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DOES INFORMATION ASYMMETRY MATTER IN THE RELATIONSHIP OF CORPORATE GOVERNANCE AND STOCK PRICE CRASH RISK

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Abstract

The purpose of this study is to investigate the relationship of corporate governance and stock price crash risk in emerging economies. The study also investigates the mediating role of information asymmetry. The data was collected from non-financial firms of China, India and Pakistan. The data was collected from 2011 to 2023. To measure the stock price crash risk (SPCR), this study uses two proxies (NSKEW and DUVOL). These data were collected from data stream and annual statement of the firms. The results are consistent throughout the countries: strong corporate governance is associated with lower SPCR, the effects operate mainly through the reduction of information asymmetry. findings show that corporate governance significantly reduces information asymmetry which reduces SPCR. The study contributes to the literature in such a way that it will give insights to regulators, investors, researchers and creditors.

Introduction

The stock market is vital for financial development and the economic stability of country as it indicate the real economic situation (Deng et al., 2025), however, in recent history it was witnessed that the sharp declines happens in the stock market of different countries (Zheng et al., 2023), only a single financial crises of 2008 cost around $25 trillion to the investors and to the businesses, as these are the main players of stock market (Su & Song, 2022), investors have lost billions in other sharp declines, i.e. 2015 China crash, after COVID effects (Mazur, Dang, & Vega, 2021). These sharp declines known as stock price crash created panic among investors, to understand the phenomena of such declines researchers has identified different factors to as a determinants of Stock price crash risk especially in the area of corporate governance, such as CEO age (Andreou, Louca, & Petrou, 2017), social trust (Su & Song, 2022), CEO trustworthiness and locality (Gu, Liu, & Peng, 2020), manager ownership (Haghighi & Safari Gerayli, 2020) board diversity (Jebran, Chen, & Zhang, 2020) and political connection (Fang et al., 2020).

Disclosure of negative information to investors about the performance of a firm can harm the personal wealth of younger CEO as compare to older CEO because the market will use this information as a reference point in the future and it will create a negative stereotype about that CEO (Boschen et al., 2003). Moreover, Multiple leading roles create difficulties for a person to execute his plan and create chaos (Gill & Mathur, 2011). Those firms, who have an overconfident CEO face SPCR as compare to those firms that have non-overconfident CEO (Kim, Wang, & Zhang, 2016). In addition to that, it also appears that the effect

of overconfidence in CEOs is less pronounced for those firms who are more conservative CEO (Kim & Zhang, 2016). Taking the fact into account stock price crash reduces the value of the firm, it also creates a dent in the reputation of the managers. CEO who is educated and with great cognitive ability. This ability affects their decision and identifies appropriate strategic options that can positively affect firm performance (Wang et al., 2016). However, the competitive advantage of an organization is its human capital should be unique, scarce, and valuable. Firms with an executive of high education perform better as compare to low education executives (Barney & Arikan, 2001).

The above studies have worked on a single facet of corporate governance and based on one facet of corporate governance it is difficult to generalize without considering other facets of CG. There is a need for the investigation regarding how corporate governance mitigates the (SPCR) using unique cultural settings of Pakistan, India, and China. When the investor stops investing in short-term financing, the institutions are forced to liquidate the security prices decline sharply. This decline further intimidates collateral calls and creates financial crises (Shleifer & Vishny, 2011). It can be occurring in such a way that an investor buys shares considering it peaches but it turns out to be a lemon (American slang using when you know after buying that the product was spoiled), so he tries to sell that shares at price lower than the market value. After some time, the market won't differentiate between the good or the bad ones, so the bad shares would outperform the good ones and the market would decline sharply. In addition to these limitations, some future directions for (SPCR) were given in previous literature which includes board composition (Jebran, Chen, & Zhang, 2020), negative behavior (Lin et al., 2020), financial reporting, managerial characteristics and corporate governance (Habib, Hasan, & Jiang, 2018) and CEO age (Marinovic & Varas, 2019).

The actions of selfish managers exploit the informational advantage they have and deviate their neutrality. It includes making investment decisions which temporarily improve valuations or engaging in earning management to prevent inflated stock price is unsustainable and will eventually result in a stock price crash. In this situation, a firm needs a comprehensive strategy. There is a need to examine those factors that create the situation of a stock crash. Existing literature identified different factors, which include CEO and board characteristics, ownership structure, and audit quality. These factors are important to manage agency conflict. Some studies try to check a few governance factors with (SPCR), but with single or few factors included. the existing literature is limited to gender diversity, CEO tenure, and CEO education. Existing evidence is scarce in terms of emerging economies. There is limited research done where corporate governance and environmental information disclosure on SPCR tested. From previous literature, it is also identified that indirect relationship should be tested. The current study will extend the literature by examining the firm specific (SPCR). Therefore, the current study aims to explore the impact of corporate governance on (SPCR) along with the mediating role of information asymmetry between corporate governance on (SPCR).

The findings of this study will be useful for regulators working in Pakistan, China, and India to formulate policies for the best interest of all the stakeholders. These bodies include SECP in Pakistan, Central bank in China, and corporate governance bodies in India. They need to establish governance regulations and implement a structural framework on the organization for better governance of the firm and to meet the interest of all stakeholders.

As stated above, the most important stakeholder is the equity holders. Being a significant user of financial statements, they are concerned about the performance of the organization. The findings of this study can help them unveil the opportunistic behavior of a manager which could stop them in a particular firm. Investors employ company-specific information in the form of financial statements for the investment decision; this study can help them understand the information given by the organization to take timely decisions. This study

offer insight to creditors for their information which helps them while providing funds to the organization. The findings of this study can help them unveil the opportunistic behavior of a manager which could stop them in a particular firm. Investors employ company-specific information in the form of financial statements for the investment decision; this study can help them understand the information given by the organization to take timely decisions. This study will also help them how to evaluate a firm while giving capital to the firm.

This study will also help managers to implement governance policies provided them by regulatory bodies to decrease the chances of stock price crash. This will also help them to understand the phenomena of SPCR and how they can avoid such crash. This study will be helpful for the researcher to understand the theories discussed in this study regarding determinants of SPCR. The outcome will help in such a way that whether effective governance mitigates information asymmetry. The use of panel data will provide generalizable results for implications. The current study will extend the literature on governance and firm (SPCR) by providing implications for emerging economies.

The finding of this study will help regulatory bodies working in these three economies formulate policies in the very best interest of their firms. The findings of this study will help the analyst, how corporate governance and a pandemic are linked with (SPCR). The current study, first time explores audit quality in relationship with CG and (SPCR). The findings of this study will help creditors and managers to evaluate firms before providing capital.

Literature Review

Corporate governance and SPCR

The ownership and control of the organization are separated which results in a conflict of interest between the principal and agent of the firm, the manager maximizes individual utility, whereas the owner ought to maximize his wealth, thus affect the welfare of the organization (Ashwin & Krishnan, 2015). The agency theory literature suggests different mechanisms in which good governance is one of them to minimize the effect of agency problems (Jensen & Meckling, 1976). It also suggested that effective governance may enhance firm transparency and reduce the adverse effects of agency problems (Prommin, Jumreornvong, & Jiraporn, 2014). Based on the agency theory framework, information asymmetry provides an opportunistic behavior to the manager which produces agency conflict. A manager has more access to financial information and full knowledge about the firm's prospects as compared to external stakeholders put the manager in a better position to use it for personal gain.

Institutional ownership plays significant role in quality and quantity of financial statements which disseminates the information to the external stakeholders. Previous studies also recommend institutional ownership as a monitoring mechanism to reduce earnings management (Velury & Jenkins, 2006) increase value of the firm (Salehi et al 2011), improve corporate performance (Liu et al., 2015), reduce information asymmetry (Heflin, Shaw, & Wild, 2005). Moreover, they have a good expertise to manage and monitor their sizeable investment and lower earnings management (Kyaw, Olugbode, & Petracci, 2015). In past literature, institutional ownership has both views; in favor and opposing views. A study conducted in Iran shows negative relationship between institutional ownership and SPCR (Haghighat, Farhangzadeh, & Haghighat, 2015), it means that monitoring through institutions can mitigate managerial selfish behavior of bad news hoarding by improving information related to firm specific. The ownership structure defines the financial risks, financial channel and other relationship. Keeping agency theory in consideration, CEOs are likely to build their empire through which they can achieve personal gains and financial benefits of their interests, and even advance their careers further within the firm. Agency theory suggests that board members supervise management so that they do not give preference to their interests (Belkhir, 2009).

Monitoring of the managers is an important task of board members. Previous studies suggested

frequency of board meetings has a significant attribute and has a strong impact on monitoring effectiveness (Baccouche, Hadriche, & Omri, 2014; Brick & Chidambaran, 2010). When the meetings are frequently occurring, board members have good coordination while performing their tasks, opportunity to formally participate in organizational activities i.e. monitoring (Jiraporn, Singh, & Lee, 2009). The board member needs more time to understand the problem. Moreover, the board member has to discuss the matter in the meeting, then follow up on the decision (Di Pietra et al., 2008). To curb this selfish management of a manager a firm needs to keep outside directors so that the CEO could not engage with them and these independent directors keep check on him for organizational benefits and for reducing information asymmetry, which eventually will lead to low crash risk. Independent directors limit decision-making and insider dealing and improve efficiency (Liu et al., 2015). Typically a board with independent directors is considered a more effective monitoring mechanism that protects shareholders from self-serving management (Agrawal & Chadha, 2005; Xie, Davidson III, & DaDalt, 2003). One of the factor of corporate governance is gender diversity, organization around the world has immense pressure to include female directors on the board (Adams & Funk, 2012). Past research on board provides evidence (Barua et al., 2010; Cumming, Leung, & Rui, 2015; Kong et al., 2023), of gender diversity in the board can affect the governance of the firm and financial performance. Female directors are effective in controlling fraud and negative financial reporting (Cumming, Leung, & Rui, 2015).

Duality define, a situation where a CEO and chairman board position are occupied by the same person. Duality makes a person self-serving, takes actions that benefit him, and empowers the managers, makes him autonomous to make executive decisions in line with stewardship theory (Mallin, 2011). However, shareholders' expectation from duality creates immense pressure and he uses authority to manipulate the information (Davidson, Jiraporn, Kim, & Nemec, 2004). This autonomous role makes the CEO in a central position without answering someone, in this situation manager can take a risky decision in his interest, which lead the stock price crash in the longer run. Duality empowers the CEO to withhold bad news which leads to a stock price crash (Chen & Huang, 2023). Moreover, according to Gill and Mathur (2011), multiple leading roles create difficulties for a person to execute his plan and create chaos. This certainly justifies how they make a decision that greatly affects stock returns.

Age is another factor of corporate governance that can lower (SPCR). Younger CEO are more sensitive about organizational performance. This sensitiveness about firm performance makes a younger CEO more reserved and he hides bad news from outside investors because of the firm's reputation which eventually halts the performance and has high chances of a crash in the longer run. Therefore, the younger CEO has more incentives to withhold bad news from outside investors to avoid personal wealth decline, hoping for the best in the future, as this poor performance will be offset by good performance. Studies found that a younger CEO has high chances of risk-taking (Barker III & Mueller, 2002) high crash risk (Andreou, Louca, & Petrou, 2017), and do financial restatement (Huang, Rose-Green, & Lee, 2012). A risk-taking behavior can lead to earnings management and higher chances of hoarding bad news and crash risk. However, over time, risk-taking behavior is shifting towards risk-averse behavior and reducing earnings management and stock crashes. Recent accounting studies have started to explore the impact of demographic characteristics of individual managers. The investors are held local shares due to the informational advantage about the shares; they are familiar with those shares. moreover, the manager doesn't hide bad news because he knows that the accumulated bad news has to go out in the market, so due to local monitoring he is reluctant to hide bad news (Xu, Yu, & Zurbruegg, 2020). Therefore, a local CEO reduces information asymmetry so the crash of a stock. Moreover, The locality or managers who belong to the local community

reduces the crash risk (Gu, Liu, & Peng, 2020). Moreover, the manager doesn't hide bad news because s/he knows that the accumulated bad news has to go out in the market, so due to local monitoring he is reluctant to hide bad news (Xu, Yu, & Zurbruegg, 2020). Therefore, a local CEO reduces information asymmetry so the crash of a stock.

The competitive advantage of an organization is that its human capital should be unique, scarce, and valuable. Firms with an executive of high education perform better as compare to low education executives (Barney & Arikan, 2001). The decision-making of one CEO (which depends on training and skills) is different from another CEO, because a timely taken decision decreases the organization's chances to rely on information asymmetry, and if there is no information asymmetry, there is no crash risk. Educational directors have low incentives to manipulate the firm's finances (Wicaksana, Yuniasih, & Handayani, 2017). Therefore, it is expected that education reduces bad news hoarding and so crash risk. Geographic proximity is important in reporting (Choi et al., 2012) and reduces the restatement of the firm.

It is the manager-owner who decides how much risk should be taken. However, it depends upon the capability to identify risk. The manager who is serving longer in an organization has a negative effect on risk-taking (Kellermanns et al., 2008) and earnings overstatement (Ali & Zhang, 2015). Earnings overstatement was less in early years as compared to long-lasting CEO. The market is also uncertain about his ability in the early years, so by trying to build his influence he starts doing earning overstatements (Ali & Zhang, 2015). Over the years CEO contributes to the organizational decision making and it is not easy to replace the CEO due to different ownership, whereas longer serving CEO may establish a relationship and informal risk-taking (Glowka, Kallmünzer, & Zehrer, 2020). This long relationship makes the CEO to own the organization and take rationale decision.

H_1: Corporate governance has a negative significant effect on information asymmetry.

H_2: Corporate governance has a negative significant effect on SPCR.

Mediating role of information asymmetry.

The literature on corporate finance mentions the behavior of CEOs who contain bad news within the firm to sustain excess welfare. Global crises of 2008, Covid-19, and corporate scandals created great stress in governance and loss of investor confidence (Alkurdi et al., 2019; Gong et al., 2023; Gu, Liu, & Peng, 2020). The short-sightedness of executives makes them use the information for their interest. Managers of those firms exploit information asymmetries due to career concerns and do short-term betterment of the organization through suboptimal investments (Kothari, Shu, & Wysocki, 2009) and earnings (Bebchuk & Stole, 1994). However, delaying or withholding bad news is not long-lasting, this information has to be revealed in the market (Bleck & Liu, 2007; Kim & Zhang, 2016; Richardson, Obaydin, & Liu, 2022). Corporate governance can mitigate agency problems (Ali & Zhang, 2015; Andreou et al., 2016; Barua et al., 2010). Organization around the world has immense pressure to include female directors on the board (Adams & Ferreira, 2009). Past research on board provides evidence (Cumming, Leung, & Rui, 2015) of gender diversity in the board can affect the governance of the firm and financial performance. Female representation on board effective monitoring mechanism and such mechanism improve performance, Female directors are effective in controlling fraud and negative financial reporting. Therefore, female presence on board is important which increases the monitoring mechanism and reduces crash risk. Moreover, gender has its qualities, female CFO shows higher accounting conservatism as compare to male CFOs (Francis et al., 2014; Ge, Matsumoto, & Zhang, 2011). In addition to that female CFOs are related to higher accrual quality (Barua et al., 2010). In the light of the above evidence, we can say that female CEO has less information asymmetry as compared to male CEO, and if there is no information asymmetry then no stock crash in case of female CEO. Firms

with female CEO have more unlikely to experience a stock price crash, as they suggest that females are less of an opportunist because of the ethicality and morality factor in them (Li & Liu, 2012).

The size of the board matters in organizational decision-making. It's not just the number that has to be high, but this needs to be an appropriate number with relevant background and skills to make the board more efficient and increase the monitoring mechanism of the firm. Smaller boards may be considered an effective mechanism to accomplish high monitoring (Jensen, 1993). Whereas Forbes and Milliken (1999) argue that a larger board has some advantages, like brainstorming, sharing of expertise, management, in addition, they have the capacity of strong opposition against an irrational decision made by the CEO. Secondly, monitoring of the managers is an important task of board members. Previous studies suggested frequency of board meetings has a significant attribute and has a strong impact on monitoring effectiveness (Baccouche, Hadriche, & Omri, 2014; Brick & Chidambaran, 2010). When the meetings are frequently occurring, board members have good coordination while performing their tasks, opportunity to formally participate in organizational activities i.e. monitoring (Jiraporn, Singh, & Lee, 2009).

H_3: Information asymmetry mediates the relationship between corporate governance and SPCR.

Theoretical Framework

Agency theory is concerned with principal and agent. The basic goal of the agent is to maximize the shareholders' wealth. Agency relationship suggests that corporate executive compensation and their policies are determined endogenously (Kang, Kumar, & Lee, 2006). The agency theory suggested that effective governance may enhance firm transparency and reduce the adverse effects of agency problems (Prommin, Jumreornvong, & Jiraporn, 2014). If a manager intentionally delays the undesirable information, like poor financial reports, corporate manipulations for an extended period of time, the stock price would be overvalued for an extended period of time, which creates stock price bubble, once such information is released in the market, the price bubble will burst immediately and stock price crash would happen.

The problem of lemon arises when both parties have a different direction or interest which leads them to distort the market, in essence, this problem causes undervalued good stocks of capital market and overvalued bad stocks based on information asymmetry. The literature offers a solution for the lemon problems i.e motivation to comply with disclosure of inside information)Kreps, 1990(, strengthen the regulatory bodies and financial intermediaries can also play an important role to curb the opportunistic behavior of the managers (Healy & Palepu, 2001).

According to signaling theory (Spence, 1973), when a positive news about environmental information disseminates in the market, it will reduce the information asymmetry and can find more financial support from reliable partners, so will reduce SPCR. In other words, disclosure is in the form of signals (information), a good firm deliberately give signals to the market, so that the market forces could differentiated the bad and the good ones. Similarly, it releases a signal of non-egoism and gain intangible reputation. Signaling theory also suggests that volunteer disclosure could corresponds to high ethical standards of the organization which leads to less information asymmetry and SPCR. On the other hand, following agency theory, organization may use disclosure to pursue self-interests and cover up corporate manipulations, thereby leading to information asymmetry.

Methodology

This study focuses on non-financial firms in China, India and Pakistan. The data was collected from 2011 to 2023, the data sample was started from 2011 because the effect of financial crises could be settled down then, secondly, the new standard of accounting was implemented during that period. This study was also excluded firm from financial companies, because the reporting standard and accounting practices were different

for financial organizations. This study also excluded firms with missing data. The other assumption from past literature (Kim & Zhang, 2016) of measuring stock price crash risk was a minimum 26 week data should be available was also employed.

The data was collected from data stream and annual statement of the firms. The initial sample was 600; 200 from each country. After applying the above assumption, the sample was reduced to 312.

Measurement of variable

Stock price crash risk

The dependent variable of the study is SPCR, which was measured through two proxies one is NSKEW and the other one is DUVOL. This study uses two proxies, so that the results should be generalizable. It was measure based on a firm's specific weekly returns by following (Deng et al., 2025; Jebran, Chen, & Zhang, 2020). The following equation was used to measure the SPCR

First of all, to measure firm weekly negative returns was calculated through following regression equation

$$r_{i,t} = \alpha_{i,} + \beta 1_i r_{m,t-2} + \beta 2_i r_{m,t-1} + \beta 3_i r_{m,t} + \beta 4_i r_{m,t+1} + \beta 5_i r_{m,t+2} + \varepsilon_{i,t}$$

Then the residual derived from the above equation was then put into another equation:

$$W_{it} = \ln(1 + \varepsilon_{it})$$

Following the above two equation the value of W_{it} then put into each measure of SPCR

$$NSKEW = -\frac{\left[n(n-1)^{\frac{3}{2}} \sum w_{i,t}^3\right]}{\left[(n-1)(n-2)(\sum w_{i,t}^2)^{3/2}\right]}$$

Where t is time, i is the firm, the data was taken weekly, and at the end it was multiplied with -ve, so that it shows the higher side of downside risk.

The second measure was used down to up volatility, where the natural log of the equation was taken.

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

Where nu is number of up weeks, n_d is number of down week, Down/Up means the week above/below the annual mean value, the results suggest, higher value means high crash risk of the firm.

Measure of corporate governance

Corporate governance index was developed based on the following constructs of CEO and Board characteristics:

CEO duality was measure by dummy variable by taking 1, if the CEO is a member and chairman as well otherwise 0. CEO Education was measuring continuous variable by taking his/her education. CEO Age was taken as a variable. CEO tenure was measured by taking the number of years served in the organization. CEO gender was measured through dummy variable, 1 for male and 0 for female. Board size was measured by number of board members in a board. Board gender diversity was measured by taking female ratio in a board. Board independence was measure by number of independent directors in a board. Board activeness was measured by number of meetings held in a financial year.

Once, all these constructs were measured by using different methods, principal component analysis was done, which is used for dimension reduction, once it was employed, weights were assigned according to the following table.

Table 1
PCA weights

	China	India	Pakistan
BGD	0.608	0.269	0.362
BI	0.638	0.589	0.062
BA	0.667	0.7	0.366
BS	0.631	0.416	0.655
CEOD	0.279	0.594	0.452
CEOE	0.744	0.452	0.271
CEOA	0.778	0.47	0.497
CEOG	0.539	0.392	0.238
CEOT	0.462	0.343	0.579

Note: CGI=corporate governance index, CEOD=CEO duality, CEOE=CEO education, CEOT=CEO tenure, CEOG=CEO gender, BS=Board size, BA=Board activeness, BI=Board independence, BGD=Board gender diversity

Once the weights were assigned, the following equation employed and developed corporate governance index:

$CGI=\Sigma(W_1CEOD+W_2CEOE+W_3CEOT+W_4CEOA+W_5CEOG+W_6BS+W_7BA+W_8BGD+W_9BI)$

Where the W denotes the weights of each construct, and others are given in note of Table 1.

Measure of information asymmetry

There are different proxies of information asymmetry was used i.e. (Cho, Lee, & Pfeiffer Jr, 2013; Thuy et al., 2022), it includes discretionary accrual model of jones, then its modified jones model (1995), analyst coverage, but this study was used bid and ask spread, which was feasible to measure and also used by recent studies, it means it's a reliable model:

$$Bid-ask\ spread = \frac{Bid_{it} - Ask_{it}}{Price_{it}}$$

This study used the bid first, so the value could be positive and show higher value a high information asymmetry.

This study also taken some control variable which plays significant role and mentioned in the literature (Bhagat & Bolton, 2008; Kim, Wang, & Zhang, 2016; Lin et al., 2020; Rajgopal & Venkatachalam, 2011), it includes market to book ratio, age of the firm and size of the firm.

Model

To investigate the relationship between corporate governance and SPCR, this study adopts the following model:

$$\boldsymbol{IA_{i,t} = \alpha + \beta_1(CGI_{i,t}) + \beta_2 \sum Con_{i,t} + \varepsilon_{i,t}}$$

$$\boldsymbol{SPCR_{i,t} = \alpha + \beta_1(CGI_{i,t}) + \beta_2(CGI_{i,t}) + \beta_3 \sum Con_{i,t} + \varepsilon_{i,t}}$$

Results

This section synthesizes and interprets the outcomes/results of the study which is based on the relationship between corporate governance and stock price crash risk (SPCR) by using two proxies NSKEW and DUVOL. The analysis is based on a panel data by using data from 100 non-financial firms from three countries i.e. China, India and Pakistan. The study also check the

mediation analysis of information asymmetry crucial variable discussed in the literature (Jin & Myers, 2006). Based on the literature and econometric assumptions, this study follows a sequence of analysis that start from the descriptive statistics followed by correlation analysis and then main analysis of the study was carried out according the econometric assumptions.

Descriptive statistics

The results of descriptive statistics are shown in Table 2, where the value of mean, SD and min/max was given.

Table 2

Descriptive statistics (China)

	Mean	Maximum	Minimum	Std. Dev.	Skewness
CGI	50.3378	88.5273	17.5873	9.86372	0.06711
DUVOL	6.4056	27.5295	-14.283	6.73122	-0.0194
IA	32.6693	50.77720	14.49161	5.441049	-0.0457
NSKEW	-32.0574	52.8498	13.9908	6.02629	-0.1315

CGI=Corporate governance index, NSKEW=Negative skewness, DUVOL=Down to up volatility, IA=Information asymmetry

Table 3

Descriptive statistics (India)

	Mean	Maximum	Minimum	Std. Dev.	Skewness
NSKEW	-9.6654	1.853279	-21.77	3.520067	-0.0183
DUVOL	-36.463	-17.841	-57.006	6.489701	0.016240
CGI	47.37670	88.52731	17.58733	9.839415	0.078737
IA	-32.756	-16.363	-50.136	4.490219	-0.0969

CGI=Corporate governance index, NSKEW=Negative skewness, DUVOL=Down to up volatility, IA=Information asymmetry

Table 4

Descriptive statistics (Pakistan)

	Mean	Standard Deviation	Minimum	Maximum	Skewness
CGI	22.63796	19.61599	1.984	80.05798	0.846842
IA	-46.7506	39.3328	-510.45	100	-8.651
NSKEW	-0.32027	0.969371	-14.1051	5.66488	-1.56403
DUVOL	-0.07745	0.214433	-1.86921	1.210178	-0.807

CGI=Corporate governance index, NSKEW=Negative skewness, DUVOL=Down to up volatility, IA=Information asymmetry

The above Table 2,3 and 4 shows the results of descriptive statistics of all the variables of the study. Corporate governance has a mean value of 50, 47 and 22.63 respectively, and a standard deviation of 9, 3 and 19 shows that there is variation in CGI, this level of variation is crucial for SPCR (Bhagat & Bolton, 2008), but if we see the skewness, it shows the data is normal.

Moreover, the value of information asymmetry, the mediator variable of the study; information asymmetry has a mean value of -32.58, -36 and -46, the consistent negative values across all the observations are inherent to its measurement which negative bid-ask spread. The SD is 5, 4.49 and 39.

Correlation Analysis

Table 5

Correlation Matrix (China)

	CGI	DUVOL	IA	MTB	NSKEW	SIZE
DUVOL	-0.5838*					
IA	-0.4794*	0.6296*				
MTB	-0.0433	-0.00038	0.0501			
NSKEW	-0.2925	0.3876	0.4697	0.03489		
SIZE	0.0155	-0.00510	-0.0246	-0.0385	-0.0017	
AGE	0.0208	0.0045	-0.0174*	0.0171*	0.0048	0.3517*

CGI=Corporate governance index, NSKEW=Negative skewness, DUVOL=Down to up volatility, IA=Information asymmetry, ** p<0.01, * p<0.05

Table 6

Correlation Matrix (India)

	NSKEW	DUVOL	CGI	IA	MTB	Size
DUVOL	0.2123*					
CGI	-0.1497*	-0.6691**				
IA	0.5371*	0.5169*	-0.5417			
MTB	-0.2123	0.6094	0.6691	-0.5169		
Size	-0.2136	0.0699	0.0722	-0.187	0.0699	
Age	0.1091	0.033	0.0462	0.1219	0.033	0.0667

CGI=Corporate governance index, NSKEW=Negative skewness, DUVOL=Down to up volatility, IA=Information asymmetry, ** p<0.01, * p<0.05

Table 7

Correlation Matrix (Pakistan)

	NSKEW	DUVOL	CGI	IA	MTB	Size
DUVOL	-0.3378*					
CGI	-0.2681*	0.4634*				
IA	0.4245*	-0.6649*	-0.1578*			
MTB	-0.071	0.5244	0.4782	-0.078		
Size	-0.0202	0.2633	0.2656	0.0064	0.2633	
Age	0.2945*	0.2274*	0.2406*	0.2853*	0.2284	0.2701*

CGI=Corporate governance index, NSKEW=Negative skewness, DUVOL=Down to up volatility, IA=Information asymmetry, ** p<0.01, * p<0.05

Table 5, 6 and 7 presents the result of correlation analysis of all the variables of the study in three economies. The results show, no significant issue of multicollinearity as the relationship in all the economies remains in normal range. The value of correlation coefficient of corporate governance

and information asymmetry is from weak to moderate negative correlation in all the cases with the value of correlation is -0.68, -0.5 and 0.15 respectively. The association of corporate governance and SPCR in both the proxies also negative association, so it means that the prerequisite of regression is set and found useful. These findings are consistent with agency theory which suggests the monitoring mechanism curb managerial opportunism and bad new hoarding. The positive correlation of information asymmetry with SPCR also confirms the notion of signaling theory, that voluntary disclosure act as a signal of transparency.

Table 8
Unit root test (at level)

	China		India		Pakistan	
	Levin, Lin & Chu		Levin, Lin & Chu		Levin, Lin & Chu	
	t-statistic	p-value	t-statistic	p-value	t-statistic	p-value
Corporate governance	-7.84292	0.0000	-28.7720	0.0000	-28.9531	0.0000
Information asymmetry	-10.0396	0.0000	-19.4374	0.0000	-32.3820	0.0000
Negative Skewness	-13.6446	0.0000	-20.7365	0.0000	-21.9760	0.0000
Down to up volatility	-19.5850	0.0000	-29.6940	0.0000	-22.8126	0.0000

Linear regression and Mediation Analysis
Table 9
Hausman test

	China		India		Pakistan	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
$\chi 2$ Statistic	3.516836	7.617801	9.591132	1.965945	4.508212	7.985677
Prob.	0.1723	0.1066	0.0877	0.8538	0.4788	0.1570

The results of Hausman shows that it has insignificant value which means random effect model is suitable, the results are consistent in all the economies, so all the results were employed through random effect model.

Table 10
Regression analysis (random effect model)

	China		India		Pakistan	
	NSKEW	DUVOL	NSKEW	DUVOL	NSKEW	DUVOL
	β	β	B	β	β	β
CGI	-0.50409**	-0.30755**	-0.10475**	-0.38422**	-0.09493**	-0.41092**
MTB	-0.000432	-0.001831	0.000178	-0.002648	0.000355	0.000894
Age	-0.016031	0.040339	-0.030968	-0.022972	0.061051	-0.293729
Size	-0.027861	-0.459326	0.133455	0.218788	-0.017557	0.026774
R^2	0.678043	0.208451	0.087386	0.342656	0.076769	0.362199

CGI=Corporate governance index, NSKEW=Negative skewness, DUVOL=Down to up volatility, IA=Information asymmetry, ** p<0.01, * p<0.05

The results of regression analysis while employing random effect model shows that there is a significant impact of corporate governance and stock price crash risk in all the three economies, overall the results in three economies are subjectively consistent that when the corporate governance are strengthen the SPCR is decreases, as the results are in line with (Choi, Karim, & Tao, 2023; Francis et al., 2008; Gu, Liu, & Peng, 2020), where they suggest that CEO characteristics are vital for SPCR. When we go through the results, it shows a promising result for China and India, but in case of Pakistan, it shows some discrepancy due to weak governance in the organizations. The R^2 which is explained variation is also consistent for NSKEW, whereas it shows some inconsistency while employing DUVOL.

Table 11
Linear regression and Mediation analysis while using NSKEW as a proxy of SPCR

Path	Effect type	China *B*	p-value	India *β*	p-value	Pakistan *β*	p-value
CGI→NSKEW		0.2836	0.000	-0.1043	0.000	0.185411	0.0000
CGI→IA	Direct Effect	-0.3977	0.000	-0.4959	0.000	-0.508657	0.0000
IA→NSKEW		0.6377	0.000	0.3010	0.000	0.260536	0.0000
Indirect effect	CGI→IA→Crash	-0.1568	0.000	0.0517	0.000	-0.094310	0.0000
Total Effect	CGI→NSKEW (TE)	0.029986	0.0000	-0.052	0.000	-0.094931	0.0000

CGI=Corporate governance index, NSKEW=Negative skewness, DUVOL=Down to up volatility, IA=Information asymmetry, ** p<0.01, * p<0.05

Table 12
Linear regression and mediation analysis while using DUVOL as a proxy of SPCR

Path	Effect type	China *B*	p-value	India *β*	p-value	Pakistan *β*	p-value
CGI→NSKEW		0.0273	0.0000	0.206187	0.0000	0.234583	0.0000
CGI→IA	Direct Effect	-0.5089	0.0000	-0.38604	0.0000	-0.50865	0.0000
IA→NSKEW		0.86296	0.0000	1.19368	0.0000	0.901671	0.0000
Indirect effect	CGI→IA→Crash	-0.4391	0.0000	-0.59196	0.0000	-0.11932	0.0000
Total Effect	CGI→NSKEW (TE)	-0.4118	0.0000	0.20618	0.0000	-0.41092	0.0000

CGI=Corporate governance index, NSKEW=Negative skewness, DUVOL=Down to up volatility, IA=Information asymmetry, ** p<0.01, * p<0.05

Table 11 and 12 presents the results of mediation analysis of while using two proxies of SPCR i.e. NSKEW and DUVOL. The results show that information asymmetry has a positive strong

impact on SPCR in both proxies with the value of Beta is 0.63, 0.20 and 0.26 respectively whereas in case of DUVOL the results are same qualitatively. The results were generated by using (Baron & Kenny, 1986), where first of all path a CGI→IA tested and move to path b after found path significant, path b is IA→NSKEW/DUVOL, though the modern approach move on without looking at the significant sign. The results of the mediation shows that information asymmetry played a role as a mediator, the results confirm it by identifying it as a partial mediation between corporate governance and SPCR.

While comparing the results of all the three economies, we can say that the results are similar and as we discussed earlier that in case of Pakistan the coefficient value is less as compare to other two countries due to weak corporate governance and weak form of information disclosure (Saeed & Saeed, 2018).

Discussion

The study results strongly support the evidence (across all the proxies) integrated agency theory and information asymmetry. The firm strong governance increases the monitoring mechanism over managers, reduces their ability to hide bad news and reduces SPCR, this findings are in line with (Hutton, Marcus, & Tehranian, 2009). Weak governance structures are known exacerbate agency costs and SPCR (Hong & Stein, 2003), while counter strategy control curb such risks. The findings of the study also reveals that strong governance reduces crash prone information asymmetry, which is consistent with (Ge et al., 2023).

From information asymmetry perspective, corporate governance improves the transparency. The mediated pathways demonstrated that corporate governance effect partially goes through information asymmetry which confirms the findings of (Jin & Myers, 2006), which links opaque information to SPCR. In sum, the results reveals that strong governance reduces SPCR in all the economies by alleviating information asymmetry, as Kim, Li and Li (2014) suggests that CSR lowers crashes when governance is weak. It also compliments the crash literature (Xu, Liu, & Dou, 2022) by highlighting that governance are intimately linked. Managers need rules and regulation should face loss of reputation; this alone can dampen the accumulations of bad news hoarding and reduces SPCR.

Conclusion and Implications

The study examined the relationship between corporate governance and Stock price crash risk for non-financial firms in China, India and Pakistan using two proxies for SPCR. The study also investigated the mediating role of information asymmetry. The results are consistent through out the countries: strong corporate governance is associated with lower SPCR, the effects operate mainly through the reduction of information asymmetry. Information show that corporate governance significantly reduces information asymmetry which reduces SPCR. Together, the two proxies confirm the evidence that improving corporate governance and disclosure reduces downside risk and negative skewness.

The study offers insights for regulators and policymakers in such a way that they should strengthen the disclosure rules and enforce the strong governance mechanism to close information gaps to mitigate SPCR. The regulators and policymakers should prioritize transparency rules while designing governance mechanism. The investors should include the corporate governance into risk assessment of a firms, similarly, creditors should also include the firm governance while assessing their payback criteria, because the firm pay their debt from profit and it directly link with governance.

REFERENCES

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of financial Economics*, *94*(2), 291-309.

Adams, R. B., & Funk, P. (2012). Beyond the glass ceiling: Does gender matter? *Management Science*, *58*(2), 219-235.

Agrawal, A., & Chadha, S. (2005). Corporate Governance and Accounting Scandals Journal of Law and Economics. In: October.

Ali, A., & Zhang, W. (2015). CEO tenure and earnings management. *Journal of Accounting and Economics*, *59*(1), 60-79.

Alkurdi, A., Hussainey, K., Tahat, Y., & Aladwan, M. (2019). The impact of corporate governance on risk disclosure: Jordanian evidence. *Academy of Accounting and Financial Studies Journal*, *23*(1), 1-16.

Andreou, P. C., Antoniou, C., Horton, J., & Louca, C. (2016). Corporate governance and firm-specific stock price crashes. *European Financial Management*, *22*(5), 916-956.

Andreou, P. C., Louca, C., & Petrou, A. P. (2017). CEO age and stock price crash risk. *Review of Finance*, *21*(3), 1287-1325.

Ashwin, A. S., & Krishnan, R. T. (2015). Family firms in India: family involvement, innovation and agency and stewardship behaviors. *Asia Pacific Journal of Management*, *32*, 869-900.

Baccouche, S., Hadriche, M., & Omri, A. (2014). Multiple directorships and board meeting frequency: Evidence from France. *Applied financial economics*, *24*(14), 983-992.

Barker III, V. L., & Mueller, G. C. (2002). CEO characteristics and firm R&D spending. *Management Science*, *48*(6), 782-801.

Barney, J. B., & Arikan, A. M. (2001). The resource-based view: Origins and implications. *The Blackwell handbook of strategic management*, 124-188.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173.

Barua, A., Davidson, L. F., Rama, D. V., & Thiruvadi, S. (2010). CFO gender and accruals quality. *Accounting Horizons*, *24*(1), 25-39.

Bebchuk, L. A., & Stole, L. A. (1994). *Do Short-Term Managerial Objectives Lead to Under-or Over-Investment in Long-Term Projects* (0898-2937).

Belkhir, M. (2009). Board structure, ownership structure and firm performance: evidence from banking. *Applied financial economics*, *19*(19), 1581-1593.

Bhagat, S., & Bolton, B. (2008). Corporate governance and firm performance. *Journal of corporate finance*, *14*(3), 257-273.

Bleck, A., & Liu, X. (2007). Market transparency and the accounting regime. *Journal of Accounting research*, *45*(2), 229-256.

Boschen, J. F., Duru, A., Gordon, L. A., & Smith, K. J. (2003). Accounting and stock price performance in dynamic CEO compensation arrangements. *The Accounting Review*, *78*(1), 143-168.

Brick, I. E., & Chidambaran, N. (2010). Board meetings, committee structure, and firm value. *Journal of corporate finance*, *16*(4), 533-553.

Chen, Y. L., & Huang, M. C. (2023). Water usage reduction and CSR committees: Taiwan evidence. *Corporate Social Responsibility and Environmental Management*, *30*(3), 1070-1081.

Cho, S. Y., Lee, C., & Pfeiffer Jr, R. J. (2013). Corporate social responsibility performance and information asymmetry. *Journal of Accounting and Public Policy*, *32*(1), 71-83.

Choi, H., Karim, K., & Tao, A. (2023). CEO origin and stock price crash risk: Insider versus outsider CEOs. *Corporate Governance: An International Review*, *31*(1), 105-126.

Choi, J.-H., Kim, J.-B., Qiu, A. A., & Zang, Y. (2012). Geographic proximity between auditor and client: How does it impact audit quality? *Auditing: A Journal of Practice & Theory*, *31*(2), 43-72.

Cumming, D., Leung, T. Y., & Rui, O. (2015). Gender diversity and securities fraud. *Academy of management Journal*, *58*(5), 1572-1593.

Deng, B., Peng, Z., Chan, K. C., & Chen, H. (2025). Top management team stability and stock price crash risk: Evidence from China. *International Review of Financial Analysis*, *102*, 104126.

Di Pietra, R., Grambovas, C. A., Raonic, I., & Riccaboni, A. (2008). The effects of board size and 'busy'directors on the market value of Italian companies. *Journal of Management & Governance*, *12*(1), 73-91.

Fang, T.-Y., Lin, F., Lin, S.-W., & Huang, Y.-H. (2020). The association between political connection and stock price crash risk: Using financial reporting quality as a moderator. *Finance Research Letters*, *34*(C).

Forbes, D. P., & Milliken, F. J. (1999). Cognition and corporate governance: Understanding boards of directors as strategic decision-making groups. *Academy of management review*, *24*(3), 489-505.

Francis, B. B., Hasan, I., Wu, Q., & Yan, M. (2014). Are female CFOs less tax aggressive? Evidence from tax aggressiveness. *The Journal of the American Taxation Association*, *36*(2), 171-202.

Francis, J., Huang, A. H., Rajgopal, S., & Zang, A. Y. (2008). CEO reputation and earnings quality. *Contemporary Accounting Research*, *25*(1), 109-147.

Ge, W., Matsumoto, D., & Zhang, J. L. (2011). Do CFOs have style? An empirical investigation of the effect of individual CFOs on accounting practices. *Contemporary Accounting Research*, *28*(4), 1141-1179.

Ge, Y., Chen, Q., Qiu, S., & Kong, X. (2023). Environmental information disclosure and stock price crash risk: Evidence from China. *Frontiers in Environmental Science*, *11*, 1108508.

Gill, A., & Mathur, N. (2011). The impact of board size, CEO duality, and corporate liquidity on the profitability of Canadian service firms. *Journal of applied finance and banking*, *1*(3), 83.

Glowka, G., Kallmünzer, A., & Zehrer, A. (2020). Enterprise risk management in small and medium family enterprises: the role of family involvement and CEO tenure. *International Entrepreneurship and Management Journal*, 1-19.

Gong, X.-L., Li, Y.-W., Lu, J.-Y., & Feng, Y.-K. (2023). Independent director network, agency costs and stock price crash risk. *Economic Research-Ekonomska Istraživanja*, *36*(2), 2177697.

Gu, L., Liu, J., & Peng, Y. (2020). Locality Stereotype, CEO Trustworthiness and Stock Price Crash Risk: Evidence from China. *Journal of Business Ethics*, 1-25.

Habib, A., Hasan, M. M., & Jiang, H. (2018). Stock price crash risk: Review of the empirical literature. *Accounting & Finance*, *58*, 211-251.

Haghighat, A., Farhangzadeh, B., & Haghighat, M. (2015). The impact of institutional ownership on stock price synchronicity and crash risk. *International Journal of Business and Social Science*, *6*(4).

Haghighi, A., & Safari Gerayli, M. (2020). Managerial ownership and stock price crash risk: a case of Iranian firms. *International Journal of Islamic and Middle Eastern Finance and Management*, *13*(1), 42-55.

Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, *31*(1-3), 405-440.

Heflin, F. L., Shaw, K. W., & Wild, J. J. (2005). Disclosure policy and market liquidity: Impact of depth quotes and order sizes. *Contemporary Accounting Research*, *22*(4), 829-865.

Hong, H., & Stein, J. C. (2003). Differences of opinion, short-sales constraints, and market crashes. *The Review of financial studies*, *16*(2), 487-525.

Huang, H.-W., Rose-Green, E., & Lee, C.-C. (2012). CEO age and financial reporting quality. *Accounting Horizons*, *26*(4), 725-740.

Hutton, A. P., Marcus, A. J., & Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. *Journal of financial Economics*, *94*, 67-86.

Jebran, K., Chen, S., & Zhang, R. (2020). Board diversity and stock price crash risk. *Research in International Business and Finance*, *51*, 101122.

Jensen, M. C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *The Journal of Finance*, *48*(3), 831-880.

Jensen, M. C., & Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs and capital structure. *Journal of financial Economics*, *3*(4), 305-360.

Jin, L., & Myers, S. C. (2006). R2 around the world: New theory and new tests. *Journal of financial Economics*, *79*(2), 257-292.

Jiraporn, P., Singh, M., & Lee, C. I. (2009). Ineffective corporate governance: Director busyness and board committee memberships. *Journal of Banking & Finance*, *33*(5), 819-828.

Kang, S. H., Kumar, P., & Lee, H. (2006). Agency and Corporate Investment: The Role of Executive Compensation and Corporate Governance. *the Journal of Business*, *79*(3), 1127-1147.

Kellermanns, F. W., Eddleston, K. A., Barnett, T., & Pearson, A. (2008). An exploratory study of family member characteristics and involvement: Effects on entrepreneurial behavior in the family firm. *Family Business Review*, *21*(1), 1-14.

Kim, J.-B., Wang, Z., & Zhang, L. (2016). CEO overconfidence and stock price crash risk. *Contemporary Accounting Research*, *33*(4), 1720-1749.

Kim, J. B., & Zhang, L. (2016). Accounting conservatism and stock price crash risk: Firm-level evidence. *Contemporary Accounting Research*, *33*(1), 412-441.

Kim, Y., Li, H., & Li, S. (2014). Corporate social responsibility and stock price crash risk. *Journal of Banking & Finance*, *43*, 1-13.

Kong, G., Huang, J., Kong, D., & Zhu, L. (2023). Female executives, industrial robots, and stock price crash risk. *Finance Research Letters*, *57*, 104253. https://doi.org/https://doi.org/10.1016/j.frl.2023.104253

Kothari, S. P., Shu, S., & Wysocki, P. D. (2009). Do managers withhold bad news? *Journal of Accounting research*, *47*(1), 241-276.

Kreps, D. M. (1990). Corporate culture and economic theory. *Perspectives on positive political economy*, *90*(109-110), 8.

Kyaw, K., Olugbode, M., & Petracci, B. (2015). Does gender diverse board mean less earnings management? *Finance Research Letters*, *14*, 135-141.

Li, X., & Liu, H. (2012). CEO vs CFO: gender and stock price crash risk. *The Journal of World Economy*, *12*, 102-129.

Lin, F. Y., Chang, S. H., Huang, S. Y., & Wang, T. S. (2020). Self-interested board of director and stock price crash risk in loss-making firms. *Accounting & Finance*.

Liu, Y., Miletkov, M. K., Wei, Z., & Yang, T. (2015). Board independence and firm performance in China. *Journal of corporate finance*, *30*, 223-244. https://doi.org/https://doi.org/10.1016/j.jcorpfin.2014.12.004

Mallin, C. A. (2011). *Handbook on international corporate governance: country analyses*. Edward Elgar Publishing.

Marinovic, I., & Varas, F. (2019). CEO Horizon, Optimal Pay Duration, and the Escalation of Short-Termism. *The Journal of Finance*, *74*(4), 2011-2053.

Mazur, M., Dang, M., & Vega, M. (2021). COVID-19 and the march 2020 stock market crash. Evidence from S&P1500. *Finance Research Letters*, *38*, 101690.

Prommin, P., Jumreornvong, S., & Jiraporn, P. (2014). The effect of corporate governance on stock liquidity: The case of

Thailand. *International Review of Economics & Finance*, *32*, 132-142.

Rajgopal, S., & Venkatachalam, M. (2011). Financial reporting quality and idiosyncratic return volatility. *Journal of Accounting and Economics*, *51*(1-2), 1-20.

Richardson, G., Obaydin, I., & Liu, C. (2022). The effect of accounting fraud on future stock price crash risk. *Economic Modelling*, *117*, 106072. https://doi.org/https://doi.org/10.1016/j.econmod.2022.106072

Saeed, M. B., & Saeed, S. K. (2018). Corporate Governance and Accounting Conservatism: Moderating role of Audit Quality and Disclosure Quality. *Business and Economic Review*, *10*(2), 123-150.

Shleifer, A., & Vishny, R. (2011). Fire sales in finance and macroeconomics. *Journal of Economic Perspectives*, *25*(1), 29-48.

Spence, M. (1973). l the MIT press. *The Quarterly Journal of Economics*, *87*(3), 355-374.

Su, K., & Song, V. (2022). Social trust, corporate governance, and stock price crash risk: Evidence from China. *Bulletin of Economic Research*, *74*(4), 965-994.

Thuy, C. T. M., Khuong, N. V., Canh, N. T., & Liem, N. T. (2022). The mediating effect of stock price crash risk on the relationship between corporate social responsibility and cost of equity moderated by state ownership: Moderated-mediation analysis. *Corporate Social Responsibility and Environmental Management*, *29*(5), 1384-1395.

Velury, U., & Jenkins, D. S. (2006). Institutional ownership and the quality of earnings. *Journal of Business Research*, *59*(9), 1043-1051.

Wang, G., Holmes Jr, R. M., Oh, I. S., & Zhu, W. (2016). Do CEOs matter to firm strategic actions and firm performance? A meta-analytic investigation based on upper echelons theory. *Personnel Psychology*, *69*(4), 775-862.

Wicaksana, K., Yuniasih, N., & Handayani, L. (2017). Board diversity and earning management in companies listed in Indonesian stock exchange. *International Journal of Scientific and Research Publication*, *7*(12), 382-386.

Xie, B., Davidson III, W. N., & DaDalt, P. J. (2003). Earnings management and corporate governance: the role of the board and the audit committee. *Journal of corporate finance*, *9*(3), 295-316.

Xu, L., Yu, C.-F. J., & Zurbruegg, R. (2020). The benefit of being a local leader: Evidence from firm-specific stock price crash risk. *Journal of corporate finance*, *65*, 101752.

Xu, N., Liu, J., & Dou, H. (2022). Environmental, social, and governance information disclosure and stock price crash risk: Evidence from Chinese listed companies. *Frontiers in Psychology*, *13*, 977369.

Zheng, Z., Li, D., Zhong, T., Wang, T., & He, L. (2023). CEO facial structure and stock price crash risk. *Accounting & Finance*, *63*, 873-905.