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## Article

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# Family Control and Crash Risk in East Asian Firms: The Mediating Role of Opacity

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## ABSTRACT

This study examines family control's direct and indirect impacts (mediated by opacity) on crash risk in East Asian firms. We hypothesize that family control can mitigate agency problems of bad news hoarding due to increasing firm opaqueness. We chose six East Asia countries as the research sample due to their unique features that differ from developed countries, such as relatively weaker investor protection and higher earnings management practices that might positively contribute to firm opaqueness. Meanwhile, East Asian firms are also characterized by more concentrated ownership of family shareholders. Our research sample is 4,847 publicly listed firms (19,681 firm-year observations) in Hong Kong, Indonesia, Malaysia, Singapore, South Korea, and Taiwan from 2014 to 2019. This study primarily employs pooled OLS regression to test the hypotheses. As a robustness test, we conduct Fama-MacBeth regression to address the time-invariant property of family control measures and unobserved individual firm heterogeneity. This study finds robust results that family control negatively impacts crash risk, where this relationship is partly mediated by opacity. Therefore, we might argue that family control alleviates agency problems of bad news hoarding among East Asian firms.

**KEY WORDS:** crash risk, family control, opacity.

**JEL Classification:** G11.

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## 1. Introduction

Practitioners and academicians have paid more attention to the crash events since the cases of corporate scandals around the year 2000, such as Xerox, WorldCom, and Enron, and the global financial crisis 2008. As a result, scholars have explored various determinants to predict crash risk, developing the crash risk literature strand (Habib et al., 2018). Crash risk is the likelihood of a firm-specific (idiosyncratic) stock price crash caused by an all-at-once release of accumulated bad news. While stock price crashes frequently occur with un-

clear fundamental explanations (Chen et al., 2001; French, 1988), the earlier literature relates it to leverage effects (Christie, 1982), volatility feedback (Campbell & Hentschel, 1992; French et al., 1987; Pindyck, 1984), and bubble theories (Blanchard & Watson, 1982).

Later, scholars postulate two streams of explanations for idiosyncratic crashes. First, the investor information-hoarding models suggest that informed investors conceal private information due to short-sale constraints and fixed setup costs of trading, which cause increasing trading volume and upward trend before a stock price crash (Cao

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et al., 2002; Chen et al., 2001; Hong & Stein, 2003; Lv & Wu, 2019). Second, the manager information-hoarding models posit that opportunistic managers exploit information asymmetry (opacity) to conceal bad news from corporate outsiders (Jin & Myers, 2006), keeping overvalued stock prices to fulfill personal gains, such as higher stock-price-based compensation (Benmelech et al., 2010) and better access to cheaper capital (Jensen, 2004, 2005). To this extent, the second stream of crash risk explanations is grounded on the Agency Theory framework (Jensen & Meckling, 1976).

Family presence in public corporations can mitigate agency problems (Type I) due to tight monitoring of family shareholders or direct control of family members involved in management (Fama & Jensen, 1983). Family shareholders are strongly incentivized to monitor managers due to their concentrated and under-diversified ownership (Kim et al., 2014). Meanwhile, family managers possess stewardship behavior, acting as loyal servants to the family (Davis et al., 1997). Hence, family firms are less opaque (Achleitner et al., 2014; Ali et al., 2007; Wang, 2006), thus less likely to hoard bad news. On the other hand, family firms might exacerbate agency problems (Type II) when entrenched managers side to controlling family, expropriating non-controlling shareholders via non-arm's-length transactions ("tunneling") (Morck & Yeung, 2003). In East Asia, Type II agency problems occur among firms with excess control over cash flow rights exercised via pyramid and cross-holding structures (Claessens et al., 2000, 2002). In addition, family firms tend to manage earnings to hide expropriation (Leuz et al., 2003), increasing the opacity (Anderson et al., 2009; Hsu et al., 2017), thereby more likely to conceal bad news.

The theory and earlier empirical findings suggest that opacity is the channel that mediates crash risk; however, recent evidence reveals a different conclusion. Jin and Myers (2006) initially found a higher crash risk among more opaque countries. In addition, Hutton et al. (2009) find that firms with higher financial report opacity (accrual earnings management) also exhibit higher crash risk. Furthermore, Andreou et al. (2016, 2022) show that financial report opacity is limited in explaining crash

risk. They argue that U.S. public corporations become more transparent post-Sarbanes-Oxley period because of stronger corporate governance functions that enhance board purview and oversight of management's actions. Nevertheless, it remains a question mark whether a similar phenomenon occurs among East Asian public firms.

East Asia countries are interesting research contexts since they have unique features that provide a proper setting for our study. First, investor protection and law enforcement among East Asian countries are relatively weak compared to developed countries, leading to a more concentrated ownership structure (La Porta et al., 1998) and higher earnings management (Leuz et al., 2003). Second, most large public firms in East Asia are controlled by families (Claessens et al., 2000), where Type II agency conflicts are more common (Claessens et al., 2002). Third, as emerging economies, the financial market and corporate governance system are less developed; thus, East Asian countries might exhibit higher crash risk than developed countries due to higher stock price synchronicity and opacity. (Jin & Myers, 2006; Morck et al., 2000).

According to the study background above, the extent literature leaves two research gaps. First, the impact of family control on crash risk has not been examined in East Asia countries, which have specific characteristics as mentioned above. Second, previous studies show mixed findings regarding the efficacy of opacity in explaining crash risk (Andreou et al., 2022; Hutton et al., 2009; Zachro & Utama, 2021). Third, to the best of our knowledge, the simultaneous relationship between family control, opacity, and crash risk has not been investigated. Therefore, this study fulfills these three research gaps by examining family control's direct and indirect impacts (mediated by opacity) on crash risk in East Asia.

This paper provides several contributions to the literature. First, we examine the influence of family control on crash risk in the East Asian firms' context, where Type II (rather than Type I) agency problems are more prevalent among public corporations (Claessens et al., 2002). Therefore, our paper complements Srinidhi and Liao (2020), who examined the impact of family control on crash

risk among U.S. public corporations. Second, we reaffirm the relationship between family control and opacity in East Asian countries, where earnings management levels are higher due to relatively weak investor protection, more concentrated ownership, and less developed stock markets (Leuz et al., 2003); thereby, our paper extends Achleitner et al. (2014) and Hsu et al. (2017), who studied a similar topic using German and U.S. samples. Third, as the main contribution, this paper examines the mediating effect of opacity on the relationship between family control and crash risk using Muller et al.'s (2005) three-step procedure. Therefore, it differs from parallel studies examining the moderating effect of family control on the impact of busy directors (Zachro & Utama, 2021) and Corporate Social Responsibility (CSR) (Yang et al., 2023) on crash risk. Finally, this study responds to Andreou et al. (2022), who question the efficacy of opacity in channeling crash risk.

## 2. Literature Review and Hypotheses Development

### 2.1. Crash Risk Theories

Crash risk theory falls into two broad categories: investor information hoarding and managerial hoarding models. The investor information hoarding models theorize that crash risk is the aftermath of delayed trading of investors, mainly when negative information occurs. For instance, the "information blockages" model posits that the "information pipeline" is intermittently "clogged" and then releases information in large lumps due to the presence of fixed setup costs of trading, such as brokerage fees and the time and attention required to execute a trade (Cao et al., 2002). In this setting, some investors prefer to delay their trading until the price movement validates their private signals. As a result, this model predicts negative (positive) skewness following stock price run-ups (run-downs). Alternatively, the "differences of opinion" model posits that stock price crashes occur following high trading volume, reflecting opinion differences between constrained bearish investors who cannot execute short-sale tradings (such as mutual funds) regarding the fundamental stock value (H. Hong &

Stein, 2003). Instead, they prefer not to trade, acting as "support buyers" until the stock price drops to a desirable range. On the other hand, uninformed investors (arbitrageurs) can learn new information and decide to trade when these informed investors engage in the market, increasing trading volume further.

The managerial information hoarding models theorize that crash risk results from bad information concealing by opportunistic managers. The "control and risk-bearing" model assumes that managers have two choices in addressing bad corporate performance, namely "bearing risk" and "abandonment" options (Jin & Myers, 2006). In a setting where the firm is partly opaque—outside investors cannot determine the true value of the firm; corporate insiders have incentives, such as to secure their job, to conceal the bad news as long as the firm can produce enough internal cash flow to fulfill investors' dividend expectations. However, after a series of bad performances, the internal cash flow would no longer be sufficient. Therefore, managers would exercise the "abandonment" option—announcing the hoarded bad news all at once, causing a stock price crash. The "dynamic rational expectation" model argues that fully stock-based compensation has downside consequences under an asymmetric information environment (Benmelech et al., 2010). When the company is not performing well, the manager has two options. First, they may immediately disclose this information to shareholders, letting the stock price decline. Second, they may conceal the bad news, keeping the stock price overvalued. The latter option is more tempting since it can maximize stock-based compensation but might lead to a stock price crash.

### 2.2. Crash Risk Determinants

The extant literature on crash risk has examined various determinants of crash risk, classifying them into five categories: (a) financial reporting (corporate disclosure), (b) managerial incentives (characteristics), (c) capital market transactions, (d) informal institutional mechanisms, and (e) corporate governance mechanisms (Habib et al., 2018). Jin and Myers (2006) are among the earliest to study financial reporting-related determinants of

crash risk. They show higher stock-crash frequencies and stock-price synchronicity (R-squared) appear in more opaque countries. Hutton et al. (2009) show that firms with stronger earnings management practices (more opaque) have higher stock-crash frequencies and stock-price synchronicity and are more inclined toward crash risk. Salehi et al. (2022) find a negative relationship between the accounting quality, audit, auditor industry specialization and crash risk. Concerning managers' characteristics, firms managed by female CEOs exhibit lower crash risk (Li & Zeng, 2019), while firms managed by more powerful CEOs have higher crash risk (Al Mamun et al., 2020). Jebran et al. (2020) show that greater board diversity can mitigate crash risk. A higher likelihood of crash risk is also positively related to trading volume (Chen et al., 2001) and stock liquidity (Chang et al., 2017) as capital market transaction determinants. Crash risk studies with informal institutional mechanism determinants have developed rapidly in China. Piotroski et al. (2015) reveal that stock-price crashes are lower during political events but higher in the post-event years. Li and Chan (2016) find that state-owned enterprises where Communist Party of China committee members serve as directors have lower stock-price crash risk. Hu and Wang (2018) show that corporate political connections can mitigate crash risk. Jebran et al. (2019) find that the degree of informality among directors can exacerbate crash risk. Li and Jiang (2022) find a positive association between institutional investor networks and crash risk. Jebran et al. (2022) find a positive (negative) relationship between internal (external) board social capital and crash risk. On the contrary, Jin et al. (2022) find higher crash risk among firms in areas that adopt Confucianism. Finally, Chen et al. (2022) show that firms in regions with stronger tax enforcement exhibit lower crash risk. S. Li et al. (2023) find an inverse U-shaped relationship between the number of subsidiaries and crash risk. Aldhamari et al. (2023) found a lower crash risk among Malaysian firms with a stand-alone risk committee. In terms of the extent of the determinants of corporate governance mechanisms, Andreou et al. (2016) show that CEO's stock option incentives, transient institutional ownership,

and outside directors' shareholdings exacerbate crash risk, while accounting conservatism, insider shareholding, board size, and companies' mandates of formal corporate governance policy alleviate crash risk. Finally, recent studies show that particular ownership structures, such as insider ownership (Hu et al., 2022), institutional cross-ownership (Hou & Liu, 2023), and institutional common ownership (Chen et al., 2024), have corporate governance functions that can mitigate crash risk.

### 2.3. *Bad News Hoarding Channels*

The extant literature documents three bad news hoarding channels leading to stock price crash risk: opacity, overinvestment, and overvaluation. The opacity channel argues that managers conceal bad news via accrual earnings management practices (Hutton et al., 2009). The firm becomes more opaque as more bad news is hidden, causing the stock price to deviate from the true value and more prone to crashes (L. Jin & Myers, 2006). The overinvestment channel posits that managers conceal bad news by choosing sub-optimal investments to satisfy their interests (Benmelech et al., 2010). The overvaluation channel argues that managers have incentives to retain overvalued equity to gain benefits from stock-price-based compensation, perceived performance, and access to cheaper capital (Jensen, 2004, 2005).

### 2.4. *Family Control and Crash Risk*

This study proposes the incentive hypothesis that family firms have the incentive to reduce opacity and bad news hoarding, thereby mitigating crash risk. Family firms possess unique characteristics, such as concentrated ownership (wealth) of family shareholders (Barontini & Caprio, 2006; Barth et al., 2005; Srinidhi et al., 2014) and involvement of family members (founder or founder's descendant) in top management or board positions (Ali et al., 2007; Anderson & Reeb, 2003, 2004). Therefore, family firms bear minimum or no agency problems (Type I) due to unified ownership and management (Fama & Jensen, 1983; Jensen & Meckling, 1976). Family shareholders are long-term-oriented investors (James, 1999); thus, family firms are less likely to be involved in practices that produce a short-term gain while sacrificing value

in the long run, which might tarnish the family's reputation (Cheng, 2014), such as bad news hoarding. However, family firms might increase their risk-taking behaviour during recession, such as during COVID 19 period (Al-Maliki et al., 2023). Meanwhile, family managers exhibit stewardship behavior; hence, they are less likely to conduct opportunistic practices that inflict a financial loss on family shareholders (Donaldson & Davis, 1991). Prior empirical studies show that family ownership is negatively associated with opaqueness to the extent of lower abnormal accruals (Wang, 2006), providing early warnings about incoming bad news (Ali et al., 2007), lower market opacity index (Hsu et al., 2017), and higher accounting conservatism (Avabruth et al., 2024). Family shareholders possess concentrated wealth in the company (Kim et al., 2014); hence, to the extent of higher cash-flow rights, family firms might exhibit the incentive effect (Claessens et al., 2002). Considering the arguments above, we propose the first hypothesis as follows:

H1: Family control negatively impacts crash risk among East Asian firms.

### 2.5. Mediating Role of Opacity

The "control and risk-bearing" theory suggests that opacity is the channel that facilitates bad news hoarding, which leads to a stock price crash. When the firm is partly opaque, outside investors can learn about macroeconomic but not firm-specific information indicated by a higher stock price synchronicity (R-squared). Jin and Myers (2006) find a positive relationship between R-squared, opaqueness, and crash risk. Alternatively, Hutton et al. (2009) posit that managers utilize accrual earnings management as the bad news hoarding vehicle, thus representing opacity for individual firms. Besides, they also found a positive relationship between financial report opacity and crash risk.

Bad news hoarding mechanism via earnings management is consistent with the "equilibrium reporting strategy" model (Kirschenheiter & Melumad, 2002). The manager tends to under-report (over-report) over slightly good (bad) news to smooth earnings, adjusting its level to the investors' expected earnings. However, when the bad news is sufficiently large, the manager prefers a "big bath" strategy, under-reporting at the maximum amount possible in the

current period to report higher earnings in the future, causing an occasional stock price crash. Nevertheless, recent empirical evidence finds that financial report opacity is limited as an agency channel in explaining crash risk post-Sarbanes-Oxley period (Andreou et al., 2016, 2022). To this extent, family firms might avoid earnings management practices which can damage their reputation (Salehi et al., 2020). Considering the arguments above, we propose the second hypothesis as follows:

H2: The relationship between family control and crash risk is mediated by opacity.

## 3. Methodology

### 3.1. Data and Sample

The research sample is publicly listed firms in six East Asian countries between 2014 and 2019 for which Thomson Reuters Eikon and S&P Capital IQ provide data on stock prices and financial reports, respectively. We deliberately do not use the year 2020 and after to avoid bias from the COVID-19 period on the stock market. Referring to Claessens et al. (2000) and Lins and Servaes (2002), we selected Indonesia, Hong Kong, Malaysia, Taiwan, Singapore, and South Korea as the research sample because these six countries are emerging economies in the East Asia region. Since the data are provided in U.S. dollars, we find no difficulties matching different currencies across countries.

The S&P Capital IQ records 8,335 publicly listed firms (41,675 firm-year observations) together in selected six East Asian countries, excluding firms operating in the financial service industry. After screening out firms not listed on the major stock exchanges of a country and firms with no ownership data, the remaining sample consists of 6,810 publicly listed firms (34,050 firm-year observations). Finally, following Hutton et al. (2009), we eliminate firms operating in the financial service industry, firm-year observations with less than twenty-six weeks of stock-return data in a fiscal year, firm-year observations with a negative book value of equity, and firm-year observations with inadequate financial data to measure control variables. Thus, the final sample consists of 16,488 firm-year observations from 2014 until 2019. Table 1 provides details of this sample selection procedure.

Table 1  
Sample Selection

Description	Number of firm-year observations
Initial Observations	41,675
- Observations not listed on the major stock exchange of a country	(3,315)
- Observations with no ownership data	(4,310)
- Remaining Observations	
- Observations with less than twenty-six weeks of stock-return data in a fiscal year	(6,071)
- Observations with the negative book value of equity and inadequate financial data to measure control variables	(8,120)
Final Observations	19,859

3.2. Variables

3.2.1. Dependent Variables

Crash risk: This study defines crash risk as the tendency of firm-specific stock price crashes in a year. Following prior studies, we proxy crash risk using three alternative measures. The first measure, the negative skewness coefficient (NCSKEW), is the negative value of the skewness of the firm-specific weekly abnormal return distribution (Chen et al., 2001), as presented in Equation (1).

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

The firm-specific weekly abnormal return is denoted by  $w_{i,t} = \ln(1 + \varepsilon_{i,t})$ , where  $\varepsilon_{i,t}$  is the regression residual of the expanded market model in Equation (2),

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

$n$  is the number of weekly returns in a fiscal year, and  $t$  is the week in a fiscal year  $\tau$ . The lead and lag terms of the stock return ( $r_i$ ) and the market return ( $r_m$ ) are included in the model to address nonsynchronous trading (Dimson, 1979). The second measure, the down-to-up volatility (DUVOL), is the natural logarithmic ratio of the standard deviation during the up weeks to the standard deviation during the down weeks (Chen et al., 2001), as presented in Equation (3).

$$DUVOL_{i,\tau} = \ln \left[ \frac{1}{(n_d - 1)} \sum_{down} w_{i,t}^2 + \frac{1}{(n_u - 1)} \sum_{up} w_{i,t}^2 \right] \quad (3)$$

This measure classifies down (up) weeks if the firm-specific abnormal weekly return is lower (higher) than the annual average weekly return, where  $n_d$  is the number of down weeks, and  $n_u$  is the number of up weeks. The third measure, the frequency of crash weeks (FREQ), is the number of firm-specific weekly abnormal returns that exceed two standard deviations below their mean value in a given year (Luo & Zhang, 2020).

3.2.2. Independent Variables

Family control: This study defines family control as the controlling degree represented by ownership of the family shareholders—an individual or a nonpublic corporation other than a government, a government-owned corporation, a public financial institution, or a public corporation (Claessens et al., 2000; La Porta et al., 1999). Although we realize that there are many alternative family control proxies in the literature, we represent family control with three measures due to the limitations of our data. The first measure, the family firm indicator (33%) (FAM33), is a binary indicator that classifies a firm as a family firm if the family is the majority shareholder with at least 33% of the ownership (Barth et al., 2005). The second measure, the family firm indicator (51%) (FAM51), is a more robust binary indicator that classifies a firm as a family firm if the family is the majority shareholder that owns at least 51% of the ownership (Barontini & Caprio, 2006). The third measure, the family ownership fraction (FAMOWN), is the fractional equity ownership of family shareholders (Anderson & Reeb, 2003).

Opacity: This study employs the modified Jones's (1991) model, which is proposed by Dechow et al.



(1995) to proxy opacity (*OPAQUE*). This method involves two steps. We realize that this two-step procedure is limited to the extent that it can generate biased coefficients and standard errors, leading to incorrect inferences (Chen et al., 2018). First, we conduct cross-sectional regression for each sample year to obtain the estimated regression coefficients ( $\hat{\alpha}_0$ ,  $\hat{\beta}_1$  and  $\hat{\beta}_2$ ) with the model described in Equation (4), where  $\varepsilon_{i,\tau}$ ,  $i$ , and  $\tau$  represent error terms, firms, and years, respectively.

$$\frac{TA_{i,\tau}}{Assets_{i,\tau-1}} = \alpha_0 \frac{1}{Assets_{i,\tau-1}} + \beta_1 \frac{\Delta Sales_{i,\tau}}{Assets_{i,\tau-1}} + \beta_2 \frac{PPE_{i,\tau}}{Assets_{i,\tau-1}} + \varepsilon_{i,\tau} \quad (4)$$

where total accruals ( $TA_{i,\tau}$ ) is calculated with Equation (5).

$$TA_{i,\tau} = [\Delta Current\ Assets_{i,\tau} - \Delta Cash_{i,\tau} - \Delta Current\ Liabilities_{i,\tau} - \Delta Current\ Maturities\ of\ Long\ Term\ Debt_{i,\tau} - \Delta Income\ Tax\ Payable_{i,\tau} - \Delta Depreciation\ and\ Amortization\ Expense_{i,\tau}] \quad (5)$$

The discretionary accruals are computed by those parameter estimates, as described in Equation (6).

$$DiscAcc_{i,\tau} = \frac{TA_{i,\tau}}{Assets_{i,\tau-1}} - \hat{\alpha}_0 \frac{1}{Assets_{i,\tau-1}} - \hat{\beta}_1 \frac{\Delta Sales_{i,\tau} - \Delta Receivables_{i,\tau}}{Assets_{i,\tau-1}} - \hat{\beta}_2 \frac{PPE_{i,\tau}}{Assets_{i,\tau-1}} \quad (6)$$

Second, financial report opacity for each firm-year observation is measured with the sum of the annual discretionary accruals' absolute values, as described in Equation (7).

$$OPAQUE_{i,\tau} = |DiscAcc_{i,\tau-1}| + |DiscAcc_{i,\tau-2}| + |DiscAcc_{i,\tau-3}| \quad (7)$$

Control variables: We refer to Chen et al. (2001) and Srinidhi and Liao (2020) in employing several variables to control stock trading and firm characteristics. Lagged crash risk (*CrashRisk*) captures the property of conditional skewness (Harvey & Siddique, 1999). Share turnover (*TURN*) represents the intensity of investors' disagreements over the stock's true value (H. Hong & Stein, 2003). Stock return volatility (*SIGMA*) captures the "volatility feedback" property—a possibility of increasing volatility along with negative returns (Campbell & Hentschel, 1992). Yearly abnormal return (*WRET*) explains the "stock price reversal" or "stock price bubble" phenomenon (Blanchard & Watson,

1982). In addition to prior studies, we introduce a new control variable, information discreteness (*ID*), to reveal the degree of the information flow disclosed by the firm (Da et al., 2014). Firm size (*SIZE*) is an atheoretic control widely used in finance research. However, we can presume that the firm size is negatively associated with the incentive of managers to withhold bad news due to more scrutiny from outside investors and analysts (Chen et al., 2001). Leverage (*LEV*) captures the level of debt holders' monitoring function in mitigating bad news hoarding (Wang et al., 2020). Return on assets (*ROA*) is an atheoretic control representing profitability.

Since this study employs a cross-countries sample, we also added variables to control the fixed effect of country characteristics. The financial system dummy (*FINSYS*) captures differences between the market and bank-based financial systems (Maksimovic & Demirgüç-Kunt, 2002). The disclosure requirement index (*DISCREQ*) and anti-director rights score (*ADRIGHT*) represent the soundness of the corporate governance system (La Porta et al., 1998, 2006). The importance of the equity market score (*IEM*) captures the important role of the equity market (Leuz et al., 2003). Finally, yearly inflation (*INF*) and GDP per capita (*GDPCAP*) represent countries' macroeconomic conditions. Table 2 presents details of names, symbols, and descriptions of all variables.

### 3.3. Empirical Models

This study employs the three-step procedure proposed by Muller et al. (2005). To test H1 and H2, in the first step, we employ OLS regression using the pooled model on the empirical model described in Equation (8), which also infers H1.

$$CrashRisk_{i,\tau} = \beta_0 + \beta_1 Family_{i,\tau-1} + \sum \beta_k Control_{i,\tau-1} + \varepsilon_{i,\tau} \quad (8)$$

The model above uses  $\beta_0$  as a constant factor,  $\beta_1$  as a coefficient of family control,  $\beta_k$  as coefficients of control variables,  $\varepsilon_{i,\tau}$  as the error term, and  $i$  and  $\tau$  to indicate firms and years, respectively.  $CrashRisk_{i,\tau}$  represents crash risk proxied by three alternative measures: negative skewness coefficient (*NCSKEW*), down-to-up volatility (*DUVOL*), and frequency of crash weeks (*FREQ*) of firm  $i$  in the year  $\tau$ .  $Family_{i,\tau-1}$  represents family control proxied by three alternative



**Table 2**  
*Definitions and Operations of Variables*

Variables	Abbreviation	Description
Negative skewness coefficient	NCSKEW	The negative value of skewness of the firm-specific weekly abnormal return distribution (Chen et al., 2001).
Down-to-up volatility	DUVOL	The natural logarithmic ratio of the standard deviation during the up weeks to the standard deviation during the down weeks (Chen et al., 2001).
Frequency of crash weeks	FREQ	The number of firm-specific weekly abnormal return that falls more than two standard deviations below their mean value in a given year (Luo & Zhang, 2020).
Family firm indicator (33%)	FAM33	The dummy variable equals 1 if a family is the majority shareholder with at least 33% of the ownership and 0 otherwise (Barth et al., 2005).
Family firm indicator (51%)	FAM51	The dummy variable equals 1 if a family is the majority shareholder with at least 51% of the ownership and 0 otherwise (Barontini & Caprio, 2006).
Family ownership fraction	FAMOWN	The fractional equity ownership of family shareholders (Anderson & Reeb, 2003).
Opacity	OPAQUE	The sum of the annual discretionary accruals' absolute values (Hutton et al., 2009).
Share turnover	TURN	Average monthly trading volume/number of shares outstanding (Chen et al., 2001).
Stock return volatility	SIGMA	The standard deviation of firm-specific weekly abnormal return (Chen et al., 2001).
Yearly abnormal return	WRET	The average firm-specific abnormal weekly returns times one hundred (Srinidhi & Liao, 2020).
Information discreteness	ID	Da et al.'s (2014) information discreteness measure.
Firm size	SIZE	Natural log of total assets.
Leverage	LEV	Total debt/total assets.
Market-to-book value	MTB	Market capitalization/total equity.
Return-on-assets	ROA	Net income/total assets.
Financial system	FINSYS	The dummy variable equals 1 for a market-based country and 0 for a bank-based country (Maksimovic & Demirgüç-Kunt, 2002).
Disclosure requirements index	DISCREQ	The disclosure requirements index of one country (La Porta et al., 2006).
Anti-director rights score	ADRIGHT	The anti-director right score of one country (La Porta et al., 1998).
Importance of equity market score	IEM	The importance of the equity market score of one country (Leuz et al., 2003).
Inflation	INF	The inflation of one country in a fiscal year.
Gross domestic product per capita	GDPCAP	Natural log of the GDP of one country in a fiscal year.

measures: family firm indicator 33% (*FAM33*), family firm indicator 51%, and family ownership fraction (*FAMOWN*). Following prior studies (Chen et al., 2001; Srinidhi & Liao, 2020), we include lagged crash risk ( $CrashRisk_{i,t-1}$ ) as a control variable to accommodate the property of conditional skewness (Harvey & Siddique, 1999). In addition, we also employ the past value of control variables ( $Control_{i,t-1}$ ) explained in previous sections on the regression model. Finally,  $\varepsilon_{i,t}$  represents the error term.

In the second and third steps, we employ OLS regression using the pooled model on the empirical model described in Equation (9) and Equation (10) to infer H2.

$$OPAQUE_{i,t-1} = \beta_0 + \beta_1 Family_{i,t-1} + \sum \beta_K Control_{i,t-1} + \varepsilon_{i,t-1} \quad (9)$$

$$CrashRisk_{i,t} = \beta_0 + \beta_1 Family_{i,t-1} + \beta_2 OPAQUE_{i,t-1} + \sum \beta_K Control_{i,t-1} + \varepsilon_{i,t} \quad (10)$$

These models use  $\beta_0$  as a constant factor,  $\beta_1$  as a coefficient of family control,  $\beta_2$  as a coefficient of opacity,  $\beta_K$  as coefficients of control variables,  $\varepsilon_{i,t}$  as the error term, and  $i$  and  $\tau$  to indicate firms and years, respectively.  $OPAQUE_{i,t-1}$  represents financial report opacity. H2 is supported when family control coefficients are significant in Step 1 and Step 2. To this extent, opacity plays a full mediation role if the inclusion of opacity makes the family control coefficient insignificant in Step 3. Meanwhile, we conclude a partial mediation of opacity if the family control coefficient is significant with reduced magnitude.

## 4. Results and Discussions

### 4.1. Descriptive Statistics

Table 3 presents a mean comparison of family control, opacity, and crash risk sample across six countries. Family ownership is highest in Indonesia (38.2%), followed by Hong Kong (34.7%), Singapore (35.1%), Malaysia (26.1%), South Korea (21.3%), and Taiwan (3.1%). Claessens et al. (2000) show almost the same sequence in that Indonesia (71.5%) also has the highest percentage of family firms defined by the 20% voting rights threshold, followed by Malaysia (67.1%), Hong Kong (66.7%), Singapore (55.4%), South Korea (48.4%), and Taiwan (48.2%). Indonesia has the highest opacity (accruals earning management) (95.5%), followed by

Singapore (91.2%), Malaysia (87.7%), South Korea (81.7%), Hong Kong (75.2%), and Taiwan (70.2%). Meanwhile, Leuz et al. (2003) document that the earnings management score is highest in South Korea, followed by Taiwan, Singapore, Hong Kong, Indonesia, and Malaysia. Finally, our data show that the highest crash risk is found in Singapore, followed by Indonesia, Hong Kong, Malaysia, South Korea, and Taiwan.

Table 4 presents the descriptive statistics for the dependent, independent, and control variables. Negative values of negative skewness coefficient and down-to-up volatility (-0.092 and -0.065) indicate that the firm-specific abnormal weekly return distribution of East Asian firms is positively skewed. These values are lower than those of Srinidhi and Liao (2020), who use the United States sample (0.036 and 0.005). Variations in opaqueness levels among countries might affect these differences. Jin and Myers (2006) show that higher crash risk among countries is associated with poorer corporate governance systems, less developed financial systems, and higher stock price synchronicity (R-squares). *FAM33* and *FAM51* indicate that family shareholders control 35.9% and 18.6% of firms in six East Asian countries. Meanwhile, Srinidhi and Liao (2020) find that 9.52% of public firms in the United States are family firms. These results align with La Porta et al. (1999) families are the ultimate shareholders of firms in six East Asian countries, while the public controls most listed firms in the United States.

### 4.2. Multiple Regression Analyses

Table 5 presents the results of pooled OLS regression of the impact of family control on crash risk while controlling for other independent variables. The dependent variable is crash risk measured by NCSKEW in columns (1), (2), and (3); DUVOL in columns (4), (5), and (6); and FREQ in columns (7), (8), and (9). The primary independent variable is family control measured by *FAM33* in columns (1), (4), and (7); *FAM51* in columns (2), (5), and (8); and *FAMOWN* in columns (3), (6), and (9). The findings show a significant negative relationship between family control and crash risk at the 5% level in all columns except columns (7) and (8), verifying H1. These results also suggest that FREQ is a less prone crash risk proxy than NCSKEW and DUVOL. This

**Table 3**  
*Family Control and Crash Risk Sample Mean Comparison Across Six Countries*

	Hong Kong	Indonesia	Malaysia	Singapore	South Korea	Taiwan
NCSKEW	-0.075	-0.049	-0.079	0.031	-0.148	-0.148
DUVOL	-0.056	-0.028	-0.060	0.039	-0.096	-0.123
FREQ	1.202	1.184	1.081	1.049	1.074	1.108
FAM33	0.529	0.574	0.325	0.499	0.249	0.005
FAM51	0.326	0.366	0.133	0.259	0.059	0.001
FAMOWN	0.347	0.382	0.261	0.351	0.213	0.031
OPAQUE	0.738	0.885	0.911	0.893	0.775	0.872

Source: Computed using STATA 17

**Table 4**  
*Descriptive Statistics*

Variables	N	Mean	Median	Std. Dev.	Min	Max
NCSKEW	19,859	-0.092	-0.127	0.874	-2.309	3.165
DUVOL	19,855	-0.065	-0.082	0.567	-1.413	1.684
FREQ	19,859	1.118	1.000	0.814	0.000	5.000
FAM33	19,859	0.359	0.000	0.480	0.000	1.000
FAM51	19,859	0.186	0.000	0.389	0.000	1.000
FAMOWN	19,859	0.174	0.000	0.379	0.000	1.000
TURN	19,859	0.131	0.036	0.260	0.000	1.664
SIGMA	19,859	0.051	0.045	0.028	0.012	0.161
WRET	19,859	-0.164	-0.099	0.199	-1.213	-0.007
ID	19,859	-0.095	-0.096	0.120	-0.392	0.176
OPAQUE	19,859	0.816	0.638	0.659	0.057	3.671
SIZE	19,859	19.217	18.956	1.654	15.967	23.927
LEV	19,859	0.407	0.400	0.204	0.034	0.894
MTB	19,859	1.932	0.926	3.626	0.000	27.057
ROA	19,859	0.012	0.025	0.108	-0.522	0.262
FINSYS	19,859	0.827	1.000	0.379	0.000	1.000
DISCREQ	19,859	82.260	92.000	13.260	50.000	100.000
ADRIGHT	19,859	3.342	4.000	1.228	2.000	5.000
IEM	19,859	19.302	25.300	8.689	4.700	28.800
INF	19,859	0.019	0.015	0.014	-0.006	0.084
GDPCAP	19,859	10.060	10.291	0.777	8.076	11.020

Note: The NCSKEW, DUVOL, TURN, SIGMA, WRET, ID, OPAQUE, SIZE, LEV, MTB, and ROA data have been winsorized at the 1% level to reduce the effect of outliers.

Source: Computed using STATA 17.

finding confirms Srinidhi and Liao (2020), who show a lower crash risk among family firms in the U.S. In addition, we also find several significant relationships between crash risk and control variables, as described in prior studies. For instance, a positive relationship between crash risk and its lag value indicates the presence of conditional skewness (Harvey

& Siddique, 1999). Consistent with the "differences of opinion" model (H. Hong & Stein, 2003), we also find a positive association between trading volume and crash risk. In addition, a positive relationship between size and crash risk supports the argument that big companies have more incentive to hoard bad news due to more attention from outsiders (Chen et

**Table 5**  
Pooled OLS Regression Results of The Impact of Family Control on Crash Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NCSKEW <sub>T</sub>			DUVOL <sub>T</sub>			FREQ <sub>T</sub>		
<b>FAM33<sub>T-1</sub></b>	<b>-0.048***</b> (-3.48)			<b>-0.028***</b> (-3.10)			<b>-0.013</b> (-1.01)		
<b>FAM51<sub>T-1</sub></b>		<b>-0.049***</b> (-2.77)			<b>-0.027**</b> (-2.40)			<b>-0.003</b> (-0.21)	
<b>FAMOWN<sub>T-1</sub></b>			<b>-0.118***</b> (-3.84)			<b>-0.065***</b> (-3.26)			<b>-0.054**</b> (-1.94)
NCSKEW <sub>T-1</sub>	0.008 (0.98)	0.007 (0.95)	0.007 (0.96)						
DUVOL <sub>T-1</sub>				0.019** (2.54)	0.019** (2.54)	0.019** (2.53)			
FREQ <sub>T-1</sub>							0.025*** (3.45)	0.025*** (3.47)	0.024*** (3.43)
TURN <sub>T-1</sub>	0.107*** (3.66)	0.110*** (3.77)	0.105*** (3.61)	0.073*** (4.26)	0.075*** (4.37)	0.073*** (4.22)	0.105*** (4.56)	0.106*** (4.64)	0.103*** (4.50)
SIGMA <sub>T-1</sub>	-1.430* (-1.82)	-1.373* (-1.75)	-1.412* (-1.80)	-1.055** (-2.17)	-1.021** (-2.10)	-1.043** (-2.14)	-2.559*** (-3.94)	-2.541*** (-3.91)	-2.565*** (-3.95)
WRET <sub>T-1</sub>	-0.352*** (-3.35)	-0.349*** (-3.32)	-0.351*** (-3.34)	-0.252*** (-3.83)	-0.250*** (-3.80)	-0.251*** (-3.82)	-0.340*** (-4.00)	-0.339*** (-3.98)	-0.341*** (-4.00)
ID <sub>T-1</sub>	0.229*** (4.52)	0.228*** (4.52)	0.228*** (4.52)	0.153*** (4.73)	0.152*** (4.72)	0.152*** (4.72)	0.093** (2.01)	0.093** (2.01)	0.093** (2.01)
SIZE <sub>T-1</sub>	0.027*** (5.84)	0.027*** (5.91)	0.026*** (5.61)	0.016*** (5.30)	0.016*** (5.36)	0.015*** (5.11)	0.014*** (3.17)	0.014*** (3.21)	0.013*** (3.01)
LEV <sub>T-1</sub>	-0.043 (-1.20)	-0.042 (-1.18)	-0.041 (-1.14)	-0.034 (-1.48)	-0.033 (-1.47)	-0.033 (-1.43)	-0.056* (-1.86)	-0.056* (-1.86)	-0.055* (-1.81)
MTB <sub>T-1</sub>	0.014*** (6.94)	0.014*** (6.96)	0.014*** (6.88)	0.008*** (6.48)	0.008*** (6.50)	0.008*** (6.43)	0.007*** (4.37)	0.007*** (4.39)	0.007*** (4.32)
ROA <sub>T-1</sub>	-0.021 (-0.33)	-0.029 (-0.45)	-0.017 (-0.26)	-0.001 (-0.01)	-0.005 (-0.13)	0.001 (0.03)	0.060 (1.12)	0.056 (1.04)	0.066 (1.22)
FINSYS <sub>T-1</sub>	-0.232*** (-6.76)	-0.238*** (-6.95)	-0.227*** (-6.63)	-0.160*** (-6.94)	-0.164*** (-7.09)	-0.158*** (-6.84)	-0.030 (-0.96)	-0.032 (-1.00)	-0.027 (-0.86)
DISCREQ <sub>T-1</sub>	-0.016*** (-4.51)	-0.015*** (-4.28)	-0.017*** (-4.82)	-0.014*** (-6.02)	-0.013*** (-5.81)	-0.015*** (-6.19)	-0.008*** (-2.66)	-0.008*** (-2.45)	-0.010*** (-2.98)
ADRIGHT <sub>T-1</sub>	-0.313*** (-7.54)	-0.305*** (-7.34)	-0.325*** (-7.73)	-0.255*** (-8.98)	-0.250*** (-8.82)	-0.261*** (-9.07)	0.009 (0.25)	0.014 (0.38)	0.000 (-0.01)
IEM <sub>T-1</sub>	0.074*** (7.49)	0.072*** (7.26)	0.078*** (7.71)	0.060*** (8.97)	0.059*** (8.79)	0.062*** (9.06)	0.013 (1.49)	0.012 (1.31)	0.016 (1.81)
INF <sub>T-1</sub>	1.416*** (2.12)	1.426*** (2.11)	1.405*** (2.11)	0.924** (2.11)	0.931** (2.12)	0.919** (2.09)	1.589*** (2.62)	1.596*** (2.62)	1.578*** (2.59)
GDPCAP <sub>T-1</sub>	0.015 (1.26)	0.016 (1.26)	0.017 (1.35)	0.017** (2.06)	0.017** (2.05)	0.018** (2.12)	0.025** (2.07)	0.024** (2.01)	0.026** (2.17)
Constant	0.361 (1.51)	0.294 (1.24)	0.470* (1.93)	0.441*** (2.86)	0.399*** (2.61)	0.496*** (3.14)	1.070*** (5.13)	1.030*** (4.98)	1.155*** (5.37)
Adjusted R <sup>2</sup>	0.014	0.014	0.014	0.016	0.016	0.016	0.009	0.009	0.009
# of Firms	5,290	5,290	5,290	5,290	5,290	5,290	5,290	5,290	5,290
N	21,566	21,566	21,566	21,560	21,560	21,560	21,566	21,566	21,566

Note: The t-statistics in parentheses are based on robust standard error adjusted for clusters in firms, which are heteroskedastic and serial correlated consistent. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels (one-tailed), respectively.

Source: Computed using STATA 17.

al., 2001).

Table 6 presents the results of pooled OLS regression of the impact of family control on opacity while controlling for other independent variables. The dependent variable is financial report opacity (OPAQUE). The primary independent variable is family control, measured by FAM33 in columns (1), (4), and (7); FAM51 in columns (2), (5), and (8); and FAMOWN in columns (3), (6), and (9). The results show a negative relationship between family control and opacity at the 5% level in all columns except (2), (5), and (8). A significant impact of family control on both crash risk and opacity supports H2, showing a mediating role of opacity. Even though we fail to find a lower opacity among firms with more than 51% family ownership, the relationship becomes negatively significant when we employ the Fama–MacBeth regression in the robust-

**Table 6**  
Pooled OLS Regression Results of The Impact of Family Control on Opacity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OPAQUE <sub>it-1</sub>								
FAM33 <sub>it-1</sub>	-0.040*** (-2.53)			-0.040*** (-2.54)			-0.039*** (-2.52)		
FAM51 <sub>it-1</sub>		-0.017 (-0.81)			-0.017 (-0.82)			-0.016 (-0.79)	
FAMOWN <sub>it-1</sub>			-0.086*** (-2.36)			-0.086*** (-2.36)			-0.085*** (-2.34)
NCSKEW <sub>it-1</sub>	-0.011** (-2.23)	-0.011** (-2.21)	-0.011** (-2.24)						
DUVOL <sub>it-1</sub>				-0.018** (-2.46)	-0.018** (-2.44)	-0.018** (-2.47)			
FREQ <sub>it-1</sub>							-0.005 (-1.10)	-0.005 (-1.09)	-0.005 (-1.11)
TURN <sub>it-1</sub>	-0.110*** (-5.09)	-0.108*** (-5.00)	-0.110*** (-5.09)	-0.110*** (-5.08)	-0.108*** (-5.00)	-0.110*** (-5.09)	-0.107*** (-4.97)	-0.105*** (-4.88)	-0.107*** (-4.97)
SIGMA <sub>it-1</sub>	3.939*** (7.06)	3.963*** (7.10)	3.946*** (7.07)	3.921*** (7.02)	3.945*** (7.06)	3.928*** (7.04)	3.922*** (7.02)	3.946*** (7.07)	3.930*** (7.04)
WRET <sub>it-1</sub>	0.3237*** (4.56)	0.325*** (4.58)	0.324*** (4.57)	0.323*** (4.55)	0.324*** (4.57)	0.323*** (4.56)	0.329*** (4.64)	0.330*** (4.66)	0.329*** (4.64)
ID <sub>it-1</sub>	0.1146*** (3.30)	0.114*** (3.29)	0.114*** (3.30)	0.114*** (3.27)	0.113*** (3.26)	0.114*** (3.27)	0.118*** (3.40)	0.117*** (3.39)	0.118*** (3.40)
SIZE <sub>it-1</sub>	-0.050*** (-9.09)	-0.050*** (-9.06)	-0.051*** (-9.18)	-0.050*** (-9.10)	-0.050*** (-9.07)	-0.051*** (-9.20)	-0.050*** (-9.18)	-0.050*** (-9.15)	-0.051*** (-9.28)
LEV <sub>it-1</sub>	0.059 (1.44)	0.060 (1.45)	0.060 (1.47)	0.059 (1.43)	0.059 (1.44)	0.060 (1.46)	0.060 (1.46)	0.060 (1.47)	0.061 (1.49)
MTB <sub>it-1</sub>	0.003 (1.26)	0.003 (1.27)	0.003 (1.25)	0.003 (1.25)	0.003 (1.25)	0.003 (1.23)	0.003 (1.32)	0.003 (1.32)	0.003 (1.30)
ROA <sub>it-1</sub>	0.031 (0.58)	0.026 (0.47)	0.032 (0.58)	0.030 (0.55)	0.024 (0.44)	0.030 (0.55)	0.033 (0.61)	0.027 (0.51)	0.033 (0.62)
FINSYS <sub>it-1</sub>	-0.326*** (-8.20)	-0.329*** (-8.28)	-0.324*** (-8.12)	-0.326*** (-8.19)	-0.329*** (-8.27)	-0.324*** (-8.11)	-0.325*** (-8.16)	-0.328*** (-8.24)	-0.323*** (-8.08)
DISCREQ <sub>it-1</sub>	0.032*** (8.08)	0.034*** (8.54)	0.031*** (7.64)	0.032*** (8.04)	0.034*** (8.50)	0.031*** (7.60)	0.032*** (8.07)	0.034*** (8.54)	0.031*** (7.64)
ADRIGHT <sub>it-1</sub>	-0.122** (-2.43)	-0.108** (-2.16)	-0.129** (-2.54)	-0.124** (-2.46)	-0.109** (-2.19)	-0.130*** (-2.57)	-0.120** (-2.39)	-0.106** (-2.12)	-0.126** (-2.49)
IEM <sub>it-1</sub>	-0.021* (-1.78)	-0.026** (-2.18)	-0.019 (-1.59)	-0.021* (-1.75)	-0.025** (-2.14)	-0.019 (-1.55)	-0.022* (-1.81)	-0.026** (-2.20)	-0.020 (-1.61)
INF <sub>it-1</sub>	10.394*** (21.99)	10.400*** (22.00)	10.395*** (21.99)	10.385*** (21.99)	10.391*** (22.00)	10.385*** (21.99)	10.411*** (22.08)	10.416*** (22.09)	10.411*** (22.08)
GDPCAP <sub>it-1</sub>	-0.056*** (-3.75)	-0.057*** (-3.83)	-0.055*** (-3.70)	-0.056*** (-3.74)	-0.057*** (-3.82)	-0.055*** (-3.69)	-0.055*** (-3.72)	-0.057*** (-3.80)	-0.055*** (-3.67)
Constant	0.466* (1.86)	0.364 (1.47)	0.524** (2.03)	0.476 (1.90)	0.374 (1.51)	0.534** (2.07)	0.476 (1.90)	0.374 (1.51)	0.534** (2.07)
Adjusted R <sup>2</sup>	0.061	0.060	0.061	0.061	0.060	0.061	0.061	0.060	0.061
# of Firms	4,884	4,884	4,884	4,884	4,884	4,884	4,884	4,884	4,884
N	19,944	19,944	19,944	19,940	19,940	19,940	19,944	19,944	19,944

Note: The t-statistics in parentheses are based on robust standard error adjusted for clusters in firms, which are heteroskedastic and serial correlated consistent. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels (one-tailed), respectively.  
Source: Computed using STATA 17.

ness test. Therefore, we suggest this OLS regression result might be biased with unobserved individual firm heterogeneity. A negative relationship between opacity and family control is consistent with Wang (2006) and Hsu et al. (2017), who find a lower accounting opacity among family firms. Claessens et al. (2002) show that East Asian family firms exhibit the incentive effect when the ultimate shareholder

possesses positive cash flow over control rights.

Table 7 presents the results of pooled OLS regression of the impact of family control and opacity on crash risk while controlling for other independent variables. The dependent variable is crash risk measured by NCSKEW in columns (1), (2), and (3); DUVOL in columns (4), (5), and (6); and FREQ in columns (7), (8), and (9). The primary independent

**Table 7**  
Pooled OLS Regression Results of The Impact of Family Control and Opacity on Crash Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NCSKEW <sub>it</sub>			DUVOL <sub>it</sub>			FREQ <sub>it</sub>		
FAM33 <sub>it-1</sub>	-0.043*** (-3.03)			-0.025*** (-2.65)			-0.011 (-0.82)		
FAM51 <sub>it-1</sub>		-0.037** (-1.99)			-0.020* (-1.66)			0.001 (0.07)	
FAMOWN <sub>it-1</sub>			-0.098*** (-3.02)			-0.053* (-2.53)			-0.051** (-1.73)
OPAQUE <sub>it-1</sub>	0.010 (1.02)	0.011 (1.07)	0.010 (1.01)	0.007 (1.12)	0.008 (1.17)	0.007 (1.12)	0.000 (-0.03)	0.000 (-0.01)	-0.001 (-0.06)
NCSKEW <sub>it-1</sub>	0.010 (1.28)	0.010 (1.28)	0.010 (1.26)						
DUVOL <sub>it-1</sub>				0.024*** (2.97)	0.024*** (2.97)	0.023*** (2.95)			
FREQ <sub>it-1</sub>							0.029*** (3.86)	0.029*** (3.87)	0.029*** (3.83)
TURN <sub>it-1</sub>	0.151*** (4.69)	0.155*** (4.80)	0.151*** (4.66)	0.101*** (5.29)	0.103*** (5.41)	0.101*** (5.27)	0.127*** (4.94)	0.128*** (5.02)	0.125*** (4.88)
SIGMA <sub>it-1</sub>	-1.307 (-1.50)	-1.258 (-1.45)	-1.291 (-1.49)	-1.101** (-1.99)	-1.073* (-1.94)	-1.091** (-1.97)	-3.281*** (-4.67)	-3.263*** (-4.65)	-3.292*** (-4.69)
WRET <sub>it-1</sub>	-0.340*** (-2.86)	-0.337*** (-2.84)	-0.339*** (-2.85)	-0.258*** (-3.38)	-0.257*** (-3.36)	-0.258*** (-3.37)	-0.430*** (-4.56)	-0.429*** (-4.55)	-0.431*** (-4.57)
ID <sub>it-1</sub>	0.169*** (3.19)	0.169*** (3.19)	0.169*** (3.19)	0.125*** (3.68)	0.125*** (3.68)	0.125*** (3.68)	0.075 (1.55)	0.075 (1.55)	0.075 (1.56)
SIZE <sub>it-1</sub>	0.025*** (5.25)	0.025*** (5.32)	0.024*** (5.09)	0.014*** (4.49)	0.014*** (4.55)	0.014*** (4.36)	0.010** (2.29)	0.010** (2.32)	0.010** (2.16)
LEV <sub>it-1</sub>	-0.038 (-1.02)	-0.038 (-1.01)	-0.036 (-0.97)	-0.026 (-1.10)	-0.026 (-1.09)	-0.025 (-1.06)	-0.049 (-1.57)	-0.049 (-1.58)	-0.048 (-1.53)
MTB <sub>it-1</sub>	0.012*** (5.61)	0.012*** (5.63)	0.012*** (5.57)	0.007*** (5.13)	0.007*** (5.14)	0.007*** (5.09)	0.006*** (3.45)	0.006*** (3.46)	0.006*** (3.40)
ROA <sub>it-1</sub>	0.042 (0.62)	0.034 (0.50)	0.044 (0.65)	0.038 (0.90)	0.033 (0.78)	0.039 (0.91)	0.091 (1.57)	0.087 (1.50)	0.096 (1.65)
FINSYS <sub>it-1</sub>	-0.246*** (-6.92)	-0.252*** (-7.08)	-0.243*** (-6.83)	-0.168*** (-7.08)	-0.171*** (-7.20)	-0.166*** (-7.01)	-0.027 (-0.82)	-0.028 (-0.86)	-0.024 (-0.74)
DISCREQ <sub>it-1</sub>	-0.016*** (-4.54)	-0.015*** (-4.25)	-0.017*** (-4.70)	-0.014*** (-6.15)	-0.014*** (-5.90)	-0.015*** (-6.21)	-0.009*** (-2.72)	-0.008*** (-2.49)	-0.010*** (-3.02)
ADRIGHT <sub>it-1</sub>	-0.315*** (-7.43)	-0.306*** (-7.22)	-0.324*** (-7.52)	-0.255*** (-8.86)	-0.249*** (-8.70)	-0.259*** (-8.88)	0.012 (0.32)	0.017 (0.46)	0.002 (0.06)
IEM <sub>it-1</sub>	0.075*** (7.52)	0.073*** (7.26)	0.078*** (7.60)	0.061*** (9.05)	0.060*** (8.84)	0.063*** (9.03)	0.013 (1.45)	0.011 (1.25)	0.016 (1.76)
INF <sub>it-1</sub>	1.711** (2.45)	1.712** (2.46)	1.707** (2.45)	1.110** (2.42)	1.111** (2.43)	1.108** (2.42)	1.764*** (2.78)	1.767*** (2.78)	1.758*** (2.77)
GDPCAP <sub>it-1</sub>	0.020 (1.56)	0.019 (1.52)	0.021 (1.61)	0.021** (2.45)	0.021** (2.41)	0.021** (2.48)	0.032*** (2.60)	0.031** (2.53)	0.033*** (2.70)
Constant	0.333 (1.38)	0.257 (1.08)	0.409* (1.66)	0.443*** (2.83)	0.397*** (2.56)	0.481*** (3.00)	1.082*** (5.12)	1.040*** (4.96)	1.166*** (5.34)
Adjusted R <sup>2</sup>	0.013	0.013	0.013	0.016	0.015	0.016	0.009	0.009	0.009
# of Firms	4,847	4,847	4,847	4,847	4,847	4,847	4,847	4,847	4,847
N	19,687	19,687	19,687	19,681	19,681	19,681	19,687	19,687	19,687

Note: The t-statistics in parentheses are based on robust standard error adjusted for clusters in firms, which are heteroskedastic and serial correlated consistent.

\*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels (one-tailed), respectively.

Source: Computed using STATA 17.

variables are opacity (OPAQUE) and family control measured by FAM33 in columns (1), (4), and (7); FAM51 in columns (2), (5), and (8); and FAMOWN in columns (3), (6), and (9). Family control coefficients are at the 5% level in all columns except columns (7) and (8), negating the full mediation

role of opacity on the relationship between family control and crash risk. On the other hand, a lower magnitude of family control coefficients than those in Table 6 indicates that opacity plays a partial mediation role instead. Finally, we fail to find a direct association between opacity and crash risk; thereby,

**Table 8**  
Fama-MacBeth Regression Results of The Impact of Family Control on Crash Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NCSKEW <sub>T</sub>			DUVOL <sub>T</sub>			FREQ <sub>T</sub>		
FAM33 <sub>T-1</sub>	-0.049*** (-7.34)			-0.029*** (-4.77)			-0.013** (-1.86)		
FAM51 <sub>T-1</sub>		-0.050** (-6.26)			-0.029*** (-5.03)			-0.006 (-0.39)	
FAMOWN <sub>T-1</sub>			-0.123*** (-6.30)			-0.068*** (-4.24)			-0.058*** (-2.93)
NCSKEW <sub>T-1</sub>	0.025** (2.26)	0.025** (2.27)	0.025** (2.23)						
DUVOL <sub>T-1</sub>				0.035** (2.24)	0.035** (2.25)	0.035** (2.23)			
FREQ <sub>T-1</sub>							0.031*** (3.47)	0.031*** (3.50)	0.031*** (3.44)
TURN <sub>T-1</sub>	0.094 (1.55)	0.098 (1.60)	0.093 (1.52)	0.062 (1.42)	0.064 (1.47)	0.062 (1.40)	0.112*** (3.38)	0.113*** (3.43)	0.110*** (3.31)
SIGMA <sub>T-1</sub>	-0.796 (-1.02)	-0.740 (-0.96)	-0.782 (-1.01)	-0.564 (-0.86)	-0.530 (-0.81)	-0.556 (-0.84)	-2.491*** (-2.58)	-2.482** (-2.55)	-2.501*** (-2.60)
WRET <sub>T-1</sub>	-0.316*** (-3.97)	-0.314*** (-4.01)	-0.316*** (-3.97)	-0.219*** (-2.95)	-0.218*** (-2.98)	-0.219*** (-2.96)	-0.353*** (-3.90)	-0.353*** (-3.89)	-0.353*** (-3.96)
ID <sub>T-1</sub>	0.232** (2.39)	0.232** (2.40)	0.231** (2.39)	0.162*** (3.09)	0.162*** (3.10)	0.161*** (3.09)	0.097 (1.57)	0.098 (1.57)	0.097 (1.59)
SIZE <sub>T-1</sub>	0.031*** (2.93)	0.032*** (2.97)	0.030*** (2.80)	0.019*** (2.70)	0.019*** (2.72)	0.019** (2.57)	0.016** (2.34)	0.016** (2.36)	0.015** (2.31)
LEV <sub>T-1</sub>	-0.064*** (-2.80)	-0.063*** (-2.79)	-0.061*** (-2.67)	-0.049*** (-2.67)	-0.049*** (-2.66)	-0.047** (-2.53)	-0.069 (-1.42)	-0.069 (-1.43)	-0.068 (-1.40)
MTB <sub>T-1</sub>	0.012** (2.27)	0.013** (2.28)	0.012** (2.26)	0.007 (1.87)	0.007 (1.88)	0.007 (1.86)	0.006*** (2.58)	0.006*** (2.58)	0.006** (2.54)
ROA <sub>T-1</sub>	-0.028 (-0.19)	-0.036 (-0.25)	-0.023 (-0.16)	-0.008 (-0.09)	-0.013 (-0.14)	-0.006 (-0.06)	0.064 (0.89)	0.059 (0.81)	0.070 (0.95)
FINSYS <sub>T-1</sub>	-0.170** (-2.54)	-0.177*** (-2.67)	-0.166** (-2.44)	-0.121** (-2.15)	-0.124** (-2.25)	-0.118** (-2.08)	0.019 (0.35)	0.017 (0.32)	0.022 (0.41)
DISCREQ <sub>T-1</sub>	-0.016 (-1.51)	-0.015 (-1.44)	-0.018* (-1.67)	-0.015* (-1.85)	-0.014* (-1.75)	-0.016* (-1.95)	-0.011 (-1.28)	-0.011 (-1.19)	-0.013 (-1.46)
ADRIGHT <sub>T-1</sub>	-0.285*** (-5.26)	-0.277*** (-4.99)	-0.299*** (-5.69)	-0.246*** (-5.46)	-0.241*** (-5.12)	-0.253*** (-5.79)	0.019 (0.31)	0.023 (0.38)	0.008 (0.13)
IEM <sub>T-1</sub>	0.071*** (3.56)	0.068*** (3.43)	0.075*** (3.81)	0.060*** (3.85)	0.059*** (3.64)	0.062*** (3.99)	0.016 (0.89)	0.014 (0.78)	0.019 (1.09)
GDPCAP <sub>T-1</sub>	-0.010 (-0.26)	-0.010 (-0.26)	-0.009 (-0.23)	0.000 (-0.01)	0.000 (-0.02)	0.000 (0.01)	0.007 (0.23)	0.006 (0.20)	0.008 (0.28)
Constant	0.496 (0.87)	0.429 (0.75)	0.617 (1.06)	0.574 (1.38)	0.532 (1.26)	0.636 (1.50)	1.352*** (3.56)	1.315*** (3.41)	1.442*** (3.93)
Adjusted R <sup>2</sup>	0.033	0.032	0.033	0.040	0.040	0.040	0.016	0.016	0.016
# of Firms	5,290	5,290	5,290	5,290	5,290	5,290	5,290	5,290	5,290
N	21,566	21,566	21,566	21,560	21,560	21,560	21,566	21,566	21,566

Note: The t-statistics in parentheses are based on robust standard error adjusted for clusters in firms, which are heteroskedastic and serial correlated consistent. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels (one-tailed), respectively.

Source: Computed using STATA 17.



this result is consistent with Andreou et al. (2016, 2022) while negating Hutton et al.'s (2009) finding.

#### 4.3. Robustness Tests

This study employs Fama and MacBeth's (1973) regression to address the time-invariant property of

family control and unobserved individual heterogeneity as a robustness check. The Fama–MacBeth regression deals with panel data by employing the ordinary least square in two steps. First, the cross-section observations for each year (or any period frequency) are regressed to obtain the yearly slopes.

**Table 9**  
Fama-MacBeth Regression Results of The Impact of Family Control on Opacity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OPAQUE <sub>it-1</sub>								
FAM33 <sub>it-1</sub>	<b>-0.036<sup>***</sup></b> (-5.26)			<b>-0.037<sup>***</sup></b> (-5.36)			<b>-0.037<sup>***</sup></b> (-5.29)		
FAM51 <sub>it-1</sub>		<b>-0.023<sup>***</sup></b> (-2.47)			<b>-0.023<sup>***</sup></b> (-2.56)			<b>-0.023<sup>***</sup></b> (-2.49)	
FAMOWN <sub>it-1</sub>			<b>-0.094<sup>***</sup></b> (-6.34)			<b>-0.094<sup>***</sup></b> (-6.57)			<b>-0.094<sup>***</sup></b> (-6.38)
NCSKEW <sub>it-1</sub>	-0.001 (-0.22)	-0.001 (-0.18)	-0.001 (-0.27)						
DUVOL <sub>it-1</sub>				-0.001 (-0.08)	-0.001 (-0.05)	-0.001 (-0.11)			
FREQ <sub>it-1</sub>							-0.003 (-0.54)	-0.003 (-0.52)	-0.003 (-0.60)
TURN <sub>it-1</sub>	-0.069 <sup>***</sup> (-2.90)	-0.065 <sup>***</sup> (-2.68)	-0.070 <sup>***</sup> (-2.97)	-0.068 <sup>***</sup> (-2.88)	-0.065 <sup>***</sup> (-2.66)	-0.069 <sup>***</sup> (-2.95)	-0.069 <sup>***</sup> (-2.99)	-0.066 <sup>***</sup> (-2.76)	-0.071 <sup>***</sup> (-3.05)
SIGMA <sub>it-1</sub>	3.277 <sup>***</sup> (4.81)	3.325 <sup>***</sup> (4.89)	3.284 <sup>***</sup> (4.86)	3.284 <sup>***</sup> (4.74)	3.332 <sup>***</sup> (4.81)	3.290 <sup>***</sup> (4.78)	3.274 <sup>***</sup> (4.71)	3.322 <sup>***</sup> (4.78)	3.279 <sup>***</sup> (4.75)
WRET <sub>it-1</sub>	0.130 (1.59)	0.132 (1.62)	0.129 (1.59)	0.130 (1.53)	0.133 (1.56)	0.130 (1.54)	0.129 (1.55)	0.131 (1.58)	0.128 (1.56)
ID <sub>it-1</sub>	-0.106 <sup>***</sup> (-2.57)	-0.106 <sup>***</sup> (-2.62)	-0.106 <sup>***</sup> (-2.62)	-0.107 <sup>***</sup> (-2.61)	-0.108 <sup>***</sup> (-2.65)	-0.108 <sup>***</sup> (-2.66)	-0.106 <sup>***</sup> (-2.62)	-0.107 <sup>***</sup> (-2.66)	-0.107 <sup>***</sup> (-2.67)
SIZE <sub>it-1</sub>	-0.041 <sup>*</sup> (-1.81)	-0.040 <sup>*</sup> (-1.80)	-0.041 <sup>*</sup> (-1.83)	-0.040 <sup>*</sup> (-1.80)	-0.040 <sup>*</sup> (-1.79)	-0.041 <sup>*</sup> (-1.83)	-0.040 <sup>*</sup> (-1.81)	-0.040 <sup>*</sup> (-1.80)	-0.041 <sup>*</sup> (-1.84)
LEV <sub>it-1</sub>	-0.018 (-0.26)	-0.018 (-0.26)	-0.016 (-0.23)	-0.019 (-0.28)	-0.019 (-0.28)	-0.017 (-0.25)	-0.017 (-0.25)	-0.017 (-0.25)	-0.015 (-0.22)
MTB <sub>it-1</sub>	0.009 <sup>***</sup> (2.79)	0.009 <sup>***</sup> (2.81)	0.009 <sup>***</sup> (2.78)	0.009 <sup>***</sup> (2.80)	0.009 <sup>***</sup> (2.82)	0.009 <sup>***</sup> (2.78)	0.009 <sup>***</sup> (2.81)	0.009 <sup>***</sup> (2.82)	0.009 <sup>***</sup> (2.79)
ROA <sub>it-1</sub>	-0.075 (-1.21)	-0.084 (-1.36)	-0.072 (-1.16)	-0.075 (-1.20)	-0.084 (-1.35)	-0.072 (-1.16)	-0.075 (-1.21)	-0.084 (-1.36)	-0.072 (-1.16)
FINSYS <sub>it-1</sub>	-0.082 (-1.12)	-0.086 (-1.19)	-0.078 (-1.06)	-0.081 (-1.11)	-0.085 (-1.18)	-0.077 (-1.05)	-0.081 (-1.12)	-0.085 (-1.18)	-0.077 (-1.05)
DISCREQ <sub>it-1</sub>	-0.016 <sup>***</sup> (-2.94)	-0.015 <sup>***</sup> (-2.76)	-0.017 <sup>***</sup> (-3.12)	-0.016 <sup>***</sup> (-2.97)	-0.015 <sup>***</sup> (-2.78)	-0.017 <sup>***</sup> (-3.15)	-0.016 <sup>***</sup> (-2.88)	-0.015 <sup>***</sup> (-2.70)	-0.017 <sup>***</sup> (-3.07)
ADRIGHT <sub>it-1</sub>	-0.290 <sup>***</sup> (-3.85)	-0.279 <sup>***</sup> (-3.73)	-0.301 <sup>***</sup> (-3.98)	-0.290 <sup>***</sup> (-3.85)	-0.280 <sup>***</sup> (-3.73)	-0.301 <sup>***</sup> (-3.99)	-0.288 <sup>***</sup> (-3.82)	-0.278 <sup>***</sup> (-3.70)	-0.299 <sup>***</sup> (-3.95)
IEM <sub>it-1</sub>	0.065 <sup>***</sup> (4.01)	0.061 <sup>***</sup> (3.86)	0.068 <sup>***</sup> (4.19)	0.065 <sup>***</sup> (4.03)	0.061 <sup>***</sup> (3.88)	0.068 <sup>***</sup> (4.21)	0.064 <sup>***</sup> (3.95)	0.061 <sup>***</sup> (3.80)	0.068 <sup>***</sup> (4.13)
GDPCAP <sub>it-1</sub>	-0.029 (-0.73)	-0.031 (-0.76)	-0.028 (-0.70)	-0.029 (-0.73)	-0.031 (-0.76)	-0.028 (-0.70)	-0.030 (-0.74)	-0.031 (-0.77)	-0.029 (-0.71)
Constant	2.855 <sup>***</sup> (5.86)	2.773 <sup>***</sup> (5.74)	2.949 <sup>***</sup> (6.05)	2.854 <sup>***</sup> (5.88)	2.772 <sup>***</sup> (5.76)	2.947 <sup>***</sup> (6.07)	2.847 <sup>***</sup> (5.79)	2.765 <sup>***</sup> (5.66)	2.941 <sup>***</sup> (5.98)
Adjusted R <sup>2</sup>	0.086	0.086	0.087	0.087	0.086	0.087	0.087	0.086	0.087
# of Firms	4,884	4,884	4,884	4,884	4,884	4,884	4,884	4,884	4,884
N	19,944	19,944	19,944	19,940	19,940	19,940	19,944	19,944	19,944

Note: The t-statistics in parentheses are based on robust standard error adjusted for clusters in firms, which are heteroskedastic and serial correlated consistent.

\*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels (one-tailed), respectively.

Source: Computed using STATA 17.

Second, the t-statistic for hypothesis testing is obtained by dividing the time-series average of the yearly slope by its time-series standard error.

Table 8 presents the Fama-MacBeth regression results of the impact of family control on crash risk while controlling for other independent variables. Consistent with the main analysis, the negative influence of family control on crash risk is significant at the 5% level, except in column (8). Table 9 presents the Fama-MacBeth regression

results of the impact of family control on opacity while controlling for other independent variables. Also consistent with the OLS regression, we find a negative effect of family control on opacity that is significant at the 5% level in all columns. Table 10 presents the Fama-MacBeth regression results of the impact of family control and opacity on crash risk. Significant and lower magnitude family control coefficients than those in Table 8 consistently show the partial mediation role of opacity on the

**Table 10**  
Fama-MacBeth Regression Results of The Impact of Family Control and Opacity on Crash Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NCSKEW <sub>T</sub>			DUVOL <sub>T</sub>			FREQ <sub>T</sub>		
FAM33 <sub>T-1</sub>	-0.043*** (-8.68)			-0.024*** (-4.75)			-0.011* (-1.30)		
FAM51 <sub>T-1</sub>		-0.037*** (-3.61)			-0.020*** (-3.40)			-0.002 (-0.09)	
FAMOWN <sub>T-1</sub>			-0.099*** (-7.26)			-0.054*** (-4.39)			-0.054** (-2.30)
OPAQUE <sub>T-1</sub>	0.026*** (3.04)	0.027*** (3.09)	0.025*** (3.02)	0.021*** (6.55)	0.021*** (6.61)	0.021*** (6.72)	0.005 (0.53)	0.006 (0.55)	0.005 (0.50)
NCSKEW <sub>T-1</sub>	0.028*** (2.62)	0.028*** (2.65)	0.028*** (2.60)						
DUVOL <sub>T-1</sub>				0.040*** (2.63)	0.040*** (2.64)	0.040*** (2.62)			
FREQ <sub>T-1</sub>							0.033*** (3.66)	0.033*** (3.71)	0.033 *** (3.63)
TURN <sub>T-1</sub>	0.131* (1.88)	0.134* (1.93)	0.130* (1.86)	0.086 (1.61)	0.088 (1.64)	0.085 (1.59)	0.131*** (3.66)	0.132*** (3.74)	0.129*** (3.60)
SIGMA <sub>T-1</sub>	-0.734 (-1.03)	-0.684 (-0.97)	-0.722 (-1.03)	-0.677 (-1.08)	-0.651 (-1.04)	-0.672 (-1.07)	-3.144*** (-3.40)	-3.132*** (-3.35)	-3.162*** (-3.45)
WRET <sub>T-1</sub>	-0.308*** (-4.70)	-0.306*** (-4.73)	-0.309*** (-4.72)	-0.231*** (-3.06)	-0.231*** (-3.07)	-0.232*** (-3.06)	-0.430*** (-4.96)	-0.430*** (-4.91)	-0.431*** (-5.05)
ID <sub>T-1</sub>	0.173** (1.97)	0.173** (1.97)	0.172** (1.96)	0.135*** (2.95)	0.135*** (2.95)	0.134*** (2.94)	0.079 (1.34)	0.080 (1.35)	0.080 (1.35)
SIZE <sub>T-1</sub>	0.031*** (3.25)	0.031*** (3.30)	0.030*** (3.17)	0.018*** (2.64)	0.018*** (2.66)	0.017** (2.56)	0.012 (1.46)	0.012 (1.48)	0.011 (1.42)
LEV <sub>T-1</sub>	-0.056** (-2.48)	-0.056** (-2.50)	-0.054** (-2.39)	-0.040** (-2.22)	-0.040** (-2.23)	-0.039** (-2.13)	-0.062 (-1.29)	-0.063 (-1.32)	-0.061 (-1.29)
MTB <sub>T-1</sub>	0.011** (2.07)	0.011** (2.08)	0.010** (2.06)	0.006* (1.67)	0.006* (1.68)	0.006* (1.67)	0.005** (1.96)	0.005* (1.95)	0.005* (1.92)
ROA <sub>T-1</sub>	0.030 (0.22)	0.021 (0.16)	0.032 (0.24)	0.026 (0.31)	0.021 (0.25)	0.028 (0.32)	0.091 (1.45)	0.086 (1.40)	0.095 (1.51)
FINSYS <sub>T-1</sub>	-0.180*** (-2.89)	-0.185*** (-3.00)	-0.176*** (-2.81)	-0.125** (-2.32)	-0.128** (-2.39)	-0.123** (-2.26)	0.026 (0.44)	0.025 (0.41)	0.029 (0.49)
DISCREQ <sub>T-1</sub>	-0.017 (-1.61)	-0.016 (-1.49)	-0.018* (-1.74)	-0.015* (-1.99)	-0.015* (-1.84)	-0.016* (-2.08)	-0.012 (-1.30)	-0.012 (-1.19)	-0.014 (-1.48)
ADRIGHT <sub>T-1</sub>	-0.279*** (-4.91)	-0.270*** (-4.61)	-0.288*** (-5.18)	-0.240*** (-5.53)	-0.235*** (-5.13)	-0.245*** (-5.79)	0.022 (0.35)	0.027 (0.41)	0.012 (0.18)
IEM <sub>T-1</sub>	0.071*** (3.80)	0.068*** (3.60)	0.074*** (4.03)	0.060*** (4.21)	0.059*** (3.9)	0.062*** (4.35)	0.016 (0.87)	0.014 (0.74)	0.020 (1.05)
GDPCAP <sub>T-1</sub>	-0.007 (-0.19)	-0.008 (-0.20)	-0.007 (-0.17)	0.003 (0.12)	0.003 (0.11)	0.003 (0.13)	0.015 (0.47)	0.014 (0.44)	0.017 (0.51)
Constant	0.470 (0.88)	0.395 (0.74)	0.554 (1.05)	0.571 (1.47)	0.527 (1.31)	0.614 (1.58)	1.395*** (3.37)	1.356*** (3.20)	1.483*** (3.70)
Adjusted R <sup>2</sup>	0.032	0.031	0.032	0.040	0.040	0.040	0.016	0.016	0.016
# of Firms	4,847	4,847	4,847	4,847	4,847	4,847	4,847	4,847	4,847
N	19,687	19,687	19,687	19,681	19,681	19,681	19,687	19,687	19,687

Note: The t-statistics in parentheses are based on robust standard error adjusted for clusters in firms, which are heteroskedastic and serial correlated consistent.

\*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels (one-tailed), respectively.

Source: Computed using STATA 17.

relationship between family control and crash risk. Finally, Fama-MacBeth regression analyses show that our hypotheses are robust after addressing the time-invariant limitation of family control measures and unobserved individual firm effect, which might bias the previous OLS regression analyses.

## 5. Conclusions

Crash risk, the likelihood of a firm-specific stock price crash, has caught the attention of stock market practitioners and academicians. A frequent firm-specific stock price crash might erode investors' confidence in stock investing (Merton, 1987), causing difficulties for managers in finding equity financing. Therefore, scholars explore various observable determinants that might predict stock price crashes, contributing to the literature strand of crash risk (Habib et al., 2018). The theory suggests that a stock price crash results from bad news hoarding driven by managers' motives to secure their jobs (Jin & Myers, 2006) and maintain stock-based price compensation (Benmelech et al., 2010). Therefore, crash risk reflects Type I agency problems when managers opportunistically conceal bad news, making the stock price overvalued (Jensen, 2004, 2005). However, in East Asian countries, where investor protection is relatively weaker (La Porta et al., 1999) and ownership structure is more concentrated on a single shareholder, particularly family (Claessens et al., 2000), the crash risk might indicate Type II agency problems (Claessens et al., 2002).

This study examines family control's direct and indirect effects on crash risk in East Asian firms. As the main contribution, we investigate whether opacity can mediate the relationship between family control and crash risk. First, our results suggest that family control has a direct negative impact on crash risk and opacity. Therefore, it is consistent with the incentive hypothesis that family control mitigates bad news hoarding practices indicated by lower opacity and, consequently, lower crash risk; thus, we may argue that East Asian family firms commonly exhibit fewer agency problems. These findings are consistent with Srinidhi and Liao (2020), Wang (2006), and Hsu et al. (2017), who find a lower crash risk and accounting opacity among family companies. Second, we find that opacity partly mediates the relationship between family control and opacity. This result then complements Andreou et al.

(2016, 2022), who questioned the efficacy of financial report opacity as the agency channel of crash risk. To this extent, this study suggests that, though opacity is limited as a direct channel, it still contributes as a mediating channel that conveys crash risk.

This study also has limitations, leaving room for further research. First, this research limits its sample to firms operating in non-financial industries; thus, the next researcher could examine a similar topic specifically among public financial companies. Second, we limit control variables to corporate and country characteristics to address fixed effects among firms and across countries. Nevertheless, we realize that there are various crash risk determinants from corporate governance aspects at the firm level (Andreou et al., 2016) and differences in corporate governance systems and institutional contexts across countries (L. Jin & Myers, 2006; Leuz et al., 2003). Therefore, we suggest a further cross-countries study to conduct sensitivity analyses involving corporate governance aspects (such as board structure and processes), corporate governance systems, and institutional contexts that might moderate the effect of family ownership on crash risk. Third, the dependent variable of family control possesses a time-invariant property. With an assumption that there will not be many changes in the firm's ownership, this research sample utilizes recent data on firm ownership limited to the first layer only in classifying family firms. Then, it applies them uniformly to each firm-year observation. Fourth, we limit the family owner definition to an individual or a nonpublic corporation other than a government, a government-owned corporation, a public financial institution, or a public corporation (Claessens et al., 2000; La Porta et al., 1999). To this extent, we encourage further research that identifies family firms according to the control rights of family shareholders, as in Claessens et al. (2000, 2002). We also suggest a further study to examine the ownership-control wedge's impact on crash risk, as in H. A. Hong et al. (2017), among family and non-family firms.

This study might provide practical insights to investors and managers. Individual investors might consider investing in family-controlled public companies due to the advantages of lower accrual earnings management and lower stock price crash risk; thus, family ownership can substitute the corporate governance monitoring function. Although it is still unclear

whether financial report opacity is inherent in crash risk (Andreou et al., 2022; Zachro & Utama, 2021), this study shows that opacity partly mediates the crash risk-mitigating effect of family control. Meanwhile, this study suggests that family firms' managers to be aware of family shareholders' priorities in long-term investment orientation (James, 1999) and conserving the family's reputation (Cheng, 2014); thus, they are better off disclosing bad news immediately rather than hoarding it.

## References

- Achleitner, A. K., Günther, N., Kaserer, C., & Siciliano, G. (2014). Real earnings management and accrual-based earnings management in family firms. *European Accounting Review*, 23(3), 431–461. <https://doi.org/10.1080/09638180.2014.895620>
- Al-Maliki, H. S. N., Salehi, M., & Kardan, B. (2023). The effect of COVID 19 on risk-taking of small and medium-sized, family and non-family firms. *Journal of Facilities Management*, 21(2), 298–309. <https://doi.org/10.1108/JFM-09-2021-0105>
- Al Mamun, M., Balachandran, B., & Duong, H. N. (2020). Powerful CEOs and stock price crash risk. *Journal of Corporate Finance*, 62(1), 101582. <https://doi.org/10.1016/j.jcorpfin.2020.101582>
- Aldhamari, R., Nor, M. N. M., Al Farooque, O., & Al-sabri, H. M. (2023). Risk committee and stock price crash risk in the Malaysian financial sector: the moderating role of institutional ownership. *Journal of Accounting in Emerging Economies*, 13(3), 509–540. <https://doi.org/10.1108/JAEE-09-2021-0298>
- Ali, A., Chen, T. Y., & Radhakrishnan, S. (2007). Corporate disclosures by family firms. *Journal of Accounting and Economics*, 44(1–2), 238–286. <https://doi.org/10.1016/j.jacceco.2007.01.006>
- Anderson, R. C., Duru, A., & Reeb, D. M. (2009). Founders, heirs, and corporate opacity in the United States. *Journal of Financial Economics*, 92(2), 205–222. <https://doi.org/10.1016/j.jfineco.2008.04.006>
- Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership and firm performance: Evidence from the S&P 500. *Journal of Finance*, 58(3), 1301–1328. <https://doi.org/10.1111/1540-6261.00567>
- Anderson, R. C., & Reeb, D. M. (2004). Board composition: Balancing family influence in S&P 500 firms. *Administrative Science Quarterly*, 49(2), 209–237. <https://doi.org/10.2307/4131472>
- 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. <https://doi.org/10.1111/eufm.12084>
- Andreou, P. C., Lambertides, N., & Magidou, M. (2022). A critique of the agency theory viewpoint of stock price crash risk: The opacity and overinvestment channels. *British Journal of Management*, 0(1), 1–28. <https://doi.org/10.1111/1467-8551.12693>
- Avabruth, S. M., Nathan, S., & Saravanan, P. (2024). Share pledging by controlling shareholders and accounting conservatism: evidence from India. *Meditari Accountancy Research*. <https://doi.org/10.1108/MEDAR-03-2022-1635>
- Barontini, R., & Caprio, L. (2006). The effect of family control on firm value and performance: Evidence from continental Europe. *European Financial Management*, 12(5), 689–723. <https://doi.org/10.1111/j.1468-036X.2006.00273.x>
- Barth, E., Gulbrandsen, T., & Schoø, P. (2005). Family ownership and productivity: The role of owner-management. *Journal of Corporate Finance*, 11(1–2), 107–127. <https://doi.org/10.1016/j.jcorpfin.2004.02.001>
- Benmelech, E., Kandel, E., & Veronesi, P. (2010). Stock-based compensation and CEO (dis)incentives. *Quarterly Journal of Economics*, 125(4), 1769–1820. <https://doi.org/10.1162/qjec.2010.125.4.1769>
- Blanchard, O. J., & Watson, M. W. (1982). Bubbles, rational expectations, and financial markets. In P. Wachtel (Ed.), *Crises in Economic and Financial Structure* (pp. 295–316). D.C. Heathand Company. <https://doi.org/10.3386/w0945>
- Campbell, J. Y., & Hentschel, L. (1992). No news is good news: An asymmetric model of changing volatility in stock returns. *Journal of Financial Economics*, 31(3), 281–318. [https://doi.org/10.1016/0304-405X\(92\)90037-X](https://doi.org/10.1016/0304-405X(92)90037-X)
- Cao, H. H., Coval, J. D., & Hirshleifer, D. (2002). Side-lined investors, trading-generated news, and security returns. *Review of Financial Studies*, 15(2), 615–648. <https://doi.org/10.1093/rfs/15.2.615>
- Chang, X., Chen, Y., & Zolotoy, L. (2017). Stock liquidity and stock price crash risk. *Journal of Financial and Quantitative Analysis*, 52(4), 1605–1637. <https://doi.org/10.1017/S0022109017000473>

- Chen, J., Hong, H., & Stein, J. C. (2001). Forecasting crashes: Trading volume, past returns, and conditional skewness in stock prices. *Journal of Financial Economics*, 61(3), 345–381. [https://doi.org/10.1016/S0304-405X\(01\)00066-6](https://doi.org/10.1016/S0304-405X(01)00066-6)
- Chen, S., Ma, H., Wu, Q., & Zhang, H. (2024). Common institutional ownership and stock price crash risk. *Contemporary Accounting Research*, 41(1), 679–711. <https://doi.org/10.1111/1911-3846.12915>
- Chen, S., Ye, Y., & Jebran, K. (2022). Tax enforcement efforts and stock price crash risk: Evidence from China. *Journal of International Financial Management and Accounting*, 33(2), 193–218. <https://doi.org/10.1111/jifm.12145>
- Chen, W., Hribar, P., & Melessa, S. (2018). Incorrect inferences when using residuals as dependent variables. *Journal of Accounting Research*, 56(3), 751–796. <https://doi.org/10.1111/1475-679X.12195>
- Cheng, Q. (2014). Family firm research - A review. *China Journal of Accounting Research*, 7(3), 149–163. <https://doi.org/10.1016/j.cjar.2014.03.002>
- Christie, A. A. (1982). The stochastic behavior of common stock variances. Value, leverage and interest rate effects. *Journal of Financial Economics*, 10(4), 407–432. [https://doi.org/10.1016/0304-405X\(82\)90018-6](https://doi.org/10.1016/0304-405X(82)90018-6)
- Claessens, S., Djankov, S., Fan, J. P. H., & Lang, L. H. P. (2002). Disentangling the incentive and entrenchment effects of large shareholdings. *Journal of Finance*, 57(6), 2741–2771. <https://doi.org/10.1111/1540-6261.00511>
- Claessens, S., Djankov, S., & Xu, L. C. (2000). The separation of ownership and control in East Asian Corporations. *Journal of Financial Economics*, 58(1), 81–112. [https://doi.org/10.1016/S0304-405X\(00\)00067-2](https://doi.org/10.1016/S0304-405X(00)00067-2)
- Da, Z., Gurun, U. G., & Warachka, M. (2014). Frog in the pan: Continuous information and momentum. *Review of Financial Studies*, 27(7), 2171–2218. <https://doi.org/10.2469/dig.v45.n3.17>
- Davis, J. H., Schoorman, F. D., & Donaldson, L. (1997). Toward a stewardship theory of management. *Academy of Management Review*, 22(1), 20–47. <https://doi.org/10.2307/259223>
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *The Accounting Review*, 70(2), 193–225. <http://www.jstor.org/stable/248303>
- Dimson, E. (1979). Risk measurement when shares are subject to infrequent trading. *Journal of Financial Economics*, 7(2), 197–226. [https://doi.org/10.1016/0304-405X\(79\)90013-8](https://doi.org/10.1016/0304-405X(79)90013-8)
- Donaldson, L., & Davis, J. H. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management*, 16(1), 49–64. <https://doi.org/10.1177/031289629101600103>
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *Journal of Law and Economics*, 26(2), 301–325. <https://doi.org/10.1086/467037>
- Fama, E. F., & MacBeth, J. D. (1973). Risk, return and equilibrium: Empirical tests. *Journal of Political Economy*, 81(3), 607–636. <https://www.jstor.org/stable/1831028>
- French, K. R. (1988). Crash-testing the efficient market hypothesis. *NBER Macroeconomics Annual*, 3(1), 277–285. <https://doi.org/10.1086/654090>
- French, K. R., Schwert, G. W., & Stambaugh, R. F. (1987). Expected stock returns and volatility. *Journal of Financial Economics*, 19(1), 3–29. [https://doi.org/10.1016/0304-405X\(87\)90026-2](https://doi.org/10.1016/0304-405X(87)90026-2)
- Habib, A., Hasan, M. M., & Jiang, H. (2018). Stock price crash risk: review of the empirical literature. *Accounting and Finance*, 58(1), 211–251. <https://doi.org/10.1111/acfi.12278>
- Harvey, C. R., & Siddique, A. (1999). Autoregressive conditional skewness. *Journal of Financial and Quantitative Analysis*, 34(4), 465–487. <https://doi.org/10.2307/2676230>
- Hong, H. A., Kim, J. B., & Welker, M. (2017). Divergence of cash flow and voting rights, Opacity, and stock price crash risk: International evidence. *Journal of Accounting Research*, 55(5), 1167–1212. <https://doi.org/10.1111/1475-679X.12185>
- Hong, H., & Stein, J. C. (2003). Differences of opinion, short-sales constraints, and market crashes. *Review of Financial Studies*, 16(2), 487–525. <https://doi.org/10.1093/rfs/hhg006>
- Hou, C., & Liu, H. (2023). Institutional cross-ownership and stock price crash risk. *Research in International Business and Finance*, 65(1), 101906. <https://doi.org/10.1016/j.ribaf.2023.101906>
- Hsu, W., Lee, Y., Nagarajan, N. J., & Srinidhi, B. (2017). Founder control, opacity and value creation in family firms. In *SSRN Electronic Journal*. <https://ssrn.com/abstract=2801713>
- Hu, G., Liu, Y., Wang, J. W., Zhou, G., & Zhu, X. (2022). Insider ownership and stock price crash risk around the globe. *Pacific Basin Finance Journal*, 72(1), 101714. <https://doi.org/10.1016/j.pacfin.2022.101714>
- Hu, G., & Wang, Y. (2018). Political connections and stock price crash risk: The role of intermediary information disclosure. *China Finance Review Inter-*

- national*, 8(2), 140–157. <https://doi.org/10.1108/CFRI-06-2017-0079>
- Hutton, A. P., Marcus, A. J., & Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. *Journal of Financial Economics*, 94(1), 67–86. <https://doi.org/10.1016/j.jfineco.2008.10.003>
- James, H. S. (1999). Owner as manager, extended horizons and the family firm. *International Journal of Economics and Business*, 21(1), 41–55. <https://doi.org/10.1080/13571519984304>
- Jebran, K., Chen, S., & Zhang, R. (2020). Board diversity and stock price crash risk. *Research in International Business and Finance*, 51(1), 101122. <https://doi.org/10.1016/j.ribaf.2019.101122>
- Jebran, K., Chen, S., & Zhang, R. (2022). Board social capital and stock price crash risk. *Review of Quantitative Finance and Accounting*, 58(2), 499–540. <https://doi.org/10.1007/s11156-021-01001-3>
- Jebran, K., Chen, S., & Zhu, D. H. (2019). Board informal hierarchy and stock price crash risk: Theory and evidence from China. *Corporate Governance: An International Review*, 27(5), 341–357. <https://doi.org/10.1111/corg.12282>
- Jensen, M. C. (2004). The agency costs of overvalued equity and the current state of corporate finance. *European Financial Management*, 10(4), 549–565. <https://doi.org/10.1111/j.1354-7798.2004.00265.x>
- Jensen, M. C. (2005). Agency costs of overvalued equity. *Financial Management*, 34(1), 5–19. <https://doi.org/10.1111/j.1755-053X.2005.tb00090.x>
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Jin, L., & Myers, S. C. (2006). R2 around the world: New theory and new tests. *Journal of Financial Economics*, 79(2), 257–292. <https://doi.org/10.1016/j.jfineco.2004.11.003>
- Jin, X., Liang, S., & Yu, J. (2022). Management geographical proximity and stock price crash risk. *China Finance Review International*, 12(4), 601–622. <https://doi.org/10.1108/CFRI-06-2021-0117>
- Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research*, 29(2), 193–228. <https://doi.org/10.2307/2491047>
- Kim, C., Pantzalis, C., & Park, J. C. (2014). Do family owners use firm hedging policy to hedge personal undiversified wealth risk? *Financial Management*, 43(2), 415–444. <https://doi.org/10.1111/fima.12021>
- Kirschenheiter, M., & Melumad, N. D. (2002). Can “big bath” and earnings smoothing co-exist as equilibrium financial reporting strategies? *Journal of Accounting Research*, 40(3), 761–796. <https://doi.org/10.1111/1475-679X.00070>
- La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. *Journal of Finance*, 54(2), 471–517. <https://doi.org/10.1111/0022-1082.00115>
- La Porta, R., Lopez-De-Silanes, F., & Shleifer, A. (2006). What works in securities laws? *Journal of Finance*, 61(1), 1–32. <https://doi.org/10.1111/j.1540-6261.2006.00828.x>
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. *Journal of Political Economy*, 106(6), 1113–1155. <https://www.jstor.org/stable/10.1086/250042>
- Leuz, C., Nanda, D., & Wysocki, P. D. (2003). Earnings management and investor protection: An international comparison. *Journal of Financial Economics*, 69(3), 505–527. [https://doi.org/10.1016/S0304-405X\(03\)00121-1](https://doi.org/10.1016/S0304-405X(03)00121-1)
- Li, F., & Jiang, Y. (2022). Institutional investor networks and crash risk: Evidence from China. *Finance Research Letters*, 47(1), 102627. <https://doi.org/10.1016/j.frl.2021.102627>
- Li, S., Lei, Q., & Ren, L. (2023). The increasing number of subsidiaries and stock price crash risk: evidence from the Chinese stock market. *Pacific Accounting Review*, 35(1), 105–125. <https://doi.org/10.1108/PAR-07-2021-0120>
- Li, X., & Chan, K. C. (2016). Communist party control and stock price crash risk: Evidence from China. *Economics Letters*, 141(1), 5–7. <https://doi.org/10.1016/j.econlet.2016.01.018>
- Li, Y., & Zeng, Y. (2019). The impact of top executive gender on asset prices: Evidence from stock price crash risk. *Journal of Corporate Finance*, 58(1), 528–550. <https://doi.org/10.1016/j.jcorpfm.2019.07.005>
- Lins, K. V., & Servaes, H. (2002). Is corporate diversification beneficial in emerging markets? *Financial Management*, 31(2), 5–31. <https://doi.org/10.2307/3666220>
- Luo, Y., & Zhang, C. (2020). Economic policy uncertainty and stock price crash risk. *Research in International Business and Finance*, 51(1), 101112. <https://doi.org/10.1016/j.ribaf.2019.101112>
- Lv, D., & Wu, W. (2019). Margin-trading volatility and stock price crash risk. *Pacific Basin Finance Journal*, 56(June), 179–196. <https://doi.org/10.1016/j.pacfin.2019.06.005>



- Maksimovic, V., & Demirgüç-Kunt, A. (2002). Funding growth in bank-based and market-based financial systems: evidence from firm-level data. *Journal of Financial Economics*, 65(1), 337–363. [https://doi.org/10.1016/S0304-405X\(02\)00145-9](https://doi.org/10.1016/S0304-405X(02)00145-9)
- Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *Journal of Finance*, 42(3), 483–510. <https://doi.org/10.1111/j.1540-6261.1987.tb04565.x>
- Morck, R., & Yeung, B. (2003). Agency problems in large family business groups. *Entrepreneurship Theory and Practice*, 27(4), 367–382. <https://doi.org/10.1111/1540-8520.t01-1-00015>
- Morck, R., Yeung, B., & Yu, W. (2000). The information content of stock markets: Why do emerging markets have synchronous stock price movements? *Journal of Financial Economics*, 58(1–2), 215–260. [https://doi.org/10.1016/S0304-405X\(00\)00071-4](https://doi.org/10.1016/S0304-405X(00)00071-4)
- Muller, D., Judd, C. M., & Yzerbyt, V. Y. (2005). When moderation is mediated and mediation is moderated. *Journal of Personality and Social Psychology*, 89(6), 852–863. <https://doi.org/10.1037/0022-3514.89.6.852>
- Pindyck, R. S. (1984). Risk, inflation, and the stock market. *American Economic Review*, 74(3), 335–351. <https://www.jstor.org/stable/1804011>
- Piotroski, J. D., Wong, T. J., & Zhang, T. (2015). Political incentives to suppress negative information: Evidence from Chinese listed firms. *Journal of Accounting Research*, 53(2), 405–459. <https://doi.org/10.1111/1475-679X.12071>
- Salehi, M., Hoshmand, M., & Rezaei Ranjbar, H. (2020). The effect of earnings management on the reputation of family and non-family firms. *Journal of Family Business Management*, 10(2), 128–143. <https://doi.org/10.1108/JFBM-12-2018-0060>
- Salehi, M., Zimon, G., Hashim, H. A., Jędrzejczak, R., & Sadowski, A. (2022). Accounting quality and audit attributes on the stock price crashes in an emerging market. *Risks*, 10(10), 1–24. <https://doi.org/10.3390/risks10100195>
- Srinidhi, B., He, S., & Firth, M. (2014). The effect of governance on specialist auditor choice and audit fees in U.S. family firms. *Accounting Review*, 89(6), 2297–2329. <https://doi.org/10.2308/accr-50840>
- Srinidhi, B., & Liao, Q. (2020). Family firms and crash risk: Alignment and entrenchment effects. *Journal of Contemporary Accounting and Economics*, 16(2), 100204. <https://doi.org/10.1016/j.jcae.2020.100204>
- Wang, D. (2006). Founding family ownership and earnings quality. *Journal of Accounting Research*, 44(3), 619–656. <https://doi.org/10.1111/j.1475-679X.2006.00213.x>
- Wang, M., Han, M., & Huang, W. (2020). Debt and stock price crash risk in weak information environment. *Finance Research Letters*, 33(1), 101186. <https://doi.org/10.1016/j.frl.2019.05.004>
- Yang, M., Wang, Y., Bai, L., & Maresova, P. (2023). Corporate social responsibility, family involvement, and stock price crash risk. *Corporate Social Responsibility and Environmental Management*, 30(3), 1204–1225. <https://doi.org/10.1002/csr.2414>
- Zachro, S. F., & Utama, C. A. (2021). The effect of family ownership on the relationship between busy directors and stock price crash risk for listed firms on the Indonesia stock exchange. *Jurnal Keuangan Dan Perbankan*, 25(1), 63–80. <https://doi.org/10.26905/jkdp.v25i1.4909>