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Micro-, meso- and macro-level determinants of stock price crash risk: a systematic survey of literature

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Received 10 December 2021
Revised 28 January 2022
Accepted 24 February 2022

Abstract

Purpose – This article conducts a thorough review and synthesis of the empirical research on the antecedents of stock price crash risk to ascertain the macro-, meso- and micro-level determinants contributing to stock price crashes.

Design/methodology/approach – The authors systematically reviewed 85 empirical papers published in ABS-ranked journals to assess the macro-, meso- and micro-level determinants causing stock price crashes.

Findings – The findings indicate that macroeconomic factors such as corporate governance, political and legal factors, socioeconomic indicators and religious beliefs have an effect on firm-level corporate behavior contributing to stock price crash risk. At a meso-level customer concentration, industry-level characteristics, media coverage, structural features of ownership and behavioral factors have a substantial effect on stock price crash risk. Finally, micro-level variables influencing stock market crash risk include CEO qualities and compensation, business policies, earnings management, financial transparency, managerial characteristics and firm-specific variables.

Research limitations/implications – Based on our analysis we identify priority areas for future research.

Originality/value – This is a seminal work using a multilevel framework to categorize the determinants of stock price crashes into micro-, meso- and macro-level factors.

Keywords Stock price crash risk, Agency theory, Systematic literature review

Paper type Literature review

Introduction

Following the global financial crisis, an abundance of research has been conducted on the factors that influence a firm's stock price crash (Jin and Myers, 2006; Hutton *et al.*, 2009). The term "stock price crash" refers to the presence of a negative skew in the distribution of returns on particular stocks (Chen *et al.*, 2001; Kim *et al.*, 2014; Callen and Fang, 2015). The purpose of this research is to integrate and summarize the large empirical literature on the factors contributing to stock price crash risk, as well as to identify gaps in the literature for future research. Numerous variables have been ascribed in academic literature to the stock price crash phenomena. Minimal systematic effort, however, has been undertaken to summarize and synthesize the existing literature on drivers of stock price crashes. Many of the empirical studies on stock price crash risk have been based on Jin and Myers' (2006) agency theory approach, which argues that the existence of knowledge asymmetries between company insiders and external stakeholders contribute to crash risk. Managers can conceal negative news over a longer period of time using asymmetric information in order to maximize compensation, protect employment and minimize litigation problems associated with bad

Managerial Finance
© Emerald Publishing Limited
0307-4358
DOI 10.1108/MF-12-2021-0603

news disclosures (Kothari *et al.*, 2009). When a wave of bad news hits the market all at once, stock values plummet, resulting in a collapse. Despite a surge in crash risk studies over the past decade, very little effort has been conducted to summarize the existing literature.

This study provides the most comprehensive systemic survey to date of the existing literature on stock price crash risks. Previous reviews notably those by Habib *et al.* (2017) and Habib *et al.* (2018) were based on a small number of articles (48) and focused on a limited set of determinants. This analysis reviews 85 empirical studies published in ABS-ranked journals and covers a more comprehensive list of determinants of stock price crash. Second, this is the first study to use multilevel analysis to categorize determinants into macro-, meso- and micro-level factors. Third, this study draws on key literature over the last decade to recommend future research priorities.

Based on the survey of 85 empirical studies, this research aims to establish the determinants of stock price crash risk and answer the following specific research questions. (1) What is the current state of stock price crash risk research? (2) What are micro-level determinants of stock price crash risk? (3) What are the meso-level determinants of stock price crash risk? (4) What are the macro-level determinants of stock price crash risk? (5) What are the priorities for future research?

This paper is structured as follows. The next section describes the methodological technique used in this study. The following section presents research findings. The concluding section discusses the findings and potential research directions.

Methodology

Denyer and Trandfield's (2009) multi-step approach was used to conduct a systematic literature review on determinants of stock price crash risk. Figure 1 outlines the four-step iterative process used in this study for data collection and analysis. This process ensures the rigor and robustness of this study by removing elements of subjectivity as noticed in traditional reviews (Habib *et al.*, 2017, 2018). The four-step iterative process includes (1) defining research questions, (2) describing scope and boundaries of the research, (3) identification, screening and selection process of published studies (4) and finally, analysis and synthesis.

Defining the review questions

The literature on drivers of stock crash risk has grown substantially in recent decades (see Habib *et al.*, 2017) requiring the need for a comprehensive systematic review to describe the development of stock price collapse risk literature and its determinants. This study set out to answer the following research questions. (1) What is the current state of stock price crash risk research? (2) What are micro-level determinants of stock price crash risk? (3) What are the meso-level determinants of stock price crash risk? (4) What are the macro-level determinants of stock price crash risk? (5) What are the avenues for future research?

Establishing the scope and boundaries of the review

We adopted the following parameters to identify articles on stock price crash risk. Firstly, we selected a timeframe between 2009 and 2021. The year 2009 was selected as a starting point as 2009 marks the first study Hutton *et al.* (2009) exploring determinants of stock price crash risk. Bearing in mind the research questions, we used the key term "determinants of stock price crash risk" as a conceptual boundary for this research. Subsequently based on extant literature and seminal review papers, we prepared a list of six keywords shown in Figure 1 and searched them in widely used databases including *Web of Science (ISI), EBSCOhost,*

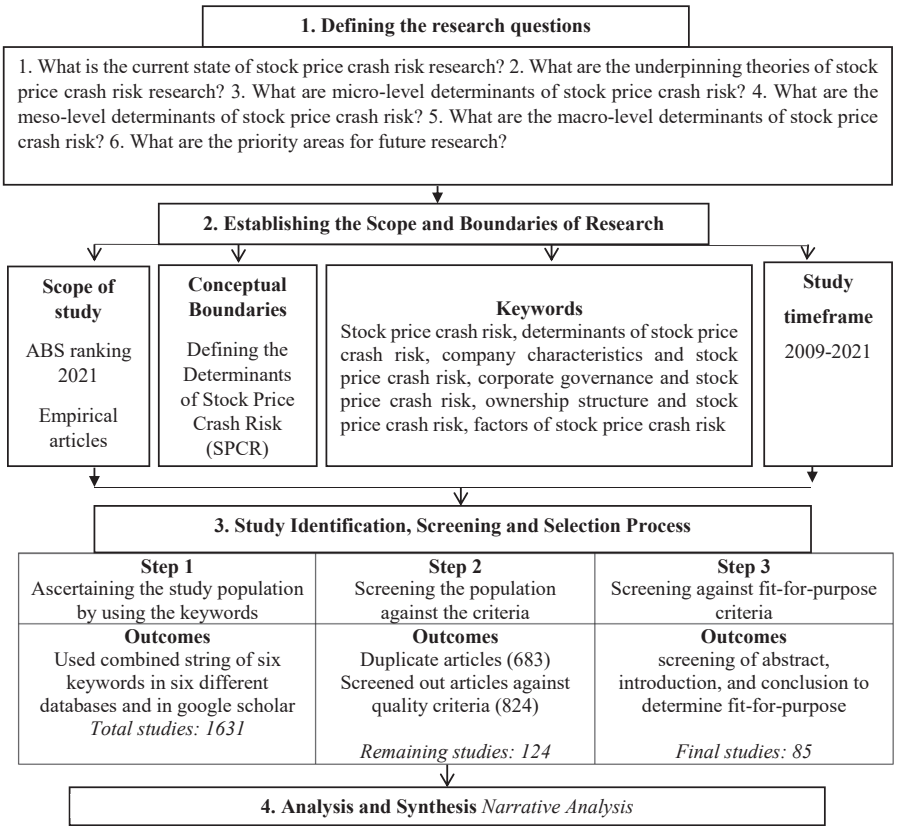


Figure 1.
Snapshot of the systematic review methodology

SAGE Journals, *Wiley Online Library*, *Elsevier Science Direct* and *Google Scholar*. Further, we included empirical papers published in ABS ranked journals in the database and excluded books, book chapters, conference proceedings and work published in predatory journals (Stumbitz *et al.*, 2018) to enhance the quality of the systematic literature review. The Charted Association of Business School provides an international ranking of journals and is widely used in previous review articles (Zahoor *et al.*, 2020).

Study identification, screening and selecting process

In the next step, we identified, screened and selected highly reliable articles to address the review questions. Initially, we searched 1,631 articles by using keywords mentioned in Figure 1 in six different databases. These articles were imported to a bibliographic software EndNote X9. The duplicate command was used to remove duplicate articles. This process resulted in 948 articles. Afterwards, we screened the searched articles against the quality criteria mentioned in step II in Figure 1 and shortlisted those studies published in ABS ranked journals. The exercise reduced the number from 948 to 124 at the selection stage of the review process. Finally, we scrutinized 124 articles against the fit-for-purpose criteria. Since this research focuses on determinants of stock price crash risk, the fit-for-purpose criteria are studies examining determinants of stock price crash risk. In this step, we examined the abstract, on some occasions, the introduction and conclusion section of articles to select the

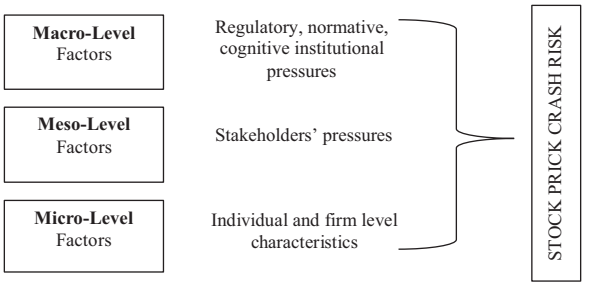
final sample of 85 articles. This number is substantially higher than prior reviews on the focal topic (Habib *et al.*, 2017, 2018).

Analysis and synthesis

This research uses narrative analysis. Narrative analysis is considered a highly reliable method to decipher reality from a fragmented and dispersed body of literature (Zahoor *et al.*, 2020; Nijmeijer *et al.*, 2014). In this analysis, we studied each article included in the sample to identify the context of the study, theoretical perspectives and determinants of stock price crash risk. We developed a separate sheet to record the determinants of stock price crash risk and carefully scrutinized them to avoid probable errors (Bailey *et al.*, 2015). This analysis helped us to create various output tables presented in the research findings section. We used a multilevel (micro, meso and macro) framework to categorize and synthesize the review findings to help readers better understand the determinants of stock price crash risk comprehensively.

Theoretical framework

Frynas and Stephans (2015) and Frynas and Yamahaki (2016) argue that organizations operate at multiple levels and future research would benefit immensely by using multilevel framework analysis to fully comprehend the research phenomenon. As such, this study employs a multilevel framework consisting of micro-, meso- and macro-levels of analysis. Macro-level refers to the context in which the firm operates (Barbour, 2017), and the context includes economic, social, cultural, political, legal and environmental factors (David and David, 2016; Frynas and Yamahaki, 2016). Micro-level phenomena are typically those that occur within organizations, and organizational members play an important role at this level (Jones *et al.*, 2004; Frynas and Yamahaki, 2016). Individuals are the primary focus or unit of analysis at the micro-level. Meso-level analysis emphasizes the interaction between the organization and other stakeholders (Barbour, 2017). According to Clarkson (1995), stakeholders may include various groups, including customers, employees, shareholders, creditors, government, media, local communities and charity organizations. Thus, corporate behavior may be influenced by the various stakeholders interacting with the firm. The theoretical framework is described below.



Theoretical Framework

Review results

This section highlights the development of stock price crash risk literature over the period of time and summarizes and synthesizes its determinants.

Journal and year-wise publications on determinants of stock price crash risk
The studies on the determinants of stock price crash risk were published in 47 different journals (see Table 1) and most of the studies were published in *Accounting* (31.76%) and *Finance* (49.41%). The *Journal of Corporate Finance* (9.4%) and *Journal of Banking and Finance* (8.2%) appeared to be the leading journals in terms of number of publications on stock price crash risk. Figure 2 shows the historical development of publications on stock price crash risk. Authors have published on stock price crash risk between 2009 and 2021. Surprising, 85.88% of the studies were published in the last 5 years (2016–2021).

Country-wise classification of publications on determinants of stock price crash risk
The studies on determinants of stock price crash risk were limited to a few developed and developing countries. In both developed and emerging markets, authors predominantly focused on USA and China respectively (see Table 2).

Macro-level factors

This section highlights the contribution of macro-level factors such as *corporate governance characteristics, political and legal factors, socio-economic indicators* and *religious beliefs* on firm-level corporate behavior in terms of stock price crash risk. These factors are discussed in detail below:

Corporate governance characteristics
According to agency theory, price crash risk emerges from knowledge asymmetry between business insiders and external stakeholders (Jin and Myers, 2006). Managers may hide bad news for a variety of reasons. When this news is released unexpectedly to the market it causes a stock price drop. Corporate governance mechanisms may reduce the level of information asymmetry between corporate insiders and external stakeholders. The extent literature demonstrates a negative relationship between board of directors and CFOs with uncertainty avoidance traits and stock price crash risk (Fu and Zang, 2019). In addition to the above, quality of internal control mechanisms (Park and Park, 2020), board monitoring by parent company (Cai *et al.*, 2019), presence of female CFO (Li and Zeng, 2019), directors' and officers' liability insurance (Yuan *et al.*, 2016) and firm-level governance significantly reduce the probability of stock price collapse. However, self-interested board of directors increases stock price crash risk (Lin *et al.*, 2021) (see Table 3).

Political and legal factors
Previous research suggests that country-level factors particularly political and legal factors improve company governance (see Table 4). A study conducted in China found that increased environmental monitoring causes corporations to report more unfavorable news, lowering future stock price collapse risk (Zhang *et al.*, 2021). In addition, monetary penalties (Zaman *et al.*, 2019), tight accounting standards (Abedifar *et al.*, 2019) and country-level governance (Song, 2015) have been shown to discourage withholding poor news and hence minimizing the probability of stock price crashes. Studies also demonstrate that country-level environmental policies (Yildiz and Karan, 2020) and the Securities and Exchange Commission regulations (Kubick and Lockhart, 2016) lower the likelihood of a firm's stock price drop. The findings by Li and Chan (2016) revealed that a company's stock price crash risk in China is linked to the board of directors' connections to political parties. A study conducted in China found that having a member of the Communist Party Control (CPC) committee serve as a director reduces a firm's crash risk (Li and Chan, 2016). The authors argue that CPC control can prevent executives from hiding bad news, resulting in more

Sr. no	Journal name	Type of journal	Quantity
1	Asia–Pacific Journal of Accounting and Economics	Accounting	3
2	Accounting and Finance	Accounting	2
3	Contemporary Accounting Research	Accounting	2
4	Journal of Accounting, Auditing and Finance	Accounting	2
5	Journal of Contemporary Accounting and Economics	Accounting	2
6	Managerial Auditing Journal	Accounting	2
7	British Accounting Review	Accounting	1
8	China Journal of Accounting Research	Accounting	1
9	European Accounting Review	Accounting	1
10	International Journal of Accounting and Information Management	Accounting	1
11	Journal of Accounting and Finance	Accounting	1
12	Journal of Accounting and Public Policy	Accounting	1
13	Journal of Applied Accounting Research	Accounting	1
14	Journal of Contemporary Accounting and Economics	Accounting	1
15	International Review of Economics and Finance	Economics	3
16	Economics letters	Economics	1
17	Economic Modeling	Economics	1
18	North American Journal of Economics and Finance	Economics	1
19	Journal of Corporate Finance	Finance	8
20	Journal of Banking and Finance	Finance	7
21	International Journal of Managerial Finance	Finance	4
22	Pacific–Basin Finance Journal	Finance	4
23	China Finance Review International	Finance	3
24	Journal of Financial Economics	Finance	3
25	Managerial Finance	Finance	3
26	Review of Finance	Finance	2
27	Journal of Financial and Quantitative Analysis	Finance	2
28	Journal of Corporate Finance	Finance	1
29	Asia Pacific Financial Markets	Finance	1
30	Emerging Markets Finance and Trade	Finance	1
31	European Financial Management	Finance	1
32	Financial Management	Finance	1
33	International Journal of Finance and Economics	Finance	1
34	International Journal of Islamic and Middle Eastern Finance and Management	Finance	1
35	International Review of Financial Analysis	Finance	1
36	Journal of Financial Stability	Finance	1
37	Journal of International Financial Markets, Institutions and Money	Finance	1
38	Journal of Portfolio Management	Finance	1
39	Research in International Business and Finance	Finance	1
40	Review of Finance	Finance	1
41	Review of Quantitative Finance and Accounting	Finance	1
42	Emerging Markets Review	IB and Area Studies	1
43	Journal of Business and Industrial Marketing	Marketing	2
44	Electronic Journal of e-Learning	Management and Education	1
45	Energy Economics	Sector	1
46	Energy Policy	Sector	1
47	Business Strategy and the Environment	Social Science	1
Total			*85*

Table 1.
Journal-wise publications on determinants of stock price crash risk

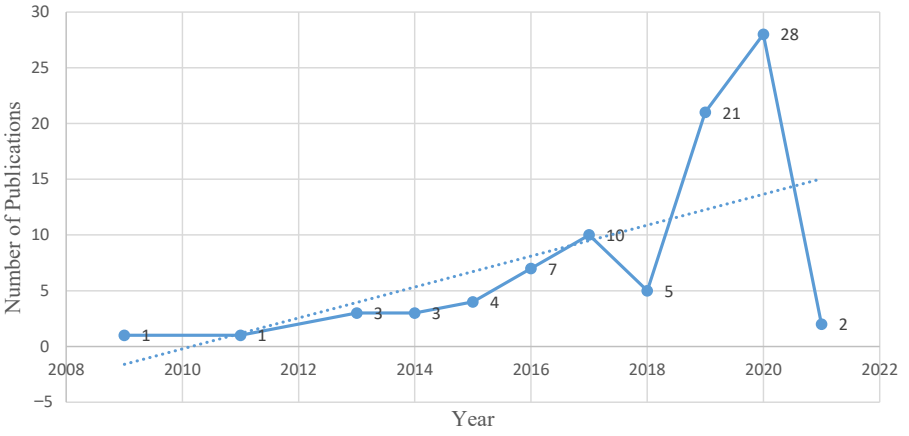


Figure 2.
Historical development of stock price crash risk research

Country	Country classification	Quantity
USA	Developed markets	32
Australia	Developed markets	4
UK	Developed markets	2
France	Developed markets	1
Europe	Developed markets	1
Hong Kong and US	Developed markets	1
Japan	Developed markets	1
Australia, US, Hong Kong	Developed markets	1
Canada and USA	Developed markets	1
Germany	Developed markets	1
China	Emerging markets	28
Korea	Emerging markets	3
Taiwan	Emerging markets	2
Columbia	Emerging markets	1
13 emerging countries	Emerging markets	1
Iran	Frontier and standalone markets	1
South Korea	Frontier and standalone markets	1
Global	Developed and emerging markets	1
Australia, China	Developed and emerging markets	1
Australia, Malaysia, New Zealand, Pakistan	Developed and emerging markets	1
Total		*85*

Table 2.
Country-wise classification of publications on determinants of stock price crash risk

orderly information flows to the market reducing information asymmetries. According to the existing literature (Obaydin *et al.*, 2021), the likelihood of shareholder litigation has a significant impact on the risk of a firm's stock price crash. Authors have argued that when a company faces the potential of a lawsuit, managers willfully disclose bad news. A lower litigation risk, on the other hand, may result in greater corporate opaqueness and, as a result, more opportunities for management to conceal bad news.

Socio-economic indicators

Country-level socio-economic factors have also been found to influence the probability of stock price crash risk (Cao *et al.*, 2016). Cultural variables have a significant impact on the

Determinants/antecedents	Context	Markets	Sign	Source
Board uncertainty avoidance background	UK	DM	–	Fu and Zang (2019)
CFO uncertainty avoidance background	UK	DM	–	Fu and Zang (2019)
Directors' and officers' liability insurance	China	EM	–	Yuan *et al.* (2016)
Female CFO	USA	DM	–	Li and Zeng (2019)
Firm-level governance	13 Emerging Countries	EM	–	Song (2015)
Quality of statutory internal auditors	Korea	EM	–	Park and Park (2020)
Self-interested board of directors	Taiwan	EM	+	Lin *et al.* (2021)
Strengthened board monitoring from parent company	China	EM	–	Cai *et al.* (2019)

Table 3.
Corporate governance characteristics

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, –: Significant negative, 0: No Relationship

Determinants/antecedents	Context	Markets	Sign	Source
China's new environmental inspector program	China	EM	–	Zhang *et al.* (2021)
Communist party control member as director on board	China	EM	–	Li and Chan (2016)
Country-level environmental policies	UK	DM	+/–	Yildiz and Karan (2020)
Country-level governance	13 Emerging Countries	EM	–	Song (2015)
Monetary penalties	USA	DM	–	Zaman *et al.* (2019)
Proximity to security and exchange commission enforcement	USA	DM	+	Kubick and Lockhart (2016)
Shareholder litigation risk	Australia	DM	+/–	Obaydin *et al.* (2021)
Strict accounting regulations	Global	DM and EM	–	Abedifar *et al.* (2019)

Table 4.
Political and legal factors

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, –: Significant negative, 0: No Relationship

crash risk of renewable energy companies (Yildz and Karan, 2020). Firms in nations that score higher on the individuality and mastery elements of national culture have a higher collapse risk (Dang *et al.*, 2019; Yildz and Karan, 2020), whereas the national culture's long-term orientation, uncertainty avoidance and embeddedness reduce crash risk (Yildz and Karan, 2020). Li *et al.* (2017) found that higher levels of social trust decrease the likelihood of stock price collapse. The hypothesis supporting this link is that social norms have a considerable impact on human behavior (Cialdini and Goldstein, 2004; Sunstein, 1996). The premise is high social trust influences informal institutions and correspondingly executives' behavior. Executives are more trustworthy—that is, honest—in providing information about their businesses in high social trust societies than in low social trust societies. So bad news gets to the market quickly. A society with great trust reduces the probability of a collapse (see Table 5).

Religious influence

Barro and McCleary (2003) argue that religious beliefs affect personality traits such as honesty and work ethic which can influence economic outcomes. A study conducted in the United States showed that companies located in religious areas have lower future stock market meltdown risk (Callen and Fang, 2015). This finding supports the idea that religion as a system of social norms causes managers to more likely report unpleasant news. Similarly, a Chinese study by Jebran *et al.* (2019) found that Confucianism reduces the probability of stock market crashes as management is more likely to report negative news. Another study conducted in China shows that superstition is one prominent belief system that appears to be positively connected with the danger of stock price crash risk (Bai *et al.*, 2020) (see Table 6).

Meso-level factors

This section highlights the influence of meso-level determinants such as *customer concentration, industry-level factors, media coverage, ownership structural elements* and *behavioral factors* on stock price crash risk behavior.

Ownership structure

The extant literature shows a link between the type of ownership and stock price crash risk but did not show consensus on the results (see Table 7). In line with the monitoring hypothesis of institutional investors, a study found that institutional ownership by public pension funds and stability of institutional investors is inversely related with future crash risk (Callen and Fang, 2013). Contrary to this, a study conducted in China, showed a positive relationship between institutional ownership and stock price crash risk (Fan and Fu, 2020). One possibility is that institutional investors in developed countries play a greater monitoring role than in emerging markets. The literature showed that family firms are less likely to experience stock price crashes (Srinidhi and Liao, 2020). This might be linked to family investors' long-term interests, as they have more decision-making power and are more aware of company operations than investors in public companies. Managerial ownership was found to be positively associated with stock price crash risk (Haghighi and Gerayli, 2020). Increasing

Determinants/antecedents	Context	Markets	Sign	Source
Firms headquartered in regions of high social trust	China	EM	−	Li *et al.* (2017)
Individualistic national culture	USA	DM	+	Dang *et al.* (2019)
National culture	UK	DM	+/−	Yildiz and Karan (2020)
Social trust	China	EM	−	Li *et al.* (2017)
Socio-economic factor	China	EM	+/−	Cao *et al.* (2016)

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

Table 5. Socio-economic indicators

Determinants/antecedents	Context	Markets	Sign	Source
Confucianism	China	EM	−	Jebran *et al.* (2019)
Higher levels of religiosity	USA	DM	−	Callen and Fang (2015)
Superstition – firms with unlucky listing codes	China	EM	+	Bai *et al.* (2020)

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

Table 6. Religious factor

Determinants/antecedents	Context	Markets	Sign	Source
Dedicated institutional ownership	USA	DM	−	Callen and Fang (2013)
Family firms	USA	DM	−	Srinidhi and Liao (2020)
Institutional holdings volatility	USA	DM	+	Callen and Fang (2013)
Institutional investor stability	USA	DM	−	Callen and Fang (2013)
Institutional investors' corporate site visits (CSVs)	China	EM	+	Gao *et al.* (2017)
Institutional ownership	China	EM	+	Fan and Fu (2020)
Managerial ownership	Iran	FSM	+	Haghighi and Gerayli (2020)
Transient institutional ownership	USA	DM	+	Callen and Fang (2013)

Table 7. Ownership structure

Note(s): DM: Developed Markets; EM: Emerging Markets; FSM: Frontier and standalone markets; +: Significant positive, −: Significant negative, 0: No Relationship

management ownership leads to opportunistic managerial activities, such as bad news hoarding. Consistent with managerial ownership, institutional shareholding volatility (Callen and Fang, 2013) and institutional shareholders' site visits (Callen and Fang, 2013) were found to be positively associated with stock price crash risk.

Industry-level factors

Industry-level factors also influence corporate behavior (see Table 8). The literature has shown that high degree of industry competition, enterprise's higher competitive position within the industry and high level of product market competition reduce the likelihood of stock price crashes (Li and Luo, 2020). Growing product market competitiveness is the principal external pressure on business management. Companies in various competitive positions respond differently to external pressures. Because of the comparative information role of product market competition, more company information is known by investors reducing the risk of a stock price crash. Similarly, government consumers have greater knowledge about a company and have been negatively linked to stock market crashes (Ma *et al.*, 2020). However, corporate customer concentration has a significant positive relationship with stock price crash risk (Ma *et al.*, 2020).

Media coverage

A study by An *et al.* (2020) found that media coverage plays an instrumental role in reducing stock price crash risk. This link is explained by a firm's low propensity to hide negative news in the presence of strong media attention. However, media coverage of a company's self-

Determinants/antecedents	Context	Markets	Sign	Source
Degree of industry competition	China	EM	−	Li and Luo (2020)
Corporate customer	USA	DM	+	Ma *et al.* (2020)
Enterprise's competitive position	China	EM	−	Li and Luo (2020)
Government customer	USA	DM	−	Ma *et al.* (2020)
Product market competition	China	EM	−	Li and Luo (2020)

Table 8. Industry-level factors

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

derived news and media releases has been positively associated with stock price crash risk (Chu *et al.*, 2021) (see Table 9).

Behavioral factors

Behavioral factors have been linked with stock price crash risk (see Table 10). A study conducted in USA by Cho and Kim (2020) found positive relationship between analysts' optimism and stock price crash. Optimistic analysts may miss the bad news that management hide or ignore its severity, increasing future crash risks (Cho and Kim, 2020). In addition to the above, investors' trading behavior (Zhou and Juang, 2019) and speculative bubbles (Jang and Kang, 2019) have positively been linked to stock price crash.

Micro-level factors

This section presents the findings of micro-level factors such as *CEO attributes and their compensation*, *corporate policies, earning management, financial transparency, managerial attributes* and *firm-specific factors* on stock price crash risk.

Corporate policies

Corporate policies appear to have an impact on the risk of a stock price crash (see Table 11). According to the literature, companies with corporate social responsibility plans can influence stock market crash risk in either direction (see Huang and Liu, 2021; Wu and Hu, 2019; Kim *et al.*, 2014; Lee, 2016). Socially responsible firms committed to a high level of transparency have been linked to lower likelihood of crash risk. Companies that engage in greenwashing have been associated with a higher crash risk. For example, Zaman *et al.* (2021) found that corporate adoption of an eco-innovation strategy was associated with lower risk of a stock price crash (Zaman *et al.*, 2021). Firms adopting eco-innovative strategies are subject to the scrutiny of institutional investors and equity analysts, which subsequently lowers stock price crash risk.

A corporation's tax avoidance policy has been found to be positively associated with higher stock crash risk (Garg *et al.*, 2022; Kim *et al.*, 2011). One possible explanation for this relationship is that tax avoidance can be used for personal gain by management, increasing

Determinants/antecedents	Context	Markets	Sign	Source
Higher media coverage	USA	DM	−	An *et al.* (2020)
Public information through online media	Japan	DM	+	Chu *et al.* (2021)

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

Table 9. Media coverage

Determinants/antecedents	Context	Markets	Sign	Source
Analysts' optimism	USA	DM	+	Cho and Kim (2020)
Investor trading behavior	China	EM	+	Zhou and Huang (2019)
Rational speculative bubbles	Korea	EM	+	Jang and Kang (2019)

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

Table 10. Behavioral factors

the likelihood of information manipulation and subsequent stock price crash risk. Similarly, corporate debt maturity structure (Hasan *et al.*, 2021), dividend policy (Bouaddi *et al.*, 2021), firm-level disclosure (Song, 2015) and corporate internal control (Chen *et al.*, 2017; Kim *et al.*, 2019) have been associated with lower stock price crash risk.

CEO attributes and their compensation

The existing literature has reported a link between CEO characteristics and stock price crash risk (see Table 12). According to a study by Xu and Zou (2019) of Chinese firms, firms that disclose CEO pay are less susceptible to stock price drops than firms that do not disclose CEO pay. A study by Al Mamun *et al.* (2020) found that the power of chief executive officers (CEOs) is linked to a higher crash risk (Al Mamun *et al.*, 2020). According to reports, powerful CEOs put significant pressure on CFOs to engage in accounting irregularities (Feng *et al.*, 2011) or report biased performance (Friedman, 2014). Further characteristics of CEOs, such as age, gender, tenure, and financial and non-financial incentives, have been linked to stock price crash risk (see Table 12). Managerial attributes have also been linked to stock price crash risk. High ability managers have greater knowledge of their firms' operations and may readily conceal unfavorable news, increasing stock price collapse risk (Cui *et al.*, 2019). Aside from the above, overconfident managers are more prone to future stock price falls than non-confident managers. The effect of overconfidence on crash risk is stronger for opaque organizations, suggesting that opacity encourages overconfident managers to conceal unfavorable news, increasing crash risk (Liang *et al.*, 2020).

Determinants/antecedents	Context	Markets	Sign	Source
Corporate eco-innovation	Australia, Malaysia, New Zealand, Pakistan	DM and EM	−	Zaman *et al.* (2021)
Corporate innovation strategy	USA	DM	+/−	Jia (2018)
Corporate relationship spending	Australia, China	DM and EM	−	Ben *et al.* (2020)
Corporate social responsibility	China	EM	−	Huang and Liu (2021)
Corporate social responsibility	China	EM	+	Wu and Hu (2019)
Corporate social responsibility	USA	DM	−	Kim *et al.* (2014)
Corporate social responsibility	Taiwan	EM	+	Lee (2016)
Debt maturity structure	Australia	DM	+	Hasan *et al.* (2021)
Dividend policy	France	DM	−	Bouaddi *et al.* (2021)
Firm-level disclosure	13 emerging countries	EM	−	Song (2015)
Higher levels of employee welfare	USA	DM	+	Ben-Nasr and Ghouma (2018)
Internal control	China	EM	−	Chen *et al.* (2017)
Internal control weaknesses	Canada and USA	DM	+	Kim *et al.* (2019)
Tax aggressiveness	Germany	DM	0	Neifar and Utz (2019)
Tax avoidance	USA	DM	+	Garg *et al.* (2022)
Tax avoidance	Canada and USA	DM	+	Kim *et al.* (2011)

Table 11. Corporate policies

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

Determinants/antecedents	Context	Markets	Sign	Source
CEO incentive for hoarding information	Europe	DM	+	Andreou *et al.* (2017)
Non-financial performance measures in CEO compensation	USA	DM	−	Shin *et al.* (2020)
CEO pay and its disclosure	China	EM	−	Xu and Zou (2019)
CEO age	USA	DM	−	Harper *et al.* (2020)
Young CEO	Europe	DM	+	Andreou *et al.* (2017)
CEO ownership	Australia	DM	−	Al Mamun *et al.* (2020)
CEO gender	USA	DM	−	Harper *et al.* (2020)
CEO tenure	USA	DM	+	Harper *et al.* (2020)
CEO tenure	Australia	DM	−	Al Mamun *et al.* (2020)
Managerial ability	China	EM	+	Cui *et al.* (2019)
Managers' political orientation (less or more conservative)	USA	DM	−	Chen *et al.* (2020)
Overconfident managers	China	EM	+	Liang *et al.* (2020)

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

Table 12. CEO attributes and their compensation

Earnings management

Earnings management is positively associated with stock price crash risk (Neifar and Utz, 2019; Khurana *et al.*, 2018). Earnings management is a deliberate intervention in the process of presenting financial data to present an overly positive view of a firm's business activities and financial performance (Schipper, 1989). While earnings management increases stock price crash risk, reporting lower than expected company earnings and meeting analysts' expectations correspond to lower stock price crash risk (Yeung and Lento, 2018) (see Table 13).

Financial transparency

The extant literature reveals that a lack of transparency in financial information contributes to stock price crash risk (Kim and Zhang, 2016, Chowdhury *et al.*, 2021; Xu *et al.*, 2013). The literature also suggests that inconsistent analyst coverage (Chowdhury *et al.*, 2021; Kim and Zhang, 2016) and accounting conservatism (Kim and Zhang, 2016) are associated with higher stock price crash risk. On the other hand, auditors' industry specialization (Feng *et al.*, 2019) and earning transparency (Hung amd Qiao, 2017; Hsu *et al.*, 2018) lower stock price crash risk. Consistent with the non-transparency in financial disclosure, material weakness of accounting disclosure (Lobo *et al.*, 2020) and opacity (Dewally and Shao, 2013) are linked to stock price crash risk (see Table 14).

Determinants/antecedents	Context	Markets	Sign	Source
Earnings management	Germany	DM	+	Neifar and Utz (2019)
Meeting analysts' expectations	China	EM	−	Yeung and Lento (2018)
Real earnings smoothing	Columbia	EM	+	Khurana *et al.* (2018)
Unexpected earnings of the company	China	EM	−	Yeung and Lento (2018)

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

Table 13. Earnings management

Determinants/antecedents	Context	Markets	Sign	Source
Abnormal analyst coverage	USA	DM	+	Chowdhury *et al.* (2021)
Abnormal analyst coverage	USA	DM	+	Kim and Zhang (2016)
Accounting conservatism	USA	DM	+	Kim and Zhang (2016)
Analyst coverage	China	EM	+	Xu *et al.* (2013)
Analyst coverage	USA	DM	−	He *et al.* (2019)
Auditor industry specialization	China	EM	−	Feng *et al.* (2019)
Causal language characteristics in annual financial reports	China	EM	+	Kong *et al.* (2021)
Earning transparency	USA	DM	−	Hung and Qiao (2017)
Increased transparency	USA	DM	−	Hsu *et al.* (2018)
Individual investors demand for information	Japan	DM	+	Chu *et al.* (2021)
Material weakness	China	EM	+	Lobo *et al.* (2020)
Opacity	USA	DM	+	Dewally and Shao (2013)

Table 14.
Financial transparency

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

Firm-specific factors

Stock price crash risk is negatively associated with firm-specific factors such as equity portfolio construction (Ak *et al.*, 2016), short-sales constraints (Dang *et al.*, 2019) and sticky cost (Tang *et al.*, 2020). Other firm-specific factors, however, such as directors litigation risk coverage (Choi and Jung, 2021), financial constraint (He and Ren, 2017), financial derivatives (Dewally and Shao, 2013), deviation in real operations from industry operations (Francis *et al.*, 2016), goodwill impairment avoidance (Han and Tang, 2020) and intangible intensity (Wu and Lai, 2020) all have a positive association stock price crash risk (see Table 15).

Capital market forces

Stock market forces also influence crash risk (see Table 16). Ghadhab (2019) found a link between cross-listing and stock price crashes. Regulations and monitoring of varied

Determinants/antecedents	Context	Markets	Sign	Source
Construction of equity portfolios	USA	DM	−	Ak *et al.* (2016)
Directors' litigation risk coverage	South Korea	FSM	+	Choi and Jung (2021)
Financial constraint	USA	DM	+	He and Ren (2017)
Financial derivatives	USA	DM	+	Dewally and Shao (2013)
Firms' deviation in real operations (DRO) from industry norms	USA	DM	+	Francis *et al.* (2016)
Goodwill impairments avoidance	China	EM	+	Han and Tang (2020)
Intangible intensity	USA	DM	+	Wu and Lai (2020)
Operating cash flow	Hong Kong and US	DM	0	Cheng *et al.* (2020)
Short-sale constraints	Australia, US, Hong Kong	DM	−	Deng *et al.* (2020)
Sticky cost	China	EM	−	Tang *et al.* (2020)

Table 15.
Firm-specific factors

Note(s): DM: Developed Markets; EM: Emerging Markets; FSM: Frontier and standalone markets; +: Significant positive, −: Significant negative, 0: No Relationship

investments are likely to be linked to cross listing and stock fall. The above is not the case for margin-trading volatility or stock liquidity (Chang *et al.*, 2017).

Determinants/antecedents	Context	Markets	Sign	Source
Exchange cross listing	USA	DM	−	Ghadhab (2019)
Margin-trading volatility	China	EM	+	Lv and Wu (2019)
Stock liquidity	USA	DM	+	Chang *et al.* (2017)

Note(s): DM: Developed Markets; EM: Emerging Markets; +: Significant positive, −: Significant negative, 0: No Relationship

Table 16.
Capital market forces

Figure 3.
Determinants of stock price crash risk

Conclusion, limitation and future research directions

The goal of this study is to systematically summarize and synthesize the fragmented and dispersed literature on stock price crash risk that has emerged since 2009. We undertook a systematic literature review examining and synthesizing 85 articles, which were then classified into macro-, meso- and micro-level determinants of stock price crash risk (for detail see Figure 3). At a macro-level, factors influencing stock market crash risk include *corporate governance characteristics, political and legal factors, socioeconomic indicators and religious beliefs. Meso-level determinants of stock market crash risk include: customer concentration, industry-level factors, media coverage, ownership structural elements and behavioral factors* of analysts and traders. At a micro-level determinants of stock market crash risk include *CEO characteristics and compensation, corporate policies, earnings management, financial transparency, managerial characteristics and firm-specific factors* such as short sales constraints and financial derivatives.

This study which is based on reviews of 85 empirical studies published in ABS-ranked journals and covers a comprehensive list of determinants of stock price crash risk adds to the existing literature in several ways. To begin, previous reviews, most notably those by Habib *et al.* (2017, 2018), were based on a small number of articles (48) and were limited to a few select determinants. This study is the first to include comprehensive list of determinants of stock price crash risk and to use multilevel analysis to categorize determinants into macro-, meso- and micro-level factors in order to improve our understanding of factors influencing stock price crash risk. The study provides an up-to-date picture of stock price crash risk literature covering the period 2009 to 2021.

The findings of our review provide some critical directions for future research. Previous review papers, and this current review, focused on independent variables and ignored control and mediating/moderating variables in their analyses. As a result, future research should incorporate mediators, moderators and control variables to better understand the influence on stock price crash risk. The majority of studies on stock price crash risk are from a small number of countries with most studies focusing on the United States or China. As a result, future research should prioritize other countries including emerging and frontier markets that will differ in institutional settings, contexts and firm expectations.

This review is not free from limitations. The study covers articles published in the English language, and ABS ranked 2021 journals and excludes books, book chapters, conference proceedings and work published in predatory journals. Furthermore, because this review only considers empirical research papers, it is possible that it overlooked antecedents of stock price crash risk where data is unavailable or scarce. The current review may overlook some aspects of stock price crash risk due to a noticeable lack of relevant studies on the determinants of stock price crash risk in developing and frontier markets. As a result, we may not provide a comprehensive and collectively exhaustive list of stock price crash risk determinates applicable across the world.

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