash risk in Indonesia warrants a deeper examination of the country's unique institutional landscape, which often diverges from the assumptions underpinning capital market theories developed in more mature economies. While the conventional view posits that transparency should reduce information asymmetry and, consequently, lower crash risk (Hutton et al., 2009), this relationship may be distorted in an environment characterized by highly concentrated ownership structures and weak investor protection mechanisms.

In Indonesia, a significant portion of listed firms are controlled by families or a small group of blockholders (Claessens et al., 2000). This concentration of power can create a severe agency conflict not between managers and shareholders, but between controlling and minority shareholders. In such a setting, increased transparency might not serve its intended purpose of leveling the information playing field. Instead, controlling shareholders could use the guise of transparency to strategically release information in a way that benefits them at the expense of minority investors. For instance, they might disclose complex or overwhelming amounts of information to obscure bad news or to facilitate tunneling activities (Jiang et al., 2010). Wongchoti et al. (2021) also found that while better earnings quality generally leads to fewer crashes, exceptionally high levels of earnings transparency, when combined with profitable insider trading, can paradoxically increase crash risk. Furthermore, the information that is made transparent may be of poor quality or misleading. Recent research in S&P 1500 indexed firms on "ESG greenwashing" has shown that misleading disclosures, a form of superficial transparency, can actually increase crash risk by creating a deceptive perception of firm quality that is prone to sudden, sharp corrections (Zadeh, Hammami, 2025).

Therefore, when the institutional framework for monitoring and enforcement is not robust – a persistent challenge in many emerging markets, including Indonesia – higher reported transparency does not automatically equate to higher quality information or reduced risk. This environment can lead to a situation where a sudden revelation of previously obscured negative information, despite a facade of transparency, triggers a market overreaction and a subsequent stock price crash. Even though there are some counterintuitive findings, this paper follows the line of research that supports that higher earnings transparency can reduce the risk of a stock price crash.

Existing literature studying crash risk in Indonesia is limited. As compared to developed countries, emerging markets are less transparent. The research gap between earnings quality and stock crashes in emerging markets compared to developed countries is highlighted.

In particular, Indonesia, as a developing country, is discussed in relation to its stock market changes and differences in regulatory measures and institutional environment, which impact earnings quality.

Previous studies have explored the influence, protection, and response to stock market crashes, revealing that in developing countries like Indonesia, it is advisable for investors to avoid stocks with high risk, low profitability, and high leverage when the threat of a stock crash looms. Furthermore, research has examined the link between earnings management and the risk of stock price decline. The findings indicate that firms with high levels of real earnings management are more prone to stock crashes. It is noted that there is still ongoing research on the relationship between earnings quality and stock crashes, particularly in the context of Indonesia, suggesting that more studies are needed in this field. Based on the earlier literature review, this study proposes the following hypotheses:

- H1. Indonesia firms with higher earnings management are associated with higher stock crash risk.
- H2. Indonesia firms with higher earnings transparency are associated with lower crash risk.

2. Research methodology

This research covers all firms listed on the Indonesia Stock Exchange from 2019 to 2021. Stock return data and firm financial data are taken from Yahoo Finance and firm websites. Sample firms are selected following Barth et al. (2013), Chen et al. (2001), Hutton et al. (2009). The final sample consists of 1,252 firms.

The sample period for this study spans from 2019 to 2021. This timeframe was chosen to analyze the most recent data available; however, it exclusively covers the period of the COVID-19 global pandemic. The economic conditions during these years were anomalous, characterized by sharp market downturns, rapid recoveries, and active government and central bank interventions in the Indonesian economy, which could systematically affect both earnings quality and stock price dynamics.

2.1. Earnings management measure

The independent variables used in this study are earnings management measured using the modified Jones model that has been updated by Dechow et al. (1995). The following regressions were performed in each industry to estimate total accruals.

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_0 + \beta_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta REV_{i,t}}{A_{i,t-1}} \right) + \beta_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t-1} \quad (1)$$

Discretionary accruals can be obtained by subtracting nondiscretionary accruals from total accruals.

$$DA_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - \left(\beta_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} \right) + \beta_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) \right) \quad (2)$$

$TA_{i,t}$ is the total accrued profit of the firm i in year t , which is the difference between the net profit after tax and the cash flow from operating activities; $\Delta REV_{i,t}$ is the difference of the operating income between the year t and year $t - 1$ of firm i ; $PPE_{i,t}$ is the total fixed assets of the firm in year t ; $A_{i,t-1}$ is the total assets of the firm i in year t ; $DA_{i,t}$ is the firm's discretionary accruals; $\Delta REC_{i,t}$ is the firm's accounts receivable changes between year t and $t - 1$.

Following Hutton et al. (2009), the sum of three lag periods absolute discretionary accruals is finally used to measure the degree of accrued earnings management:

$$AM_{Accrual,t} = |DA_{i,t}| + |DA_{i,t-1}| + |DA_{i,t-2}| \quad (3)$$

Based on the model above, the greater the $AM_{Accrual}$, the more likely the firm is to engage in earnings management activities.

2.2. Earnings transparency measure

The independent variables used in this study are earnings transparency using the Barth et al. (2013) model. In short, it measures the explanatory power of current earnings (and changes in current earnings) on observed stock returns for a given firm in a given year while accounting for industry influences.

This is a two-step method. The first step is to regress the annual stock returns of firms in a particular industry against their price-scaled annual earnings (and price-scaled earnings changes) as expressed in the following equation. First, it is necessary to classify all the sample firms by industry (11 of them according to the IDX (Indonesia Stock Exchange) industry classification) and create an industry portfolio. The objective is to capture the commonality of accounting applications within industries and thus reflect the heterogeneity between different industries.

Regressions are performed on an annual basis. The adjusted R^2 estimates (one number for each industry each year) obtained from the regression serve as a the transparency measures, namely $ETRANS_{i,t}$:

$$RETURN_{i,j,t} = \alpha_0^1 + \alpha_1^1 \left(\frac{E_{i,j,t}}{P_{i,j,t-1}} \right) + \alpha_2^1 \left(\frac{\Delta E_{i,j,t}}{P_{i,j,t-1}} \right) + \varepsilon_{i,j,t} \quad (4)$$

where:

$RETURN_{i,j,t}$ – the annualized rate of return of the industry j firm i (annualized rate of return calculated from the weekly return data of year t),

$E_{i,j,t}$ – the net profit of the industry j firm i after deducting nonrecurring profit and loss as indicated by earnings per share,

$\Delta E_{i,j,t}$ – the net profit change after deducting nonrecurring gains and losses in industry j firm i , using t year operating profit minus $t - 1$ year operating profit,

$P_{i,j,t}$ – the year-end market value in year $t - 1$ in industry j (the market value at the beginning of year t),

$\varepsilon_{i,j,t}$ – the return residual of the industry j in year t .

The second step is to account for the level of transparency of revenues outside the industry of influence. Based on the “residuals” obtained from the first regression, the firms in each industry are sorted from smallest to largest in each year. The quartile bounds of the residuals are calculated and used as a benchmark to divide the sample firms in each year into four groups. The next step is to combine the top 25% from each industry in that year to build a “portfolio”. Finally, the adjusted R^2 of the regression is $ETRANS_{i,p,t}$. This represents the level of earnings transparency based on the “portfolio” ranking free of industry effects.

$$RETURN_{i,p,t} = \alpha_0^1 + \alpha_1^1 \left(\frac{E_{i,p,t}}{P_{i,p,t-1}} \right) + \alpha_2^1 \left(\frac{\Delta E_{i,p,t}}{P_{i,p,t-1}} \right) + \varepsilon_{i,p,t} \quad (5)$$

$RETURN_{i,p,t}$ is the annualized rate of return of the portfolio p firm i (annualized rate of return calculated from the weekly return data of year t) $E_{i,p,t}$ is the net profit of the portfolio p firm i after deducting nonrecurring profit and loss (This study uses the operating profit data in the income statement). $\Delta E_{i,p,t}$ is the net profit change after deducting nonrecurring gains and losses in portfolio p firm i , using t year operating profit minus $t - 1$ year operating profit $P_{i,p,t}$ is the year-end market value in year $t - 1$ in portfolio p (the market value at the beginning of the year t). $\varepsilon_{i,p,t}$ is the return residual of the portfolio p in year t .

The second step is done to capture the explanatory power of earnings figures on stock returns beyond industry influences. As argued by Barth et al. (2013), since each combination of stocks in each “portfolio” covers all industries, it effectively eliminates industry effects. Therefore, changes in R^2 cannot be attributed to industry changes, but rather reflect the differences in explanatory power caused by certain characteristics of the firms in the portfolio to which it belongs. Finally, the level of earnings transparency of each firm in each year, $ETRANS_{i,t}$ is calculated from the combination of the two steps mentioned above.

$$ETRANS_{i,t} = ETRANS_{i,p,t} + ETRANS_{i,j,t} \quad (6)$$

where:

$ETRANS_{i,t}$ – the earnings transparency of firm i in year t ,

$ETRANS_{i,j,t}$ – the earning transparency of industry j in year t ,

$ETRANS_{i,p,t}$ – earnings transparency of portfolio p (exclude industry effect).

2.3. Stock price crash risk measure

The dependent variable used in this study is stock crash which is measured using 2 methods namely NCSKEW and CRASH (Chen et al., 2001; Hutton et al., 2009; Kim et al., 2011). This study uses weekly return data from firms to estimate the risk of stock price declines. By using weekly data, research can analyze stock price changes in more detail and identify patterns or trends that may be associated with downside risk. In previous studies, researchers measured the downside risk of stock prices which is described in the regression as follows:

$$r_{i,d} = \alpha + \beta_1 r_{j,d-1} + \beta_2 r_{m,d-1} + \beta_3 r_{i,d} + \beta_4 r_{m,d} + \beta_5 r_{j,d+1} + \beta_6 r_{m,d+1} + \varepsilon_{i,d} \quad (7)$$

where:

$r_{i,d}$ – the weekly return of the firm i in the week d without considering the cash dividend reinvestment,

$r_{m,d}$ – the weekly market return in week d without considering the cash dividend reinvestment,

$r_{j,d}$ – the value-weighted return of industry j that firm i belongs to in week d . The residual $\varepsilon_{i,d}$ is the degree to which the firm’s stock return deviates from the market weekly yield, indicating that the weekly stock return cannot be explained by the fluctuation of the market weekly yield.

The next step is to set $R_{i,d} = \ln(1 + \varepsilon_{i,d})$. Based on the “return” metric mentioned above, this study constructs the following two indicators to share price crash risk on a “firm year” basis:

- CRASH (Hutton et al., 2009; Kim et al., 2011)
- A crash is identified when $R_{i,d}$ is reduced by 3.2 times the standard deviation of the year average $R_{i,d}$. For firm i in year t , if there is at least one week of crash, then $CRASH_{i,t}$ is 1 and 0 otherwise.
- NCSKEW (Chen et al., 2001)

$$NCSKEW_{i,t} = \left(-n(n-1)^{\frac{3}{2}} \sum R_{i,d}^3 \right) / (n-1)(n-2) \left(\sum R_{i,d}^2 \right)^{\frac{3}{2}} \quad (8)$$

n represents the number of trading weeks for firm i in year t . The coefficient of skewness reflects the symmetry of the parameter. The larger the NCSKEW, the higher the degree of negative bias coefficient of the firm’s stock returns, which means that the risk of falling stock prices is higher.

2.4. Control variables

In this study, the authors discuss the factors that contribute to the risk of stock price crashes. They refer to previous research conducted by Chen et al. (2001), Hutton et al. (2009), Kim et al. (2011a), Kim et al. (2011b) to support their choice of control variables. These variables include market volatility (MV), market return (RETURN), and stock price downside risk (NCSKEW). SIGMA represents the firm’s weekly specific rate of return’s standard deviation, while RETURN indicates the firm’s buy and hold specific rate of return for the fiscal year. The authors also consider firm-specific characteristics in their analysis, such as firm size (SIZE), market to book value ratio (MTB), financial leverage (LEV), and return on assets (ROA). SIZE is measured using the natural logarithm of total assets, MB represents the ratio of market value to book value, LEV indicates the ratio of assets to liabilities, and ROA is the ratio of earnings before interest and taxes to total assets at the beginning of the year.

2.5. Regression model

To test if there is a relationship between earnings quality and stock price crash risk in Indonesia, this study uses the following multivariate regression to test the hypotheses. CRASH and NCSKEW are used as the main dependent variables for stock price crash risk. There are 4 regression models:

$$\begin{aligned} \text{NCSKEW}_{i,t+1} = & \beta_0 + \beta_1 \text{AM}_{\text{Accrual}_{i,t}} + \beta_2 \text{MTB}_{i,t} + \beta_3 \text{MV}_{i,t} + \beta_4 \text{LEV}_{i,t} + \\ & + \beta_5 \text{ROA}_{i,t} + \beta_6 \text{SIZE}_{i,t} + \beta_7 \text{RETURN}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (9)$$

$$\begin{aligned} \text{NCSKEW}_{i,t+1} = & \beta_0 + \beta_1 \text{ETRANS}_{i,t} + \beta_2 \text{MTB}_{i,t} + \beta_3 \text{MV}_{i,t} + \beta_4 \text{LEV}_{i,t} + \\ & + \beta_5 \text{ROA}_{i,t} + \beta_6 \text{SIZE}_{i,t} + \beta_7 \text{RETURN}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (10)$$

$$\begin{aligned} \text{NCSKEW}_{i,t+1} = & \beta_0 + \beta_1 \text{ETRANS}_{i,t} + \beta_2 \text{AM}_{\text{Accrual}_{i,t}} + \beta_3 \text{MTB}_{i,t} + \beta_4 \text{MV}_{i,t} + \\ & + \beta_5 \text{LEV}_{i,t} + \beta_6 \text{ROA}_{i,t} + \beta_7 \text{SIZE}_{i,t} + \beta_8 \text{RETURN}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (11)$$

$$\begin{aligned} \text{CRASH}_{i,t+1} = & \beta_0 + \beta_1 \text{ETRANS}_{i,t} + \beta_2 \text{AM}_{\text{Accrual}_{i,t}} + \beta_3 \text{MTB}_{i,t} + \beta_4 \text{MV}_{i,t} + \\ & + \beta_5 \text{LEV}_{i,t} + \beta_6 \text{ROA}_{i,t} + \beta_7 \text{SIZE}_{i,t} + \beta_8 \text{RETURN}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (12)$$

Based on the hypotheses, it is expected that β_1 to be negative and β_2 to be positive in Eq 11 and 12.

3. Results and discussion

This study begins by presenting the descriptive statistics of all variables in the sample after data filtering. Overall, the proximity of the means and medians across the variables suggests that the data does not have severe abnormalities.

Table 1.Descriptive Statistics

Variable	Number of observations	Mean	Std. Deviation	Minimum	Median	Maximum
NSKEW _{t+1}	1252	-0.611	1.203	-7.096	-0.532	7.141
ETRANS _{it}	1252	0.083	0.120	-0.140	0.043	0.666
AMACCRUALS _{it}	1252	0.248	0.260	0.010	0.179	3.477
MV _{it}	1252	0.080	0.047	0.001	0.069	0.360
SIZE _{it}	1252	28.679	1.720	22.443	28.672	33.538
ROA _{it}	1252	0.005	0.259	-7.888	0.016	0.635
LEV _{it}	1252	0.530	0.595	0.002	0.473	13.743
RETURN _{it}	1252	0.161	0.942	-0.958	-0.029	13.871
MTB _{it}	1252	2.187	5.990	-72.585	10.815	100.694

Source: own elaboration.

As a preliminary test, the correlation analysis is presented in Table 2. Overall, the table shows there is no serious multicollinearity in the regression model.

Table 2. Correlation Matrix

Variable	NCSKEW _{t+1}	ETRANS _{it}	AAM ACCRUALS _{it}	MTB _{it}	MV _{it}	SIZE _{it}	ROA _{it}	LEV _{it}	RETURN _{it}
NCSKEW _{t+1}	1								
ETRANS _{it}	0.062*	1							
AAM ACCRUALS _{it}	0.104**	0.059*	1						
MTB _{it}	0.055	-0.048	0.047	1					
MV _{it}	-0.033	-0.003	0.198**	0.055	1				
SIZE _{it}	0.039	-0.058*	-0.236**	-0.017	-0.255**	1			
ROA _{it}	-0.024	0.010	-0.087**	0.068*	-0.041	0.144**	1		
LEV _{it}	0.013	-0.013	0.086**	-0.027	0.038	0.006	-0.663**	1	
RETURN _{it}	0.104**	0.112**	0.169**	0.064*	0.372**	-0.072*	0.081**	-0.018	1

** – Correlation is significant at the 0.01 level (2-tailed).

* – Correlation is significant at the 0.05 (2-tailed).

Source: own elaboration.

3.1. Earnings management and crash risk in Indonesia

Table 3 reports the regression results of model in section 3 on the impact of earnings management level on stock price crash risk. Model 1 is the regression result using the NCSKEW proxy as the dependent variable and AM accrual as the independent variable, while Model 2 is the regression result of ETRANS as the independent variable. Model 3 is the regression result of the combined independent variables. The results are also robust to including year fixed effects.

Supporting Hypothesis 1, the coefficient of AM Accruals is significantly positive at the 1 and 5% level for both NCSKEW and CRASH. This suggests that the higher the level of earnings management, the greater the crash risk, consistent with the findings documented in Hutton et al. (2009). Unlike earnings management measures, earnings transparency has never been associated with stock price crash risk in Indonesia so far, perhaps due to its complexity. Table 3 above presents the regression results on the impact of earnings transparency on stock price crash risk. Hypothesis 2 predicts that higher transparency will lower the risk of stock price crashes. The reported results are not consistent with this prediction. The coefficient of ETRANS is significantly positive at the 1 and 5% level. This suggests that the higher the level of earnings transparency, the greater the crash risk. The stock market in Indonesia has experienced a decline in recent years, with the Composite Stock Price Index (JCI) moving at a similar level for the past five years. Negative global sentiments, such as concerns about the

Federal Reserve's interest rate hike, the US-China trade war, and Brexit, have impacted the stock market. The pressure continued into 2019 and worsened in 2020 due to the COVID-19 pandemic. However, in 2021, as the pandemic started to subside, the JCI began to recover and saw an increase. Despite business entities maintaining transparency in their earnings, investors were not influenced as the stock market was experiencing a shock at that time. The condition of the stock market in Indonesia has had a significant impact on investors and the level of earnings transparency in business entities.

Table 3. Regression result by using NCSKEW

NCSKEW _{t+1} Coeff. (t-value)			
Hyphotesis 1 & 2			
	Model 1	Model 2	Model 3
NarasConstant	-1.786***	-1.376**	- 1.889
	-2.874	-2.254	0.624
ETRANS _{it}	—	0.519**	0.479**
	—	1.876	1.730
AM ACCRUAL _{it}	0.508***	—	0.498***
	3.741	—	3.672
MTB _{it}	0.010**	0.012**	0.011**
	1.818	2.042	1.915
MV _{it}	-2.318***	-1.950**	-2.228***
	-2.888	-2.426	-2.773
SIZE _{it}	0.043**	0.030*	0.045 **
	2.024	1.429	2.119
ROA _{it}	-0.279**	-0.289*	-0.282*
	-1.572	-1.620	-1.584
LEV _{it}	-0.060	-0.042	-0.585
	-0.078	-0.546	-0.767
RETURN _{it}	0.159***	0.166***	0.152***
	4.071	4.240	3.838
Adj R ²	0.028**	0.019**	0.035**
F-stat	6.148***	4.614***	5.762***
DW stat	1.865	1.845	1.871
Fixed Effect	Yes	Yes	Yes

*, **, *** indicate significant at 10%, 5% and 1% (one-tailed test).

Source: own elaboration.

Table 4 is the mixed regression result with CRASH as the dependent variable.

Table 4. Regression result by using CRASH

	CRASH _{t+1} Coeff. (t value)
Model 4	
Constant	0.466
	0.090
ETRANS _{it}	0.411
	0.391
AM ACCRUAL _{it}	0.558**
	4.093
MTB _{it}	0.008
	0.371
MV _{it}	-3.974**
	3.550
SIZE _{it}	-0.076
	2.048
ROA _{it}	-0.338
	0.644
LEV _{it}	-0.131
	0.366
RETURN _{it}	0.143**
	2.824
Nagleskere R ²	0.020
-2 Likelihood (Intercept Only)	994.673
-2 Likelihood (Full Model)	980.703
Hosmer and Lemeshow	0.468

*, **, *** indicate significant at 10%, 5% and 1%.

Source: own elaboration.

A significant limitation to consider is the low R² value, which suggests our model has modest predictive power. This highlights that while earnings management and transparency are significant predictors, they are not the dominant drivers of crash risk, pointing to the importance of other unobserved factors in the Indonesian market.

3.2. Additional test

Additional analyses are performed on the regression model of the first hypothesis to determine the effect of earnings quality, as measured by earnings transparency and earnings management, on the risk of a stock price crash under different conditions. First, the sample is divided into two groups, namely profit and loss firms, which are assessed on the basis of return on assets (ROA). Secondly, the sample is also divided on the basis of leverage.

This study examines the impact of earnings management and debt levels on the risk of falling stock prices in firms. The results suggest that firms that engage in earnings management to achieve higher profits are more likely to experience a decline in stock prices. Managers have the ability to manipulate earnings to meet or exceed expectations in the short term, but they must eventually reduce earnings to match actual performance. This is consistent with the iron law theory of earnings management. A fundamental principle, often referred to as the “iron law” of accrual-based earnings management, is that accruals inevitably reverse. According to Dechow et al. (2010), a manager who increases earnings beyond a sustainable level will find that the reversal of these accruals in a subsequent period creates an opposing effect, depressing future reported income. This forces the manager into an escalating cycle, where even more aggressive earnings management is needed to offset the prior-period reversals and further postpone the reporting of losses. To continue postponing the recognition of poor performance, managers must engage in progressively larger acts of earnings management. This strategy is ultimately unsustainable, as within the confines of accounting standards, a poorly performing firm cannot indefinitely delay its day of reckoning. In this “iron law” The opportunistic nature of earnings management, particularly accrual earnings management, can lead to a delayed recognition of costs or revenues, which in turn increases the risk of falling share prices. In addition, firms with high levels of debt are more vulnerable to deteriorating financial performance and increased risk of default. High levels of debt were found to have a positive impact on the risk of falling stock prices. Interestingly, the study also shows that firms with low levels of debt that engage in earnings management are also at risk of falling stock prices.

The third condition splits the sample according to market volatility. Earnings transparency has a significant effect on firms with low volatility. In contrast, earnings management has a significant effect on firms with high volatility. The results of this study may be due to external factors. However, further research is needed regarding this result. As for firms with high market volatility, the higher the level of earnings management, the higher the risk of falling stock prices. Chen et al. (2001) showed that high market volatility in the previous year has a risk of falling stock prices in the future.

Table 5. Additional analysis of first and second conditions

	NCSKEW _{t+1} Coef. t-value			
	Profit	Loss	Lower Leverage	Higher Leverage
Constant	-1.295**	-2.938**	-1.507**	-2.694**
	-1.847	-2.310	-1.823	-2.677
ETRANS _{it}	0.560**	0.205	0.259	0.850**
	1.869	0.340	0.746	1.885
AM ACCRUAL _{it}	0.620***	0.298	0.301**	0.711***
	3.954	1.140	1.682	3.393
MTB _{it}	0.016**	0.006	0.038**	0.007
	2.025	0.640	2.474	1.164
MV _{it}	-2.907***	-1.319	-2.267**	-1.932**
	-2.943	-0.890	-1.936	-1.644
SIZE _{it}	0.023	0.081**	0.032	0.067**
	0.968	1.875	1.134	2.015
LEV _{it}	-0.028	0.041	—	—
	-0.255	0.514	—	—
ROA _{it}	—	—	-0.322	-0.185
	—	—	-0.640	-1.242
RETURN _{it}	0.155***	0.101	0.115**	0.138**
	3.604	1.065	1.792	2.589
Adj R ²	0.048**	0.000***	0.015**	0.044**
F-stat	7.038***	1.005	2.456***	4.719***
DW stat	2.003	1.759	2.229	1.714
N	857	395	684	568
Fixed Effect	Yes	Yes	Yes	Yes

*, **, *** indicate significant at 10%, 5% and 1%.

Source: own elaboration.

The results of this study relate to agency theory, where the behavior of managers who have an interest in increasing profits through earnings management. Investors have an interest in investing their capital, which is to make a profit. Thus, market behavior provides a different response, which increases the risk of falling stock prices due to different interests. The results of the study have the same findings as previous studies that earnings management has a positive relationship with stock market crashes (Fatima et al., 2020; Haider et al., 2022; Haseeb et al., 2020).

Table 6. Additional analysis of third conditions

	NCSKEW _{t+1} Coef. t-value	
	Low Market Volatility	High Market Volatility
Constant	-1.651**	-2.774***
	-2.034	-2.973
ETRANS _{it}	0.871**	-0.023
	2.400	-0.053
AM ACCRUAL _{it}	0.137	0.656***
	0.549	3.993
MTB _{it}	0.020**	0.003
	2.357	0.340
LEV _{it}	-0.002	-0.174*
	-0.021	-1.395
SIZE _{it}	0.032	0.069**
	1.160	2.112
ROA _{it}	-0.171	-0.860**
	-0.807	-1.942
RETURN _{it}	0.160	0.137***
	1.395	3.320
Adj R ²	0.011**	0.056**
F-stat	2.217***	4.935***
DW stat	1.605	1.969
N	784	468
Fixed Effect	Yes	Yes

*, **, *** indicate significant at 10%, 5% and 1%.

Source: own elaboration.

The results of this study do not support the existence of value relevance theory, contrary to previous research on earnings transparency. The accounting information presented in financial statements is still not reliable for investment decisions. The surprising positive association between earnings transparency and crash risk in Indonesia can be theoretically grounded in the country's unique institutional environment, which is dominated by concentrated family ownership and historically weak minority shareholder protection. Unlike in developed markets, where ownership is dispersed, the Indonesian corporate landscape is characterized by a few powerful families controlling a majority of listed firms (Claessens et al., 2000; La Porta et al., 1999). This structure shifts the core agency conflict from one between managers and shareholders (Principal-Agent) to one between controlling and non-controlling (minority)

shareholders, a phenomenon known as the Principal-Principal agency problem (La Porta et al., 1999). In such a context, transparency can be wielded as a strategic tool by controlling owners for the “entrenchment” and “expropriation” of a firm’s resources (Claessens et al., 2002). A parallel phenomenon was documented by Wongchoti et al. (2021) in the context of the Chinese stock market. Their research revealed that earnings transparency can actually heighten stock crash risk in an environment characterized by severe agency issues and prevalent insider trading activity.

The results support the inefficient market theory. In an environment with powerful insiders and weak oversight, the incentive to manage earnings becomes almost irresistible, leading managers to withhold bad news until it reaches a breaking point, at which point its sudden release triggers a crash (Jin, Myers, 2006). This mechanism is particularly potent in a market that deviates from the strong-form Efficient Market Hypothesis (EMH).

The persistence of this relationship in the Indonesian market lends support to the inefficient market theory. According to this theory, market prices do not always fully and instantly reflect all available information, as argued by Barberis and Thaler (2003) in their work on behavioral finance. In an inefficient market, investors may not be able to fully “see through” managed earnings, allowing information asymmetry to build up. This inefficiency means that the disclosure of opaque or manipulated earnings reports can lead to a mispricing of securities. The eventual, and often abrupt, correction of this mispricing – when the accumulated negative information can no longer be contained – is what manifests as a stock price crash. Therefore, the ability of earnings management to predict crash risk is, in itself, evidence of market inefficiency, as a perfectly efficient market would theoretically price in the risk of such manipulation in real-time.

An inefficient stock market shows that its stock prices do not reflect all relevant information. An inefficient stock market can provide opportunities for investors to earn abnormal returns. However, these opportunities also come with the risk of higher stock prices falling. This can occur due to several factors, one of which is the reaction of investors in decision-making. Investor behavior in Indonesia tends to overreact to both good and bad news. (Sulistiawan et al., 2023). This overreaction can amplify market volatility and contribute to the potential for stock price crashes, especially when negative information, previously obscured by earnings management, is suddenly revealed. This can cause stock prices to move irrationally. Government policies and certain global phenomena can also affect the Indonesian capital market, so the Indonesian capital market can be said to be inefficient (Budiarmo, Pontoh, 2022; Sulistiawan et al., 2023). The results showed that firms’ earnings transparency had no effect on stock price movements on the Indonesia Stock Exchange.

Conclusions

This paper examines the relationship between earnings quality and the risk of stock price crash in listed firms using sample data from non-financial firms listed on the Indonesia Stock Exchange. The results show that earnings management and earnings transparency can increase the risk of a stock price crash. A research study on firms listed on the Indonesia Stock Exchange (IDX) reveals two interesting findings regarding the relationship between earnings quality and crash risk. Firstly, investors on the IDX pay more attention to the return on assets (ROA) variable of business entities as an indicator of earnings information, but do not consider the quality of these earnings. The study finds that while ROA can reduce the risk of falling stock prices, earnings transparency actually increases this risk. This suggests that investors do not fully comprehend the current poor earnings quality, attributing it instead to bad news resulting from accrual reversals. Secondly, the risk of falling stock prices is largely influenced by external factors beyond the control of the firm, such as market volatility, market return in the previous period, and the market-to-book ratio.

These findings have implications for firm management, accounting professionals, stock exchange authorities, and investors. It is important to note that the quality of earnings is more than just the numbers that appear in the financial statements. There are several factors that influence earnings quality.

This research makes two contributions to the existing literature. First, it adds to the limited research on stock price crash risk and earnings quality in Indonesia by establishing the relationship between these two factors. Second, the results challenge the assumption that earnings quality and earnings transparency are adequate measures of earnings quality in emerging markets such as Indonesia. In contrast to previous studies in developed markets, this research indicates that a high level of earnings transparency in Indonesia does not necessarily imply a higher level of earnings quality or a lower crash risk. In fact, very high earnings transparency may actually increase downside risk for Indonesian firms. This finding has important implications for future researchers and highlights the need for caution when using earnings transparency to measure earnings quality in the Indonesian context.

The findings of this study must be interpreted with considerable caution due to its primary limitation, as it only examines a short period of time in the COVID-19 pandemic, and the models have very low R^2 values. The sample period is confined to the years of the COVID-19 pandemic (2019–2021). The pandemic-induced market volatility and extraordinary government interventions make it impossible to determine whether the findings, particularly

the counterintuitive link between transparency and crash risk, represent a fundamental characteristic of the Indonesian market or are merely pandemic-era anomalies. Future research should replicate this study using a longer time series that includes pre- and post-pandemic data to test the robustness and generalizability of these results.

Finally, these conclusions must be interpreted with the understanding that the models employed in this study exhibit low R^2 values. While the identified relationships are statistically significant, the low R^2 values indicate that earnings management and transparency explain only a small fraction of the total variation in stock price crash risk. This strongly suggests that other firm-specific, market-level, or macroeconomic factors not captured in this paper's models play a more substantial role in determining crash risk within the Indonesian market, highlighting a fruitful avenue for future research.

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