“Idiosyncratic risk and stock price crash risk: The moderating role of discretionary income smoothing”

AUTHORS	Jeanice Cecilia Setiawan Felizia Arni Rudiawarni Dedhy Sulistiawan Valentin Radu

ARTICLE INFO	Jeanice Cecilia Setiawan, Felizia Arni Rudiawarni, Dedhy Sulistiawan and Valentin Radu (2024). Idiosyncratic risk and stock price crash risk: The moderating role of discretionary income smoothing. *Investment Management and Financial Innovations*, *21*(4), 90-103. doi:10.21511/imfi.21(4).2024.08
DOI	http://dx.doi.org/10.21511/imfi.21(4).2024.08
RELEASED ON	Thursday, 10 October 2024
RECEIVED ON	Friday, 26 July 2024
ACCEPTED ON	Tuesday, 24 September 2024
LICENSE	This work is licensed under a Creative Commons Attribution 4.0 International License
JOURNAL	"Investment Management and Financial Innovations"
ISSN PRINT	1810-4967
ISSN ONLINE	1812-9358
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
31	0	5

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Jeanice Cecilia Setiawan (Indonesia), **Felizia Arni Rudiawarni** (Indonesia), **Dedhy Sulistiawan** (Indonesia), **Valentin Radu** (Romania)

IDIOSYNCRATIC RISK AND STOCK PRICE CRASH RISK: THE MODERATING ROLE OF DISCRETIONARY INCOME SMOOTHING

Abstract

Given the growing significance of the capital market, investors tend to steer clear of stock price crashes. This study aims to examine how idiosyncratic risk affects the likelihood of a stock price crash and how discretionary income smoothing affects the relationship between them. This study uses a data panel to empirically examine the hypothesis. This study uses a data panel to empirically examine the hypothesis, using 1,203 firm-year observations from non-financial companies publicly traded on the Indonesia Stock Exchange from 2019 to 2021. The results show that firms with greater idiosyncratic risk do not significantly generate higher stock price crash risk. Nevertheless, this study also discovered that managing discretionary income smoothing is essential to increasing the risk of crashes. The test shows that the coefficient of discretionary income smoothing is 0.153 and significant with a t-value of 2.104. Moreover, the investigations also indicate that greater use of discretionary income smoothing can amplify the impact of idiosyncratic risk on the likelihood of stock price crashes. This is shown from the results where the moderation of the two variables has a positive coefficient of 0.087 and is significant at 10% with a t-value of 1.446. Based on the findings, this study concludes that the presence of idiosyncratic risk by itself may not substantially impact the probability of stock market crashes. However, combined with discretionary income smoothing, it can worsen the potential negative consequences. It implies that how a firm reports its income can affect its susceptibility to stock price crashes.

Keywords risk, skewness, income, crash, return, investors, Indonesia

JEL Classification G41, M41, M49

Received on: 26th of July, 2024
Accepted on: 24th of September, 2024
Published on: 10th of October, 2024

Jeanice Cecilia Setiawan, Researcher/ Bachelor (University of Surabaya), Faculty of Business and Economics, Accounting Department, University of Surabaya, Indonesia.

Felizia Arni Rudiawarni, Doctor, Associate Professor, Faculty of Business and Economics, Accounting Department, University of Surabaya, Indonesia. (Corresponding author)

Dedhy Sulistiawan, Professor, Head of Doctoral Accounting Department, Faculty of Business and Economics, Accounting Department, University of Surabaya, Indonesia.

Valentin Radu, Professor, Ph.D. Coordinator, Faculty of Economics, Accounting and Finance Department, Valahia University of Targoviste, Romania.

Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

The global financial crisis of 2008 and its aftermath increased public interest in stock market crashes and led to significant research efforts. Chen et al. (2001) and Hutton et al. (2009) provide the basis for understanding stock price crash risk. As research in this field progresses, there is a growing interest in exploring the relationship between stock market crashes and income smoothing practices. Idiosyncratic risk serves as a crucial starting point for our investigation. This concept represents firm-specific uncertainties that cannot be easily diversified away (Vo & Dang, 2019). Interpretations of idiosyncratic risk vary. One perspective suggests that it may result from incorporating private information into stock prices, aligning them more closely with fundamental values. This alignment could reduce mispricing and lower the risk of extreme stock price fluctuations (Jin & Myers, 2006). Conversely, an alternative viewpoint posits that idiosyncratic risk may be linked to market inefficiencies driven by speculative and irrational trading behaviors. These behaviors can lead to disparities in stock valuations and increased investor disagreement, potentially contributing to stock price crashes (Cao et al., 2022).

http://dx.doi.org/10.21511/imfi.21(4).2024.08

At its core, income smoothing involves managerial actions to mitigate fluctuations in a company's profit realization through discretionary financial reporting. Managers may resort to income smoothing for various reasons, including achieving bonus targets, enhancing short-term job security, or signaling promising future company performance (Tucker & Zarowin, 2006). However, income smoothing can obscure genuine company performance, concealing unfavorable results (Leuz et al., 2003) and potentially eroding overall company value.

Market and regulatory settings affect idiosyncratic risk, stock price crash risk, and income smoothing. Short-selling restrictions in certain markets may limit pessimistic investor involvement, resulting in stock price overvaluation and subsequent corrections when negative information emerges (Kim et al., 2011b). In China, Zhong et al. (2021) found a positive association between discretionary income smoothing and stock market crash risk, while Chen et al. (2017) found the opposite. Dechow et al. (2010) argue that income smoothing is crucial even if it can be informative or opportunistic. The practice is widespread, as Graham et al. (2005) found that 97% of 400 senior executives supported income smoothing. Interestingly, 80% of CFOs believe income smoothing might help investors predict a firm's financial performance. Kirschenheiter and Melumad (2002) indicate that managers may naturally smooth income to enhance firm value. However, they acknowledge that certain companies have abused accounting flexibility.

This paper is expected to help investors plan more effective financial strategies and risk management. In addition, it offers the regulator new insights into identifying and addressing potential stock price crash risks.

1. LITERATURE REVIEW

This study examines agency linkages, stock price collapse risk, idiosyncratic risk, and discretionary income smoothing. Understanding these principles helps explain financial market dynamics and stock market stability elements. An agency relationship is a contract in which one or more principals employ an agent to do certain activities on their behalf. The contract gives the agent decision-making power and requires them to perform in the principal's best interests. However, power delegation often causes conflicts of interest. Principals, or shareholders in a corporation, aim to maximize their wealth. Agents – often company managers – want to maximize their compensation and incentives. Due to these inherent conflicts of interest, management decisions may not always be in the best interests of key stakeholders (Jensen & Meckling, 1976).

Financial markets must consider the risk of a stock crash, which might lead to exceptionally low stock returns. This crash occurs when stock prices drop significantly from their historical peak over one to two years (Sandeep & Asani, 1998). In this study, stock price crash risk refers to the likelihood of extreme unfavorable fluctuations in stock returns (Zhong et al., 2021). The causes of these share price drops are now noticeable. Chen et al. (2001) and Jin and Myers (2006) pioneered stock price crash risk research. According to the studies, these earnings-related features can be used to assess a company's information opacity and predict the likelihood of a stock price crash.

Firm-specific risk, or idiosyncratic risk, is uncertainty that is specific to a given firm and can be mitigated by diversification. Academic literature discusses idiosyncratic risk interpretation. Inside knowledge (private information) in stock prices may increase idiosyncratic risk. When factoring this information, stock prices may better reflect their underlying value (Morck et al., 2000; Durnev, 2003; Jin & Myers, 2006). This alignment may reduce share price misjudgment and lessen the possibility of significant price volatility. On the other hand, such activity might cause investor disputes and large stock valuation swings, which, in turn, can raise the likelihood that stock prices will decline (Kim & Zhang, 2016; Chen et al., 2020; Wen, 2020b; Dai, 2020).

Discretionary income smoothing helps managers stabilize earnings fluctuations. According to accounting rules, this practice uses discretion in re-

porting. Companies can notify the capital market of their expected future earnings and cash flows by smoothing earnings. Investors, analysts, suppliers, and customers use this information to assess the company's financial condition (Kirschenheiter & Melumad, 2002; Tucker & Zarowin, 2006).

The correlation between idiosyncratic risk and the risk of stock price crashes is not always straightforward, as multiple external factors can come into play. Market conditions and regulatory restrictions are just a few examples of such influences. In certain markets, pessimistic investors might face limitations on short-selling, which could impact their participation. This limitation can potentially lead to stock prices being overvalued and later corrected when negative information accumulates (Kim et al., 2011b).

Chen et al. (2017) found that income smoothing increases stock market crash risk. Khurana et al. (2018) stated that the likelihood of a stock market crash was positively correlated with real income smoothing. Conflicts of interest between managers and shareholders drive managers to purposefully smooth earnings to enhance short-term bonuses and job security (DeFond & Park, 1997). Contract theory says risk-averse managers prefer steady bonuses. They may smooth reported earnings to get more regular bonuses.

Chang and Dong (2006) investigated the relationship between institutional herding and firms' idiosyncratic risk using data from Japan from 1975 to 2003. Their findings strongly suggest that firms experiencing institutional herding tend to have a higher idiosyncratic risk. This aligns with the results of Tan and Henker (2010), who studied monthly idiosyncratic risk and the proportion of retail trading in the Australian stock market from 1996 to 2002. Their analysis revealed that retail investors prefer stocks with higher idiosyncratic risk.

Huang et al. (2015) delved into a novel approach, studying the influence of idiosyncratic risk on Taiwan's equities market herding in great detail. Their research, spanning from 2004 to 2013, confirmed the existence of stock market herding. They found that the severity of herding is significantly influenced by idiosyncratic risk. Interestingly, they observed no herding in equities with lower idiosyncratic risk, but herding was prevalent in portfolios of stocks with higher risk. The authors also discovered that financial crises escalate herding, particularly in high-idiosyncratic-risk portfolios. Furthermore, they found no discernible difference in news reaction during market stress, regardless of idiosyncratic risk.

This study seeks empirical insights particular to Indonesia to better understand the complex relationship between idiosyncratic risk and stock market crash risk, especially with discretionary income smoothing as a moderating factor. Indonesia is a rapidly evolving market with a dynamic economic landscape. How idiosyncratic risk interacts with income smoothing in this unique environment can contribute to the ongoing discussions regarding stock market stability and preventing severe stock price fluctuations.

Understanding stock price crash risk necessitates a deep dive into firm-specific risk. This risk, which can be influenced by market conditions, has been a topic of heated debate in academic literature. The introduction of managerial discretionary income smoothing further complicates this understanding. To unravel the complex interplay of idiosyncratic risk, discretionary income smoothing, market conditions, and regulatory constraints on stock market stability, comprehensive research is not just desirable but essential. This is particularly crucial in the context of dynamic economies such as Indonesia.

The literature presents two contradictory views on idiosyncratic risk and stock price crashes. From one perspective, integrating private information into stock prices may match them more closely with their fundamental values. This alignment may reduce mispricing and excessive stock price fluctuations (Morck et al., 2000; Durnev, 2003; Jin & Myers, 2006). This approach suggests that more idiosyncratic risk may stabilize the market. Conversely, idiosyncratic risk may be linked to market inefficiencies caused by speculative and irrational trading. These practices can exacerbate investor disagreement and stock valuation discrepancies, making stock price crashes more likely (Kim et al., 2011b; Chen et al., 2020; Wen et al., 2020b; Kim & Zhang, 2016; Wen et al., 2020d; Dai et al., 2020). In this context, higher idiosyncratic risk may increase stock price crashes.

http://dx.doi.org/10.21511/imfi.21(4).2024.08

Income smoothing, a managerial approach to reduce earnings volatility, can moderate the relationship between idiosyncratic risk and stock price crash risk. Managers may smooth income for personal gain, short-term job security, or signaling better company performance. This technique often involves manipulating reported earnings, affecting a firm's stability and prospects.

When the idiosyncratic risk is already high due to factors such as market inefficiencies or speculative trading behaviors, discretionary income smoothing may exacerbate this risk by distorting the fundamental financial condition of the firm. By obscuring unfavorable results and presenting a façade of stability, income smoothing may encourage investors to underestimate the actual risk associated with the firm, making the firm more susceptible to sudden stock price crashes. Thus, we suggest that the combined effect of idiosyncratic risk and discretionary income smoothing amplifies the risk of stock price crashes, emphasizing the need to investigate their interconnected influence on stock market stability.

As discretionary income smoothing acts as a moderating variable, this study builds on the findings of Chen et al. (2017), Khurana et al. (2018), and Zhong et al. (2021) by analyzing the impact of idiosyncratic risk on stock price crash risk. While Chen et al. (2017) claim that discretionary income smoothing considerably increases the risk of stock price crashes, Khurana et al. (2018) hypothesize that real income smoothing and stock price crashes may not be correlated. In contrast, Zhong et al. (2021) discovered a positive link between the likelihood of a stock market crash and discretionary income smoothing in the Chinese setting. Additionally, Chen et al. (2012) also find that income smoothing can mitigate the unpredictable, idiosyncratic risk of stock returns, so it can be beneficial for managers to enhance job security (Bushman et al., 2010) by reducing idiosyncratic risk. This study intends to investigate the relationship between discretionary income smoothing and stock market crash risk in Indonesia, a fast-rising economy. According to earlier studies (Chen et al., 2017; Khurana et al., 2018; Zhong et al., 2021), income smoothing can have a detrimental or beneficial impact on stock market crashes.

Leveraging existing theories and prior research, this study analyzes how idiosyncratic risk affects the likelihood of a stock price crash and how discretionary income smoothing influences that relationship. Regarding the theories and purpose of this study, then the proposed hypotheses are:

H_1: *Idiosyncratic risk is positively associated with stock price crash risk.*

H_2: *Discretionary income smoothing exacerbates the positive relationship between idiosyncratic risk and stock price crash risk.*

2. METHOD

This study analyzes Indonesia Stock Exchange-listed firms, excluding the financial sector, with comprehensive 2019–2021 financial statements. A total of 1,911 firm-year observations were initially identified. Companies without complete data, not actively traded for at least 90% of the trading days in a period, and not providing financial reports ending on December 31 were excluded. These criteria left 1,203 firm-year observations for analysis. Data were sourced from the Indonesia Stock Exchange (www.idx.co.id) and Unicorn Data Service.

The dependent variable in this study is stock price crash risk. The study measures firm-specific weekly returns in accordance with Kim and Zhang (2016) and Hutton et al. (2009), as is evident in Eq (1):

$$R_{i,t} = \alpha_i + \beta_1 R_{m,t-2} + \beta_2 R_{m,t-1} + \beta_3 R_{m,t} + \beta_4 R_{m,t+1} + \beta_5 R_{m,t+2} + \varepsilon_{i,t}, \quad (1)$$

where $R_{i,t}$ represents the return of stock i in week t, and $R_{m,t}$ represents the market return in week t. The firm's specific weekly return ($w_{i,t}$) of company i in week t is measured as follows:

$$w_{i,t} = \ln\left(1 + \varepsilon_{i,t}\right). \quad (2)$$

Based on research by Chen et al. (2001) and Kim and Zhang (2016), the negative skewness (NCSKEW) of a firm's specific weekly return is then used to calculate the likelihood of a stock price crash:

$$NCSKEW = -\frac{\left[n(n-1)^{\frac{3}{2}}\sum w_{j,\tau}^3\right]}{\left[(n-2)(n-1)\left(\sum w_{j,\tau}^2\right)^{\frac{3}{2}}\right]}. \quad (3)$$

This study also uses Down to Up Volatility (*DUVOL*) to measure stock crash risk. If a company's specific weekly returns during year *t* exceed the average in that year, the week is considered an "up" week; otherwise, it is considered a "down" week. Each subsample will have its standard deviation calculated. Next, D*UVOL* is calculated by taking the logarithm of the ratio of the down-week standard deviation divided by the up-week standard deviation. Subsequently, as presented in previous research by Chen et al. (2001) and DeFond et al. (2015), the calculation of *DUVO*L is as follows:

$$DUVOL_{j,t} = \log\left\{\frac{(n_u-1)\sum_{Down} w_{j,t}^2}{(n_d-1)\sum_{Up} w_{j,t}^2}\right\}, \quad (4)$$

where n_u and n_d represent the number of "up" and "down" weeks during year t, respectively. The greater the *DUVOL*, the higher the risk of a crash.

The independent variable for this study is idiosyncratic risk (*IDIOSYN*). Following Hutton et al. (2009), the R^2 from Equation (1) is used, and then the logistic transformation of R^2, which ranges from negative to positive infinity, is employed to determine idiosyncratic risk.

$$IDIOSYN = \ln\left(\frac{1-R^2}{R^2}\right), \quad (5)$$

where $1 - R^2$ is the natural measure of company-specific volatility obtained through Equation (1). A higher IDIOSYN suggests a greater degree of idiosyncratic risk. Opacity indicates a lack of specific information about the company that can influence the firm's stock returns. Opaque firms carry a greater risk of experiencing a severe outcome or crash when unfavorable information particular to the firm is eventually disclosed to investors.

The moderating variable in this study is discretionary income smoothing, measured using the model by Francis et al. (2004), calculated using the equation:

$$IS\_FLOS_{i,t} = (-1)\cdot\frac{StdDev\left(\frac{NI_{i,t}}{TA_{i,t-1}}\right)}{StdDev\left(\frac{CFO_{i,t}}{TA_{i,t-1}}\right)}. \quad (6)$$

Whereas Total Assets (*TA*), represents the total value of a company's assets, including tangible and intangible assets, Net Income (*NI*), represents a company's total profit or earnings after deducting expenses and taxes, and Net Cash Flow from Operating Activities (*CFO*), which represents the net cash generated from a company's core operating activities. Additionally, the study uses data from the three years prior to the year 2021 and the standard deviation to quantify the volatility of both net income and cash flow.

Next, *IS_FLOS* is further divided into two distinct components: expected income smoothing (NDIS_IS) and discretionary income smoothing (*DIS_IS*), in accordance with the model put forth by Lang et al. (2012):

$$\begin{aligned} IS\_FLOS_{i,t} &= \beta_1 LNTA_{i,t} + \beta_2 LEV_{i,t} \\ &+ \beta_3 BM_{i,t} + \beta_4 STDSALES_{i,t} + \beta_5 LOSS_{i,t} \\ &+ \beta_6 OPCYCLE_{i,t} + \beta_7 SG_{i,t} + \beta_8 OPLEV_{i,t} \\ &+ \beta_9 AVECFO_{i,t} + \sum Industry + \sum Year + \varepsilon_{i,t}. \end{aligned} \quad (7)$$

This model incorporates several key variables to investigate income smoothing practices within companies. These variables include *IS_FLOS*, which measures income smoothing tendencies, and other factors, including company size (*LNTA*), financial leverage (*LEV*), book-to-market ratio (*BM*), sales volatility (*STDSALES*), historical losses (*LOSS*), operational efficiency (*OPCYCLE*), sales growth (*SG*), capital intensity (*OPLEV*), and cash flow trends (*AVECFO*). *NDIS_IS* represents expected income smoothing based on a company's daily business activities, while $\varepsilon_{i,t}$ reflects discretionary income smoothing. Dummy variables are used to differentiate between companies performing discretionary income smoothing (*DIS_IS*) above the industry average during a period (dummy = 1) and those performing discretionary income smoothing below the average (dummy = 0).

http://dx.doi.org/10.21511/imfi.21(4).2024.08

The following control variables are used in this study:

1) expected level of income smoothing in year $t-1$ ($NDIS\_IS_{i,t-1}$);
2) standard deviation of firm's weekly return in year $t-1$ ($SIGMA_{i,t-1}$);
3) mean of the firm's weekly return times 100 in year $t-1$ ($RET_{i,t-1}$);
4) company's size in year $t-1$ ($SIZE_{i,t-1}$);
5) market-to-book value ratio in year $t-1$ ($MTB_{i,t-1}$);
6) return on asset in year t-1 ($ROA_{i,t-1}$);
7) leverage in year $t-1$ ($LEV_{i,t-1}$).

This study uses expected income smoothing (*NDIS_IS*), negative return skewness (*NCSKEW*), the standard deviation of firm-specific weekly returns (*SIGMA*), and an average of firm-specific weekly return (*RET*) to reduce the impact of discretionary income smoothing on stock price crash risk. Firm size (*SIZE*) significantly influences crash probability, with larger firms exhibiting a higher risk profile, as Hutton et al. (2009) stated. The natural logarithm of the total assets is used to calculate a company's size. Leverage (*LEV*) is yet another significant element linked to risk. According to Ghosh et al. (2000), increased financial and bankruptcy risks are correlated with higher leverage. The ratio of total liabilities to total assets at the end of the fiscal year is used to calculate leverage. According to Chang et al. (2017), the market-to-book ratio (MTB) is causally related to crash risk. Finally, it's important to remember that Hutton et al. (2009) suggested that companies with strong profitability (ROA) can potentially reduce crash risk all year long.

To test the hypotheses, the following model aligning with Zhong et al. (2021) is applied:

$$\begin{aligned} CRASH\ RISK_{i,t} &= \beta_0 + \beta_1 IDIOSYN_{i,t-1} \\ &+ \beta_2 DIS\_IS_{i,t-1} + \beta_3 NDIS\_IS_{i,t-1} \\ &+ \beta_4 NCSKEW_{i,t-1} + \beta_5 SIGMA_{i,t-1} \\ &+ \beta_6 RET_{i,t-1} \cdot \beta_7 SIZE_{i,t-1} + \beta_8 MTB_{i,t-1} \\ &+ \beta_9 ROA_{i,t-1} + \beta_{10} LEV_{i,t-1} \\ &+ \beta_{11} DIS\_IS_{i,t-1} \cdot IDIOSYN_{i,t-1} + \varepsilon_{i,t}. \end{aligned} \quad (8)$$

Within this model, *CRASH RISK* can represent either of two measures of crash risk: *NCSKEW* and *DUVOL*, while *IDIOSYN* represents the idiosyncratic risk, and discretionary income smoothing (*DIS_IS*). It is also crucial to keep in mind that the expected level of income smoothing (*NDIS_IS*) is considered when analyzing the effect of discretionary income smoothing on crash risk. This strategy is comparable to one used in earlier studies (Chen et al., 2001; Kim & Zhang, 2016). The following control variables are also included, as suggested by prior research: $SIZE_{t-1}$ reflects the natural logarithm of the firm's total asset in year t-1, $SIGMA_{t-1}$ denotes the standard deviation of firm's weekly returns in year $t-1$, and RET_{t-1} represents the mean of firm's weekly returns in year $t-1$ times 100. The market-to-book ratio of a corporation is shown by MTB_{t-1} at the end of the fiscal year $t-1$. Return-on-assets is shown by ROA_{t-1}, which is net income scaled by lagged total assets, and the ratio of total liabilities to total assets is shown by LEV_{t-1}.

3. RESULTS

The results obtained after applying these models were summarized in a series of tables.

Table 1. Descriptive statistics

	N	Min	Max	Mean	Std. Deviation
$NSKEW_{i,t}$	1,203	–6.907	6.962	–0.384	1.32
$DUVOL_{i,t}$	1,203	–2.48	3.052	–0.267	0.49
$DIS\_IS_{i,t-1}$	1,203	–17.895	8.162	0.106	2.207
$NDIS\_IS_{i,t-1}$	1,203	–31.412	2.663	–1.495	1.63
$NSKEW_{i,t-1}$	1,203	–6.758	6.962	–0.508	1,293
$SIGMA_{i,t-1}$	1,203	0.003	0.36	0.081	0.047
$RET_{i,t-1}$	1,203	–5.537	10.543	0.347	1.42
$SIZE_{i,t-1}$	1,203	17.001	33.495	27.999	3.017
$MTB_{i,t-1}$	1,203	–9.509	53.153	2.468	4.609
$ROA_{i,t-1}$	1,203	–1.883	0.534	0.145	0.118
$LEV_{i,t-1}$	1,203	0.001	2.915	0.506	0.303
$IDIOSYN_{i,t-1}$	1,203	–1.58	6.573	1.698	1.208

Note: NSKEW = crash risk in a current year; DIS_IS = discretionary income smoothing; NDIS_IS = expected level of income smoothing; SIGMA = standard deviation of a firm's weekly return; RET = the mean of a firm's weekly return; SIZE = company size; MTB = market-to-book ratio; ROA = return on assets; LEV = debt to total assets; IDIOSYN = idiosyncratic risk.

Table 1 shows descriptive statistics for 1,203 firm-year observations. IDIOSYN's mean is 1.698. Notably, NSKEW, which represents crash risk in the current year, has a mean of –0.384, suggesting a tendency toward lower crash risk, while DUVOL,

which represents return volatility, has a mean of –0.267. The mean of DIS_IS, which represents discretionary income smoothing in the previous year, is 0.106, indicating a low preference. NDIS_IS, which predicts income smoothing reduced from the prior year, has a mean of –1.495.

The correlation matrix between variables (Untabulated) using Pearson Correlation is also checked. Notably, DIS_IS does not correlate with stock crash indicators NSKEW and DUVOL, which shows that discretionary income smoothing may not affect stock crash risk. Second, IDIOSYN has a substantial and positive association with NSKEW, indicating that higher levels of IDIOSYN associate with higher stock price crash risk. Notably, IDIOSYN does not correlate with DUVOL or DIS_IS, indicating its specific impact on NSKEW.

Stock price crashes are strongly correlated with discretionary income smoothing. According to the correlation matrix, firms' stock price crash risk increases as they spread discretionary income. This supports earlier research by Zhong et al. (2021), which found a positive association between discretionary income smoothing and stock market crash risk, particularly in China. Chen et al. (2017) found that income smoothing enhances stock market crashes. These findings suggest that discretionary income smoothing in Indonesia increases stock crashes.

Table 2 shows the regression result of idiosyncratic risk and discretionary income smoothing on stock price crash risk measured by NSKEW. In Table 2, Model 3 and Model 5 make it clear that IDIOSYN, which initially had no relationship with the likelihood of a stock market crash or NSKEW (coeff. =

Table 2. Effect of idiosyncratic risk and discretionary income smoothing on stock price crash risk

	Dependent variable: $NSKEW_{i,t}$				
	1	**2**	**3**	**4**	**5**
	Coef.	**Coef.**	**Coef.**	**Coef.**	**Coef.**
	(t-value)	**(t-value)**	**(t-value)**	**(t-value)**	**(t-value)**
Constant	–0.403***	–0.500***	–0.405***	–1.240***	–1.167***
	(–6.464)	(–6.447)	(–3.967)	(–3.237)	(–3.013)
$IDIOSYN_{i,t-1}$	0.011	0.011	–0.044	0.024	–0.025
	(0.362)	(0.373)	(–0.906)	(0.753)	(–0.509)
$DIS\_IS_{i,t-1}$		0.153***	0.004	0.151**	0.020
		(2.104)	(0.031)	(2.089)	(0.159)
$NDIS\_IS_{i,,t-1}$				–0.005	–0.005
				(–0.250)	(–0.254)
$NSKEW_{i,t-1}$				0.046*	0.044*
				(1.535)	(1.471)
$SIGMA_{i,t-1}$				–1.559**	–1.493**
				(–1.779)	(–1.701)
$RET_{i,t-1}$				0.129***	0.128***
				(3.808)	(3.779)
$SIZE_{i,t-1}$				0.028**	0.028**
				(2.274)	(2.291)
$MTB_{i,t-1}$				0.018***	0.018**
				(2.348)	(2.299)
$ROA_{i,t-1}$				–0.007**	–0.006**
				(–1.954)	(–1.946)
$LEV_{i,t-1}$				0.010	0.011
				(0.077)	(0.090)
$DIS\_IS_{i,t-1}$*$IDIOSYN_{i,t-1}$			0.087*		0.077*
			(1.446)		(1.282)
F-statistics	73.087***	56.079***	45.321***	21.44***	19.928***
Adj. R^2	0.152	0.155	0.155	0.169	0.17
Fixed Effect	Yes	Yes	Yes	Yes	Yes
N	1,203	1,203	1,203	1,203	1,203

Note: *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively. One tailed-test.

http://dx.doi.org/10.21511/imfi.21(4).2024.08

–0.044, t-value = –0.906 in Model 3) becomes positive and moderately significant when moderated by DIS_IS (coeff. = 0.087, t-value = 1.446 in Model 3; coeff. = 0.077, t-value = 1.282 in Model 5). This suggests that stock crashes are more likely to occur when higher amounts of DIS_IS are used in situations with high IDIOSYN. This result lends credence to H_2, which contends that smoothing discretionary income can worsen the association between idiosyncratic risk and the risk of stock price crashes. This tendency is ascribed to a particular information asymmetry caused by the smoothing of discretionary income. Companies use this tactic to hide bad news, which lowers the quality of their information disclosure. Due to the increased information asymmetry between investors and management, stock valuations diverge, and investors engage in speculative and herding behaviors (Kim et al., 2011b; Kim & Zhang, 2016). Particularly, when both idiosyncratic risk and discretionary income smoothing are high, this information asymmetry, specifically caused by it, can turn idiosyncratic risk, which was initially insignificant, into a significant positive factor, worsening the risk of stock price crashes.

Table 2 also highlights significant relationships between control variables and stock price crash risk. Notably, higher return volatility (SIGMA) is linked to reduced crash risk, possibly due to more efficient pricing, while profitable firms (higher ROA) tend to experience fewer crashes. Conversely, firms with higher historical returns (RET), larger sizes (SIZE), and complex capital structures (MTB) face increased crash risk. Strikingly, leverage (LEV) shows no significant impact on crash risk, implying that a company's leverage level may not affect its susceptibility to stock price crashes in this context.

Table 3. Additional test: DUVOL as stock crash measurement

	Dependent variable: $DUVOL_{i,t}$				
	1	**2**	**3**	**4**	**5**
	Coef.	**Coef.**	**Coef.**	**Coef.**	**Coef.**
	(t-value)	**(t-value)**	**(t-value)**	**(t-value)**	**(t-value)**
Constant	–0.269***	–0.277***	–0.227***	–0.588***	–0.551***
	(–10.788)	(–8.925)	(–5.560)	(–3.836)	(–3.555)
$IDIOSYN_{i,t-1}$	0.001	0.001	–0.029*	0.010	–0.015
	(0.055)	(0.057)	(–1.459)	(0.807)	(–0.755)
$DIS\_IS_{i,t-1}$		0.013	–0.065*	0.009	–0.057
		(0.465)	(–1.286)	(0.342)	(–1.147)
$NDIS\_IS_{i,t-1}$				–0.002	–0.002
				(–0.251)	(–0.257)
$NSKEW_{i,t-1}$				0.028	0.026**
				(2.317)	(2.236)
$SIGMA_{i,t-1}$				–0.870***	–0.836***
				(–2.479)	(–2.380)
$RET_{i,t-1}$				0.038***	0.037***
				(2.817)	(2.780)
$SIZE_{i,t-1}$				0.011***	0.012***
				(2.381)	(2.403)
$MTB_{i,t-1}$				0.006**	0.006**
				(2.172)	(2.111)
$ROA_{i,t-1}$				–0.002	–0.002*
				(–1.580)	(–1.570)
$LEV_{i,t-1}$				0.052	0.053
				(1.057)	(1.073)
$DIS\_IS_{i,t-1}$ *$IDIOSYN_{i,t-1}$			0.046**		0.039*
			(1.902)		(1.647)
F-statistics	7.961***	6.021***	5.551***	4.353	4.233
Adj. R^2	0.017	0.016	0.018	0.032	0.034
Fixed Effect	Yes	Yes	Yes	Yes	Yes
N	1,203	1,203	1,203	1,203	1,203

Note: *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively. One tailed-test.

The results in Table 3, where DUVOL is the dependent variable, offer fascinating new information. Model 3 shows an inverse relationship between IDIOSYN (coeff. = -0.029, t-value = –1.459) and DIS_IS (coeff. = –0.065, t-value = –1.286) to stock crash risk. The presence of DIS_IS, on the other hand, amplifies the influence of IDIOSYN on stock crash risk, as shown by the moderating variable DIS_IS (coeff. = 0.046, t-value = 1.902), which increases its significance when it is introduced. So, when taken together, DIS_IS and IDIOSYN positively relate to stock crash risk despite their initial significant negative association. This suggests that a stock price crash risk is likely higher when IDIOSYN is high and exists in conjunction with high levels of DIS_IS. The findings are corroborated in Model 5 when all control variables are included in the analysis. These results highlight the importance of moderating variable discretionary income smoothing in influencing the relationship between idiosyncratic risk and stock price crash risk.

In Table 4, robustness tests are conducted concerning company size and profitability. The sample is divided into two categories based on size and profitability. Small size consists of companies whose total assets are smaller than the annual industry-specific mean, and large or big size consists of those having total assets larger than the annual industry-specific mean. Loss sub-samples refer to companies with an ROA of less than zero, and profit companies have an ROA greater than zero.

The results show that IDIOSYN and DIS_IS do not significantly impact the stock crash risk for all sub-samples. For the loss companies, the greater

Table 4. Robustness test: company size and profitability

	Dependent variable: NSKEWi,t			
	SIZE		ROA	
	(1) Coeff. (t-value)	(2) Coeff. (t-value)	(1) Coeff. (t-value)	(2) Coeff. (t-value)
	Small	Large	Loss	Profit
Constant	–0.534**	–0.154	–1.696**	–1.049***
	(–2.040)	(–0.972)	(–2.069)	(–2.432)
$IDIOSYN_{i,t-1}$	0.026	–0.069*	–0.064	–0.011
	0.260	(–1.256)	(–0.642)	(–0.199)
$DIS\_IS_{i,t-1}$	–0.040	0.029	–0.365	0.112
	(–0.142)	(0.229)	(–1.249)	(0.812)
$NDIS\_IS_{i,t-1}$	0.036	–0.022	–0.013	0.001
	(0.828)	(–0.977)	(–0.407)	(0.046)
$NSKEW_{i,t-1}$	0.074*	–0.001	0.105**	0.001
	(1.603)	(–0.023)	(1.928)	(0.035)
$SIGMA_{i,t-1}$	–2.172*	–1.517	–0.522	–1.583*
	(–1.618)	(–1.229)	(–0.310)	(–1.542)
$RET_{i,t-1}$	0.167***	0.090**	0.122**	0.127***
	(2.959)	(2.128)	(1.739)	(3.290)
$SIZE_{i,t-1}$			0.048**	0.020*
			(1.91)	(1.461)
$MTB_{i,t-1}$	0.033**	0.013*	0.039**	0.010
	(2.203)	(1.539)	(2.095)	(1.239)
$ROA_{i,t-1}$	–0.003	–0.008**		
	(–0.560)	(–2.121)		
$LEV_{i,t-1}$	0.139	–0.246*	0.090	0.089
	(0.756)	(–1.350)	(0.493)	(0.504)
$DIS\_IS_{i,t-1}$ *$IDIOSYN_{i,t-1}$	0.123	0.038	0.185*	0.056
	(1.012)	(0.558)	(1.460)	(0.811)
F-statistics	9.203	13.321	6.382	15.761
Adj. R^2	0.165	0.173	0.152	0.174
Fixed effect	Yes	Yes	Yes	Yes
N	497	706	362	841

Note: *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively. One tailed-test.

http://dx.doi.org/10.21511/imfi.21(4).2024.08

the size and MTB, the higher the stock crash risk, and the last period crash risk positively impacts the crash risk for subsequent periods. In large companies, IDIOSYN has a positive and significant influence. However, in smaller companies, IDIOSYN does not exhibit significance. Moreover, return (RET) and market-to-book ratio (MTB) are positively significant. Meanwhile, return-on-assets (ROA) and leverage (LEV) only show significance in large companies, and sigma is significant in small companies. Notably, the moderation effect of DIS_IS on IDIOSYN is still negligible with regard to the risk of a stock price crash, except for small companies at a 10% significant level.

Moving on to Table 5, CRASH is used as the primary measurement, which indicates whether a company's stock price will experience a significant decline over a given period. A formula involving the average and standard deviation of weekly returns was used to determine this. Following Hutton et al. (2009) and DeFond et al. (2015), the likelihood of a CRASH is assessed by employing an indicator that equals 1 for a firm-year when the weekly returns of the firm fall 3.2 standard deviations below the average for that year. Companies with lower specific weekly returns (=1) and those with higher returns (=0) were separated from the sample into two groups. Since the dependent variable is a binary number, so binary logistic regression is employed for Table 5. The results in Table 5 are quite different from NSKEW and DUVOL. In Table 5 Model (1), IDIOSYN has a strong positive effect on CRASH, and this pattern repeats in other Models. On the other hand, DIS_IS only shows a significant positive impact in Models (2) and (4), suggesting that it affects CRASH on its own, as we saw in Table 2. Interestingly, when we look at the interaction between DIS_IS and IDIOSYN, it does not significantly affect CRASH. This means that

Table 5. Robustness test: binary logistic regression using CRASH

	Dependent variable: CRASHi,t				
	1	2	3	4	5
	Coef.	Coef.	Coef.	Coef.	Coef.
	(z-value)	(z-value)	(z-value)	(z-value)	(z-value)
Constant	–2.166***	–2.314***	–2.215***	–1.347**	–1.282*
	(–14.338)	(–12.402)	(–8.659)	(–1.686)	(–1.572)
$IDIOSYN_{i,t-1}$	0.360***	0.362***	0.313***	0.350***	0.314***
	(5.539)	(5.559)	(2.855)	(5.055)	(2.731)
$DIS\_IS_{i,t-1}$		0.223*	0.072	0.219*	0.107
		(1.392)	(0.229)	(1.357)	(0.329)
$NDIS\_IS_{i,t-1}$				–0.043	–0.043
				(–1.014)	(–1.017)
$NSKEW_{i,t-1}$				0.100*	0.098*
				(1.635)	(1.609)
$SIGMA_{i,t-1}$				–1.892	–1.851
				(–1.017)	(–0.994)
$RET_{i,t-1}$				0.129**	0.128**
				(1.922)	(1.913)
$SIZE_{i,t-1}$				–0.028	–0.028
				(–1.112)	(–1.104)
$MTB_{i,t-1}$				–0.002	–0.002
				(–0.141)	(–0.152)
$ROA_{i,t-1}$				0.001	0.001
				(0.169)	(0.161)
$LEV_{i,t-1}$				–0.144	–0.144
				(–5.055)	(–0.545)
$DIS\_IS_{i,t-1}$ *$IDIOSYN_{i,t-1}$			0.074		0.056
			(0.547)		(0.398)
LR-statistics	32.259	34.226	34.524	41.726	41.884
McFadden. R^2	0.028	0.029	0.03	0.036	0.037
N	1,203	1,203	1,203	1,203	1,203

Note: *, **, and *** denote significance at 10%, 5%, and 1% levels, respectively. One tailed-test.

while both discretionary income smoothing and idiosyncratic risk separately increase the chance of a stock price crash, when combined, they do not make it worse. Among the control variables, only RET is significant.

The results indicate that H_1 is not supported, since that idiosyncratic risk cannot explain stock price crash risk (except for binary logistic regression result). Meanwhile when discretionary income smoothing is considered, the results show that discretionary income smoothing exacerbate the effect of idiosyncratic risk to stock price crash risk. So, H_2 is supported.

4. DISCUSSION

The capital market plays a crucial role in today's economy, given the growing magnitude of funds and the increasing number of interested investors. Hence, the escalating concern of stock market crashes persists today. This study examines the complex link between idiosyncratic risk and stock price crash risk, emphasizing the moderating role played by discretionary income smoothing.

According to the findings, idiosyncratic risk does not significantly increase the likelihood of a stock price crash in the context of the Indonesian capital market. In contrast, the study by Cao et al. (2022) in China discovered a substantial positive correlation between idiosyncratic risk and the risk of a stock price crash. This study finds that the association between idiosyncratic risk and stock market crash risk in Indonesia is more significant when discretionary income smoothing is employed as a moderating variable. This result is consistent with the notion advanced by Kirschenheiter and Melumad's (2002) model, which postulates that managers may intentionally report good news by employing earnings management strategies. Additionally, they claim that disclosing a larger earnings surprise reduces both the perceived accuracy of reported earnings and the valuation impact of higher reported earnings. This suggests that when a corporation uses discretionary income smoothing, idiosyncratic risk – which may first seem to have no impact – might actually increase the probability of a major stock price decrease.

Key theoretical insights can explain the phenomenon where idiosyncratic risk alone does not significantly affect stock price crash risk but exhibits a positive relationship when moderated by discretionary income smoothing.

Initially, idiosyncratic risk, measuring firm-specific risk, may not inherently contribute to stock price crashes due to divergent viewpoints. It is argued that idiosyncratic risk, arising from private information incorporated into stock prices, aligns valuations with fundamentals, reducing mispricing and crash risk (Morck et al., 2000; Durnev et al., 2003; Jin & Myers, 2006). Conversely, it may indicate market inefficiencies, driven by speculative trading, resulting in significant valuation deviations and heightened disagreement, leading to increased crash risk (Kim et al., 2011b; Chen et al., 2020; Wen et al., 2020b; Kim & Zhang, 2016; Wen et al., 2020d; Dai et al., 2020). Because the empirical evidence shown in this study produces different results from previous research (Chen et al., 2017; Khurana et al., 2018; Zhong et al., 2021), the specific situations to detect the relationship between idiosyncratic risk and stock price crash risk being further analyzed by adding discretionary income smoothing as moderating variable.

Idiosyncratic risk's influence depends on market conditions and investor behaviors. Discretionary income smoothing adds complexity. Managers use it to stabilize reported earnings, aiming for job security and bonuses (DeFond & Park, 1997). Applied as a moderating factor, it intensifies the impact of idiosyncratic risk. In smoothing earnings, managers may hide uncertainties, creating a false sense of security for investors. When idiosyncratic risk is moderated by income smoothing, it may lead to a pronounced positive relationship with crash risk, as investors react dramatically when actual risks are revealed. Furthermore, the research results also demonstrate a significant positive relationship between discretionary income smoothing and stock price crash risk, which aligns with the findings of Zhong et al. (2021).

This study shows the impact of discretionary income smoothing on the likelihood of a stock market crash across different informational set-

http://dx.doi.org/10.21511/imfi.21(4).2024.08

tings. Within companies with a less transparent information environment and higher firm-specific risk, it becomes more convenient for firms to engage in discretionary income smoothing, enabling them to manipulate earnings. So, investors face greater challenges in unraveling the opaqueness of financial reporting. Furthermore, when agency conflicts intensify, managers are more motivated to hide unfavorable information (Jin & Myers, 2006), increasing the probability of crashes. The findings imply that enterprises with greater idiosyncratic risk face a more pronounced effect of discretionary income smoothing on crash risk.

Additional evidence from a binary logistic test suggests that idiosyncratic risk and discretionary income smoothing are positively associated with severe stock price declines (CRASH) but do not have a significant connection when considered together. The differences could be attributed to the difference in crash risk measurement compared with the two earlier tests. In the binary logistic test, the price crash risk is represented as a categorical variable, while it is a continuous variable in the previous two. The different outcomes suggest that the results should be interpreted more carefully, given the sensitivity to the variables employed.

CONCLUSION

This study aims to investigate the relationship between idiosyncratic risk and the stock price crash risk, as well as the impact of discretionary income smoothing on this relationship. The result of the study finds that in the Indonesian capital market, idiosyncratic risk alone does not notably impact stock price crash risk – except when the stock price crash risk indicator uses binary measurement. However, when discretionary income smoothing serves as a moderating factor, it intensifies the link between idiosyncratic risk and stock price crash risk due to the unique information asymmetry it creates. This, in turn, leads to greater valuation disparities and speculative behaviors, ultimately raising the risk of stock price crashes. This study concludes that for listed companies in IDX, idiosyncratic risk and income smoothing jointly affect the risk of a stock crash. Hence, the presence of high earnings quality coupled with low firm-specific risk can mitigate the likelihood of a stock price crash.

STUDY LIMITATIONS AND FUTURE RESEARCH

The study emphasizes the significance of taking managerial strategies and the local financial environment into account when evaluating the risk of a stock price crash. This research underscores the complexity of financial markets and the need for comprehensive analysis. However, it is important to recognize the study's limitations, such as its emphasis on the Indonesian context. Future studies should expand their scope and consider various regions, with additional analysis by comparing the relationship between variables across different countries' characteristics. Future studies can also use other measurements for idiosyncratic risk, discretionary income smoothing and add variables into the model to better understand stock price crash risk determinants.

AUTHOR CONTRIBUTIONS

Conceptualization: Jeanice Cecilia Setiawan, Felizia Arni Rudiawarni, Dedhy Sulistiawan, Valentin Radu.
Data curation: Jeanice Cecilia Setiawan.
Formal analysis: Jeanice Cecilia Setiawan, Felizia Arni Rudiawarni, Dedhy Sulistiawan, Valentin Radu.
Investigation: Jeanice Cecilia Setiawan.
Methodology: Jeanice Cecilia Setiawan, Felizia Arni Rudiawarni, Dedhy Sulistiawan.
Project administration: Felizia Arni Rudiawarni.
Supervision: Felizia Arni Rudiawarni, Dedhy Sulistiawan.
Validation: Felizia Arni Rudiawarni, Dedhy Sulistiawan, Valentin Radu.

Visualization: Dedhy Sulistiawan.
Writing – original draft: Jeanice Cecilia Setiawan.
Writing – review & editing: Felizia Arni Rudiawarni, Dedhy Sulistiawan, Valentin Radu.

REFERENCES

1. Bushman, R., Dai, Z., & Wang, X. (2010). Risk and CEO turnover. *Journal of Financial Economics, 96*(3), 381-398. http://dx.doi.org/10.1016/j.jfineco.2010.03.001
2. Cao, J., Wen, F., Zhang, Y., Zhujia, Y., & Yun, Z. (2022). Idiosyncratic volatility and stock price crash risk: Evidence from China. *Finance Research Letters, 44*(C), 102095. https://doi.org/10.1016/j.frl.2021.102095
3. Chang, X., Yangyang, C., & Zolotoy, L. (2017). Stock liquidity and stock price crash risk. *The Journal of Financial and Quantitative Analysis, 52*(4), 1605-1637. https://doi.org/10.1017/S0022109017000473
4. Chen, C., Kim, J. B., & Yao, L. (2017). Earnings smoothing: Does it exacerbate or constrain stock price. *Journal of Corporate Finance, 42*(C), 36-54. https://doi.org/10.1016/j.jcorpfin.2016.11.004
5. Chen, Hong, & Stein. (2001). Forecasting crashes: Trading volume, past returns, and conditional skewness in stock prices. *Journal of Financial Economics, 61*(3), 345-381. https://doi.org/10.1016/S0304-405X(01)00066-6
6. Dai, Z., Zhou, H., Wen, F., & He, S. (2020). Efficient predictability of stock return volatility: The role of stock market implied volatility. *The North American Journal of Economics and Finance, 52*(C), 101174. https://doi.org/10.1016/j.najef.2020.101174
7. Dechow, P., Weili, G., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their consequences. *Journal of Accounting and Economics, 50*(2-3), 344-401. https://doi.org/10.1016/j.jacceco.2010.09.001
8. DeFond, M. L., & Park., C. W. (1997). Smoothing income in anticipation of future earnings. *Journal of Accounting and Economics, 23*(2), 115-139. https://doi.org/10.1016/S0165-4101(97)00004-9
9. DeFond, M. L., Hung, M., Li, S., & Li, Y. (2015). Does mandatory IFRS adoption affect crash risk? *The Accounting Review, 90*(1), 265-299. https://doi.org/10.2308/accr-50859
10. Durnev, A., Morck, R., Yeung, B., & Zarowin, P. (2003). Does greater firm-specific return variation mean more or less informed stock pricing? *Journal of Accounting Research, 41*(5), 797-836. https://doi.org/10.1046/j.1475-679X.2003.00124.x
11. Francis, J., O, P. M., LaFond, R., & Schipper, K. (2004). Costs of equity and earnings attributes. *Accounting Review, 79*(4), 967-1010. https://doi.org/10.2308/accr.2004.79.4.967
12. Ghosh, A., Cai, F., & Li, W. (2000). The determinants of capital structure. *American Business Review, 18*(2), 129-132. Retrieved from https://digitalcommons.newhaven.edu/americanbusinessreview/vol18/iss2/3/
13. Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics, 24*(7-8), 3-73. https://doi.org/10.1016/j.jacceco.2005.01.002
14. Hutton, A. P., Marcus, A. J., & Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. *Journal of Financial Economics, 94*(1), 67-86. https://doi.org/10.1016/j.jfineco.2008.10.003
15. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency cost and ownership structure. *Journal of Financial Economics, 3*(4), 305-360. https://doi.org/10.1016/0304-405X(76)90026-X
16. Jin, L. &. Myers, S. C. (2006). R^2 around the world: New theory and new tests. *Journal of Financial Economics, 79*(2), 257-292. https://doi.org/10.1016/j.jfineco.2004.11.003
17. Khurana, I. K., Pereira, R., & Zhang, E. X. (2017). Is real earnings smoothing harmful? Evidence from firm-specific stock price crash risk. *Contemporary Accounting Research, 35*(1), 558-587. https://doi.org/10.1111/1911-3846.12353
18. Kim, Dong-JIn, Li, Xi, Zhang, & Liandong. (2011a). CFOs versus CEOs: Equity incentives and crashes. *Journal of Financial Economics, 101*(3), 713-730. https://doi.org/10.1016/j.jfineco.2011.03.013
19. Kim, Dong-Jin, Song, Hyunjin, Zhang, & Liandong. (2011b). Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics, 100*(3), 639-662. https://doi.org/10.1016/j.jfineco.2010.07.007
20. Kim, J. B., & Zhang, L. (2016). Accounting conservatism and stock price crash risk: Firm-level evidence. *Contemporary accounting research, 33*(1), 412-441. https://doi.org/10.1111/1911-3846.12112
21. Kirschenheiter, M., & Melumad, N. D. (2002). Can "big bath" and earnings smoothing co-exist as equilibrium financial reporting strategies? *Journal of Accounting Research, 40*(3), 761-796. https://doi.org/10.1111/1475-679X.00070
22. Leuz, C., Nanda, D., & Wysocki, P. (2003). Investor protection and earnings management: An international comparison. *Journal of Financial Economics, 69*(3), 505-527. https://doi.org/10.1016/S0304-405X(03)00121-1
23. Li, K., Morck, R., Yang, F., & Yeung, B. (2004). Firm-specific variation and openness in emerging markets. *Review*

http://dx.doi.org/10.21511/imfi.21(4).2024.08

of Economics and Statistics, 86(3), 658-669. https://doi.org/10.1162/0034653041811789

24. Sandeep, P., & Asani, S. (1998). Crises in developed and emerging stock markets. *Financial Analysts Journal, 54*(6), 50-61. Retrieved from https://www.jstor.org/stable/4480124

25. Tucker, J., & Zarowin, P. (2006). Does income smoothing improve earnings informativeness? *The Accounting Review, 81*(1), 251-270. Retrieved from https://www.jstor.org/stable/4093136

26. Vo, X. V., & Phan, D. B. (2019). Herd behavior and idiosyncratic volatility in a frontier market. *Pacific Basin Finance Journal, 53,* 321-330. https://doi.org/10.1016/j.pacfin.2018.10.005

27. Wen, F., Weng, K., & Zhou, W. (2020a). Measuring the contribution of Chinese financial institutions to systemic risk: An extended asymmetric CoVaR approach. *Risk Management, 22*(4), 310-337. https://doi.org/10.1057/s41283-020-00064-1

28. Wen, F., Wu, N., & Gong, X. (2020b). China's carbon emissions trading and stock returns. *Energy Economics, 86,* 104627. https://doi.org/10.1016/j.eneco.2019.104627

29. Wen, F., Xu, L., Chen, B., Xia, X., & Li, J. (2020c). Heterogeneous institutional investors, short selling and stock price crash risk: Evidence from China. *Emerging Markets, 56*(12), 2812-2825. https://doi.org/10.1080/1540496X.2018.1522588

30. Wen, F., Yuan, Y., & Zhou, W. (2020d). Cross-shareholding networks and stock price synchronicity: Evidence from China. *International Journal of Finance and Economics, 26*(1), 914-948. https://doi.org/10.1002/ijfe.1828

31. Zhong, Y., Li, W., & Li, Y. (2021). Discretionary income smoothing and crash risk: Evidence from China. Asia-Pacific *Journal of Accounting and Economics, 28*(3), 311-333. https://doi.org/10.1080/16081625.2019.1600413