

Are Family Firm Stocks More Prone to Crash?

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Keywords: Family firm, Stock crash risk, Transparency, Board independence, Agency problem

JEL classification: G32, G34

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Abstract

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1. Introduction

Stock price crashes are extreme events that significantly impact the welfare of investors, corporations and even the broader economy. Jin and Myers (2006) show in a theoretical framework that the limited information and poor protection of investors enables the managers to capture a firm's cash flow. They capture more when times are good. However, when cash flow is lower than investors expect, managers hide the bad news and reduce their capture to protect their jobs. When the accumulated bad news finally crosses a tipping point, managers give up trying to conceal the information and all the bad news is released at once, which then results in a stock price crash. The Jin and Myers (2006) model has received a large body of empirical support as the literature has identified several firm-specific determinants of stock crash risk, ranging from corporate disclosures, managerial incentives, to corporate governance mechanisms.¹

While family firms represent a significant portion of publicly listed firms, the extant literature on stock crash risk does not distinguish family firms from non-family firms. According to Villalonga and Amit (2006), more than half of public firms in the U.S are family firms. More importantly, the agency conflicts in family firms are inherently different from non-family firms. Family control alleviates the classic agency conflict of interests between the principle and agents, which Villalonga and Amit (2006) label as Agency Problem I. Shleifer and Vishny (1986) consider ownership concentration a partial corporate governance solution because large shareholders have both the incentive and clout to get informed and monitor managers. The benefits of concentrated ownership are more apparent when a family is the controlling shareholder. Family shareholders are particularly dedicated principles and effective monitors due to their high personal

¹ See Hutton, Marcus, and Tehranian (2009), An and Zhang (2013), Kim, Li, and Zhang (2011a), Kim, Li, and Zhang (2011b), DeFond et al. (2015), and Kim et al. (2016).

stake in the firm, both financially and emotionally. Families' presence in the management team can further reduce and even eliminate the separation of ownership and management by integrating them in the same individuals.

While family control mitigates the classic owner-manager agency problem, it exacerbates the conflict of interest between family and non-family shareholders, which Villalonga and Amit (2006) label as Agency Problem II. Shleifer and Vishny (1986) show that ownership concentration provides large shareholders the opportunity to appropriate private benefits of control at the expense of the small shareholders. The risk of expropriation is even higher if the controlling shareholder is an individual or a family who doesn't need to divide the private benefit of control. Evidence of expropriation includes tunnelling assets and profits out of the firm by the controlling families for their benefits (Bertrand, Mehta, and Mullainathan (2002) and Bertrand et al. (2008)). Another example of private benefit of control involves selecting undeserving family members as CEOs, which has a negative effect on firm performance (Bennedsen et al. (2007)).

Taken together, family firms face a unique set of agency problems that have different implications for stock crash risk. To the extent that the agency problem drives firm-specific crash risk, the less conflicts of interests between owners and managers implies less crash risk in family firms, whereas the heightened conflict of interest between family and non-family shareholders suggests higher crash risk. Ultimately, family firms' stock crash risk is an empirical issue that warrants further study.

To identify family firm status, we begin with all firm-year observations in the S&P 1500 index from 1992 to 2019, among which 35.9% are identified as family firms. Using two alternative measures of stock crash risk, we find that family firms have higher crash risk than their non-family counterparts. The results suggest that the mitigating effect of Agency Problem I in family firms is

offset by the Agency Problem II, which enables controlling family to appropriate private benefit of control at the expense of non-family shareholders.

As Jin and Myers (2006) point out, a necessary condition of insider expropriation is investors' lack of information about the firm's true cash flows. In the cross-sectional tests, we examine if the impact of information opacity on stock crash risk is different for family firms. We find that the positive association between opacity and stock crash risk is more pronounced for family firms, which is consistent with Anderson, Duru, and Reeb (2009)'s finding that public listed family firms in the U.S. are "significantly more opaque than diffuse shareholder firms." Our result offers further support of their claim that "founders and heirs in large, publicly traded firms exploit opacity to extract private benefits at the expense of minority investors."

Next, we examine if strong corporate governance reduces family firms' crash risk. Among a variety of governance mechanisms, we identify one that significantly reduces family firms' crash risk. Specifically, board independence is significantly associated with lower crash risk in family firms. While a well-functioning board has been considered a governance solution to protect shareholders from self-dealing managers, our results suggest that board independence plays an especially important role in protecting minority shareholders from the expropriation of controlling family shareholders in the U.S. as Villalonga and Amit (2009) find that families' disproportionate board representation is the most common form of control enhancement in this country.

This study contributes to the literature on family firms by examining the third moment of their stock return distribution. Family firms' higher crash risk has critical implications for market participants, regulators, and policy makers, especially considering family firms account for a significant portion of publicly listed firms. Moreover, the findings of this study shed light on the

debate about family control's impact on firm performance. The results suggest that the mitigating effects of less severe Agency Problem I is offset by Agency Problem II in family firms.

This study contributes to the stock crash risk literature by distinguishing family firms from non-family firms. The unique set of agency problems in family firms provide an ideal setting to test the stock crash model developed by Jin and Myers (2006). While the extant literature on stock crash risk has focused on managerial misbehaviors, the study shifts the attention to controlling shareholder's expropriation, which fills a void in the literature. This study corroborates earlier research establishing a link between information, control rights, and stock crash risk. Our results highlight the role played by information opacity in causing stock crashes, which is highly relevant to family firms as the prior literature find they are less transparent than non-family firms. We show that enhancing board independence is effective in curbing family firms' crash risk. As Armstrong, Core, and Guay (2014) find that independent directors cause improvement in firm transparency, our results suggest that a potential channel through which board independence reducing crash risk is by reducing information opacity in family firms. To the extent that the U.S. has a strong investor protection framework and a well-developed information environment, this study's findings suggest that family firms' crash risk can be even higher in civil law systems and particularly in developing countries, where challenges related to investor protection and corporate transparency are more pronounced.

The remainder of this paper is organized as following. Section 2 reviews the relevant literature and develops the hypotheses. Section 3 describes the data and variables. Section 4 discusses empirical design and findings. Section 5 concludes the paper.

2. Literature review and hypothesis development

2.1 Stock price crash risk

Scholarly interest in the stock price crash risk has been growing since Jin and Myers (2006) drew attention to this phenomenon characterized by large and negative market-adjusted returns on individual stocks. As Jin and Myers (2006) illustrate in their model, corporate insiders capture part of a firm's operating cash flows, about which outside investors do not have perfect information. When cash flows are lower than the investors' expectations, managers may initially conceal the negative news to protect their positions. However, when the accumulation of negative news finally reaches a tipping point, the news come out, resulting in a stock price crash. Jin and Myers (2006) also demonstrate that the stock price crash risk is associated with corporate opacity across the globe. Then, Hutton et al. (2009) test the Jin and Myers' (2006) model by using a large sample of U.S. firms. The authors find that the corporate opacity in the form of discretionary accruals is positively related to the stock price crash risk. However, the interactions of corporate opacity with other corporate governance dynamics in influencing financial outcomes are still under researched. Moreover, a burgeoning literature focuses on the corporate insiders' incentives and characteristics that influence the firms' stock price crash risk. Kim and colleagues (2011) find that the chief financial officer's option incentive (i.e., the sensitivity of the option portfolio value to the stock price), is positively related to the firm's future stock price crash. The authors discuss that the use of equity-based compensation induces managers to conceal negative news, which initially leads to an overvalued stock price and then eventually a stock price crash.

The literature has also identified several managerial characteristics that influence crash risk, such as CEO overconfidence, managerial ability, CEO gender, and CEO power (Demerjian et al., 2013; Kim, 2016b, Li & Zeng, 2019; Al Mamun et al., 2020). The mechanisms that corporate insiders devise to obscure negative information include earnings management, tax avoidance, and

financial statement comparability, all of which increase the firms' stock price crash risk (Hutton, 2009; Kim et al., 2011a, 2011b, 2016a).

Moreover, the stock price crash risk literature has highlighted several mechanisms that deter insiders from manipulating information, ultimately reducing stock price crash risk. These mechanisms are both internal, such as reporting conservatism, brand capital, and external, such as monitoring by institutional investors, auditors, and regulators (An & Zhang, 2013; Bauer, Fang, & Pittman, 2021; Callen & Fang, 2017; Hasan, Taylor, & Richardson, 2022; Kim & Zhang, 2016). While this prominent stream of research provides valuable insights into the factors influencing stock price crash risk, past research assumes a homogenous group of corporations in the investigations without distinguishing between the founder or heir-controlled firms and the management-controlled firms. Given the prevalence of the founder or heir-controlled firms among corporations and their unique agency problems, there is surprisingly sparse evidence about the stock price crash risk in such firms, which we examine in this paper.

2.2 Ownership structure and agency conflicts

The nature of agency conflicts depends critically on ownership structure. In widely held firms, the primary conflict arises between managers and shareholders (Jensen and Meckling, 1976). In contrast, in firms with concentrated ownership, the key conflict shifts toward that between controlling shareholders and minority investors (Shleifer and Vishny, 1997).

Family firms represent a prominent form of concentrated ownership. In these firms, founding families often maintain substantial control through equity ownership, board representation, and managerial involvement (Villalonga and Amit, 2006). This structure alters both monitoring incentives and opportunistic behavior.

On the one hand, concentrated ownership aligns the interests of controlling shareholders with firm value and enhances monitoring of managers. Family members often have large undiversified stakes and long investment horizons, which can reduce managerial opportunism and improve oversight. To the extent that crash risk arises from managerial bad news hoarding, these features suggest that family firms may exhibit lower crash risk.

On the other hand, concentrated control also enables controlling shareholders to pursue private benefits at the expense of minority investors. Such activities include tunneling, related-party transactions, excessive compensation, and the appointment of unqualified family members to key positions (Bertrand et al., 2002; Bennedsen et al., 2007). These actions are often difficult to observe and may be facilitated by opaque information environments.

Importantly, the incentives to conceal bad news may differ between managers and controlling shareholders. While managers conceal bad news to protect their careers or compensation, controlling shareholders may do so to preserve private benefits of control or avoid external scrutiny. As a result, the presence of a controlling family can both mitigate and exacerbate the underlying drivers of crash risk.

2.3 Family firms and stock price crash risk

The dual role of family control leads to competing predictions regarding crash risk. The mitigation of managerial agency problems (Agency Problem I) suggests a reduction in bad news hoarding and thus lower crash risk. In contrast, the exacerbation of conflicts between controlling and minority shareholders (Agency Problem II) suggests an increase in bad news hoarding and higher crash risk.

Several features of family firms suggest that the latter effect may dominate. First, controlling families often possess significant influence over disclosure policies and corporate

decisions, allowing them to shape the firm's information environment. Second, the private benefits of control—both pecuniary and non-pecuniary—can create incentives to conceal unfavorable information. Third, the separation between control rights and cash flow rights in some family firms further weakens the alignment between controlling shareholders and minority investors.

These considerations imply that, despite improved monitoring of managers, family firms may exhibit greater incentives and ability to hoard bad news at the controlling shareholder level. If so, crash risk will be higher in family firms.

Accordingly, we test the following hypothesis:

H1: Family firms have higher stock price crash risk than non-family firms.

2.4 The Role of information opacity

Information opacity is a central mechanism in the crash risk literature because it determines the extent to which insiders can conceal bad news. When financial reporting is less transparent, outside investors face greater difficulty in detecting opportunistic behavior, enabling insiders to delay the disclosure of adverse information (Jin and Myers, 2006; Hutton et al., 2009).

Prior research suggests that family firms are, on average, opaquer than firms with dispersed ownership (Anderson, Duru, and Reeb, 2009). This opacity may arise from weaker disclosure incentives, more complex organizational structures, or deliberate efforts to obscure information.

In the presence of greater opacity, the incentives of controlling shareholders to extract private benefits can be more effectively pursued. At the same time, opacity reduces external monitoring by investors, analysts, and regulators. As a result, opacity is likely to amplify the impact of Type II Agency Problem on crash risk.

Therefore, while opacity increases crash risk in general, its effect should be particularly strong in family firms, where controlling shareholders have both the incentives and the ability to exploit opaque environments.

H2: The positive association between information opacity and stock price crash risk is stronger in family firms than in non-family firms.

2.5 The Role of board independence

Corporate governance mechanisms can mitigate agency conflicts by improving monitoring and constraining opportunistic behavior. Among these mechanisms, board independence plays a key role in enhancing oversight and promoting transparency.

In family firms, boards are often influenced by controlling families through direct participation or informal control. This can reduce the effectiveness of the board as a monitoring mechanism and allow controlling shareholders to pursue private benefits. In such settings, increasing board independence can serve as an important counterbalance by strengthening oversight and limiting the ability of controlling shareholders to conceal bad news.

Independent directors are also associated with improved disclosure quality and greater transparency (Armstrong, Core, and Guay, 2014), which can reduce the accumulation of hidden bad news. Consequently, board independence is expected to mitigate crash risk, particularly in firms where agency conflicts between controlling and minority shareholders are more severe.

H3: Board independence reduces stock price crash risk more in family firms than in non-family firms.

3. Sample and variable construction

3.1 Family firms and the sample

We begin with all firm covered by Execucomp, which includes the S&P 1500 firms starting from 1992. We manually collect information about these firms' founders and their descendants. After combining with the Execucomp data on top executives and their tenure, we classify the firm-year observations into four groups: (1) a founder is the CEO, (2) a founder's descendant is the CEO, (3) a founder or a family member is a board director but not the CEO, and (4) neither a founder nor a family member is the CEO or a board director. If a firm belongs to groups (1)-(3), we classify it as a family firm in that year.

Our sample consists of all Execucomp firms incorporated in the U.S. from 1992 through 2019. Stock price data is from the Center for Research in Securities Prices (CRSP). We obtain accounting data from Compustat. We delete observations with non-positive total assets. As a result, our sample includes 3,745 firms with 48,613 firm-year observations.

3.2 Measuring crash risk

We follow the literature and construct two measures of firm-specific crash risk, which are based on the following expanded market model.

$$r_{i,k,w} = \alpha_i + \beta_i \cdot r_{m,w} + \gamma_i \cdot r_{k,w} + \varepsilon_{i,w} \quad (1)$$

$r_{i,k,w}$ is the return of firm i in industry k in week w , $r_{m,w}$ is the CRSP value-weighted market return in week w , and $r_{k,w}$ is the value-weighted return of industry k in week w .

We use weekly returns to avoid the problem of thinly traded stocks. The firm in question is excluded when calculating the industry returns to prevent spurious correlations in industries dominated by few firms. To avoid firms that went public, were delisted, or experienced trading halts, we follow Morck, Yeung, and Yu (2000) and Jin and Myers (2006) and exclude firms whose shares trade for less than 26 weeks over a fiscal year.

The first measure, *COUNT*, is based on the regression residuals from Equation (1). Following Hutton, Marcus, and Tehranian (2009), we denote firm-specific weekly return as the natural log of one plus the regression residual from Equation (1). A crash (jump) occurs when the firm-specific weekly return is 3.09 standard deviations below (above) its mean over the fiscal year.² *COUNT* is the number of crashes minus the number of jumps over the fiscal year (Jin and Myers (2006)).³

The second measure of crash risk is *NCSKEW*, the negative conditional skewness. Following Kim, Li, and Zhang (2011a) and Kim, Li, and Zhang (2011b), we calculate *NCSKEW* by taking the negative of the third central moment of firm-specific weekly return scaled by the sample variance of firm-specific weekly return raised to 3/2. Specifically, we compute *NCSKEW* for firm i in fiscal year t as:

$$NCSKEW_{i,t} = -[n(n-1)^{3/2} \sum (W_{i,t} - \bar{W}_{i,t})^3] / \left[(n-1)(n-2) \left(\sum (W_{i,t} - \bar{W}_{i,t})^2 \right)^{3/2} \right] \quad (2)$$

where $W_{i,t}$ is the firm-specific weekly return. $\bar{W}_{i,t}$ is the average firm-specific weekly return in the fiscal year, and n is the number of observations in fiscal year t . Scaling the raw central third moment by the cubed standard deviation is a standard normalization employed for skewness in statistics that allows for a comparison across returns with different variances. We follow the literature by putting a minus sign in front of the skewness so that an increase in *NCSKEW* corresponds to more crash risk, i.e., a more negative-skewed stock return distribution.⁴

3.3 Summary statistics

² We follow Hutton, Marcus, and Tehranian (2009) and choose 3.09 to generate 0.1% in the normal distribution.

³ We obtain similar results using a dummy variable to measure crash risk.

⁴ Another stock crash measure used in the literature is *DUVOL*, down-to-up volatility, which is highly correlated to *NCSKEW*. We obtain similar results using *DUVOL* to measure crash risk (not tabulated).

Table 1 provides summary statistics. Family firms represent 35.9% of the sample. The means of the two crash measures, *COUNT* and *NCSKEW*, are 0.030 and 0.022, respectively. The mean and median of the two crash measures, *ROA*, and *RET* in our sample are slightly higher than those reported in studies that examine the broader stock market.⁵ The difference is mainly attributed to our study's focus on the S&P 1500 firms.

[Insert Table 1 about here]

4. Empirical design and results

4.1. Crash risk

We compare the stock crash risk of family firms vs. non-family firms by regressing the following model. Standard errors are clustered at the firm level in all regressions.

$$\begin{aligned}
 CRASH_{i,t} = & \alpha_t + \eta_i + \beta_1 \cdot FAMILY_{i,t-1} + \beta_2 \cdot SIZE_{i,t-1} + \beta_3 \cdot MTB_{i,t-1} + \beta_4 \cdot LEV_{i,t-1} \\
 & + \beta_5 \cdot DTURN_{i,t-1} + \beta_6 \cdot NCSKEW_{i,t-1} + \beta_7 \cdot SIGMA_{i,t-1} + \beta_8 \cdot RET_{i,t-1} \\
 & + \beta_9 \cdot ROA_{i,t} + \beta_{10} \cdot KURTOSIS_{i,t-1} + \varepsilon_{i,t}
 \end{aligned} \tag{3}$$

In this equation, the dependent variable *CRASH* is a measure of crash risk for firm *i* in fiscal year *t*. As described before, we have two such measures: *COUNT* and *NCSKEW*. α_t and η_i represent the fiscal year and firm fixed effects, respectively. The variable of interest is *FAMILY*, an indicator variable that equals one if firm *i* is classified as a family firm in fiscal year *t-1*. We follow Kim, Li, and Zhang (2011b) and control for the following variables:

⁵ For example, An and Zhang (2013).

$SIZE_{t-1}$ is the natural log of the firm's sales at the end of last fiscal year; MTB_{t-1} is the ratio of the market value of equity to the book value of equity at the end of last fiscal year; LEV_{t-1} is the book value of all liabilities scaled by total assets at the end of last fiscal year; $DTURN_{t-1}$ is the detrended turnover, which is calculated as the difference between average monthly turnover over fiscal year $t-1$ and the prior fiscal year's average monthly turnover; $NCSKEW_{t-1}$ is the lagged value of $NCSKEW$; $SIGMA_{t-1}$ is the standard deviation of the firm-specific weekly return over last fiscal year; RET_{t-1} is the average firm-specific weekly return over last fiscal year; ROA_t is the contemporaneous income before extraordinary items divided by the book value of total assets; $KURTOSIS_{t-1}$ is the kurtosis of firm-specific weekly return over the last fiscal year.

Table 2 reports the regression results with crash risk measured and by *COUNT* in Columns 1-2, and by *NCSKEW* Columns 3-4. Across the two crash risk measures, we find robust evidence that family firms have higher stock crash risk than non-family firms. The estimated coefficients of *FAMILY* are positive and statistically significant across the four Columns. Regarding the economic significance, in Column 2 where the dependent variable is *COUNT*, the family firms' stock crash risk is 0.051 higher than non-family firms, which is significant compared to 0.030, the mean of *COUNT*.

[Insert Table 2 about here]

The results suggests that the heightened conflict of interest between family and non-family shareholders exacerbate family firms' stock crash risk, which offsets the mitigating effect of the less severe agency problem between managers and shareholders.

4.2. Opacity

Opacity is the focal point in the stock crash model of Jin and Myers (2006) because if investors have perfect information about the firms' cash flow, it will make insiders expropriation much harder, at least in the U.S. where investor protection is relatively strong. Hutton, Marcus, and Tehranian (2009) provide empirical evidence that corporate opacity predicts firm-specific stock crash risk. We follow Hutton, Marcus, and Tehranian (2009) and use the absolute value of discretionary accrual as the measure of accounting opacity. Specifically, we use the modified Jones model (Dechow, Sloan, and Sweeney (1995)) to estimate the discretionary accruals. First, we run regression Equation (4) and obtain estimated coefficients for each of the 48 Fama-French industries in every year.

$$\frac{AC_{i,t}}{Assets_{i,t-1}} = \alpha_0 \frac{1}{Assets_{i,t-1}} + \alpha_1 \frac{\Delta Rev_{i,t}}{Assets_{i,t-1}} + \alpha_2 \frac{PPE_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (4)$$

$AC_{i,t}$ denotes the total accruals for firm i in year t , estimated as income before extraordinary items minus cash flow from operating activities adjusted for extraordinary items and discontinued operations. $\Delta Rev_{i,t}$ is the change in revenue for firm i in year t . $PPE_{i,t}$ represents property, plan, and equipment for firm i in year t . Second, we calculate the predicated value of total accruals for each firm-year from Equation (5) using the estimated coefficients associated with the industry from the first step.

$$\frac{AC_{i,t}}{Assets_{i,t-1}} = \alpha_0 \frac{1}{Assets_{i,t-1}} + \alpha_1 \frac{\Delta Rev_{i,t} - \Delta Rec_{i,t}}{Assets_{i,t-1}} + \alpha_2 \frac{PPE_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (5)$$

where $\Delta Rec_{i,t}$ is the change of accounts receivable. Third, we calculate the discretionary accruals, which is the difference between its predicated value and the actual value. Finally, *OPACITY* is calculated as the sum of the absolute values of the discretionary accruals during the last three years.

We add *OPACITY* in the regression and interact it with *FAMILY* to compare its impact on stock crash risk between family and non-family firms.

$$CRASH_{i,t} = \gamma_1 \cdot FAMILY_{i,t-1} + \gamma_2 \cdot OPACITY_{i,t-1} + \gamma_3 \cdot FAMILY_{i,t-1} \cdot OPACITY_{i,t-1} + \beta \cdot CONTROL + \alpha_t + \eta_i + \varepsilon_{i,t} \quad (6)$$

[Insert Table 3 about here]

As Table 3 shows, the estimated coefficient on *OPACITY* is positive in column 1 where *NCSKEW* is the dependent variable, evidence that firms with more opaque financial reports are more likely to crash in the future. More importantly, the estimated coefficient on the interaction term *FAMILY * OPACITY* is -0.072 in Column 1, and -0.071 in Column 2. Both are statistically significant at the 5% level. The results indicate that the impact of opacity on stock crash risk is more pronounced in family firms, which is consistent with Anderson, Duru, and Reeb (2009)'s finding that public listed family firms in the U.S. are “significantly more opaque than diffuse shareholder firms.” Our result offers further support of their claim that “founders and heirs in large, publicly traded firms exploit opacity to extract private benefits at the expense of minority investors.”

4.3. Board independence

In this subsection, we examine if strong corporate governance can reduce family firms' heightened stock crash risk. Among several conventional governance mechanisms, we find enhanced board independence is particularly effective in curbing family firms' stock crash risk. We obtain data on the board of directors from Institutional Shareholder Services (formerly

RiskMetrics).⁶ We calculate $IND_{i,t}$ as the percentage of independent directors on the board of firm i in year t . We add both $IND_{i,t}$ and the interaction term $FAMILY * OPACITY$ in the baseline regression.

$$CRASH_{i,t} = \gamma_1 \cdot FAMILY_{i,t-1} + \gamma_2 \cdot IND_{i,t-1} + \gamma_3 \cdot FAMILY_{i,t-1} \cdot IND_{i,t-1} + \beta \cdot CONTROL + \alpha_t + \eta_i + \varepsilon_{i,t} \quad (7)$$

[Insert Table 4 about here]

As Table 4 shows, the estimated coefficient on the interaction term $FAMILY * IND$ is -0.460 in Column 1, and -0.705 in Column 2. Both are statistically significant. The results show more independent boards of directors are significantly associated with lower crash risk in family firms. While a well-functioning board has been considered a governance solution to protect shareholders from self-dealing managers, our results suggest that board independence plays an especially important role in protecting minority shareholders from the expropriation of controlling family shareholders in the U.S. as Villalonga and Amit (2009) find that families' disproportionate board representation is the most common form of control enhancement in this country. This finding collaborates with our result about opacity's role in causing stock crashes. As Armstrong, Core, and Guay (2014) find that independent directors cause improvement in firm transparency, our results suggest that a potential channel through which board independence reducing crash risk is by reducing information opacity in family firms.

⁶ Our director data starts from 2007, when RiskMetrics changed its methodology.

4.4. Instrumental variable approach

Endogeneity is concern for this study because family firm status is not random. We employ an instrumental variable (IV) approach to mitigate the endogeneity concern. Specifically, we follow Chen, Dasgupta, and Yu (2014) by using CEO age as the instrumental variable for the family firm status. Family CEOs, especially funders, often find it emotional challenging to relinquish control of the firm. Moreover, their significant power and influence enable them to keep their positions longer than non-family CEOs. Family firm succession is another reason for the positive association between CEO age and family firm status. According to Chen, Dasgupta, and Yu (2014), if a family CEO plans to pass the control to a heir, he/she would need to keep the CEO position long enough until the successor is ready to take over. Therefore, CEO age is positively related to family firm status, which we confirm in the data. Moreover, because CEO age does not directly affect stock crash risk, the exclusion restriction of instrumental variable is likely satisfied. According to Chen, Dasgupta, and Yu (2014), industry competition and volatility are negatively related to family firm status because controlling families are more likely to sell their ownership stakes in more competitive and volatile industries as managing business in these industries are more demanding and riskier. Furthermore, we use lagged values of the two industry-level variables so that they won't directly impact future firm-specific risk. Specifically, we measure industry competition by *HHI*, the Herfindahl index of market shares in a 2-digit Standard Industrial Classification (SIC) industry. *VOL* is the log of median change in industry stock return volatility between years $t - 3$ and $t - 1$. *Age* is CEO age based on Execucomp.

We run a two-stage least-squares regression (2SLS) using *AGE*, *HHI*, and *VOL* as the instrument variables for *FAMILY*. In the first stage, we regress *FAMILY* against the IVs and all the control variables included in regression Equation (3). As Column 1 of Table 5 shows, *AGE*,

HHI, and *VOL* are significantly related to *FAMILY*, suggesting that the instrumental variables are not weak.

[Insert Table 5 about here]

In the second stage, we replace *FAMILY* by its fitted values from the first stage regression. Column 2 and 3 of Table 5 report the results from the second-stage regression. The estimated coefficient of *FAMILY* is 0.432 in Column 2, and 0.696 in Column 3. Both are significant at the 10% level.

Overall, the IV estimation shows the estimated coefficients of *FAMILY* remain statistically significant and larger in magnitude, which suggests that the endogeneity problem, if it exists, likely biases the ordinary least squares results towards zero.

5. Conclusion

This study examines the stock price crash risk of family firms by focusing on the distinct agency conflicts arising from concentrated ownership. Using a large sample of S&P 1500 firms from 1992 to 2019, we show that family firms exhibit significantly higher crash risk than non-family firms. This finding suggests that the principal–principal agency conflict between controlling and minority shareholders dominates the mitigating effect of reduced principal–agent conflicts in family firms.

Our results provide further insights into the mechanisms underlying this relation. We document that the positive association between information opacity and crash risk is significantly stronger in family firms, consistent with the view that opaque information environments facilitate

the concealment of bad news and the extraction of private benefits by controlling shareholders. In addition, we find that board independence mitigates crash risk more effectively in family firms, highlighting the role of governance in constraining controlling shareholder opportunism and improving transparency.

These findings contribute to the literature by shifting the focus of crash risk from managerial incentives to the role of controlling shareholders. While prior studies emphasize managers' incentives to hoard bad news, our evidence suggests that controlling shareholders can play a similar role when they possess both the incentives and the ability to influence disclosure and governance. Overall, our findings highlight the importance of considering ownership structure and agency conflicts beyond the traditional manager–shareholder framework when analyzing stock price crash risk.

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Table 1: Summary statistics

This table reports the summary statistics for a sample of public firms incorporated in the U.S. from 1992 through 2019. *COUNT* is the number of crashes minus the number of jumps over the fiscal year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return. *SIZE* is the natural log of the firm's sales at the end of last fiscal year. *MTB* is the ratio of the market value of equity to the book value of equity at the end of last fiscal year. *LEV* is the book value of all liabilities scaled by total assets at the end of last fiscal year. *DTURN* is the detrended turnover, which is calculated as the difference between average monthly turnover over fiscal year t-1 and the prior fiscal year's average monthly turnover. *SIGMA* is the standard deviation of the firm-specific weekly return over last fiscal year. *RET* is the average firm-specific weekly return over last fiscal year. *ROA* is the contemporaneous income before extraordinary items divided by the book value of total assets. *KURTOSIS* is the kurtosis of firm-specific weekly return over the last fiscal year.

	Mean	SD	p25	Median	p75
<i>COUNT</i>	0.030	0.689	0.000	0.000	0.000
<i>NCSKEW</i>	0.022	0.908	-0.467	-0.048	0.425
<i>SIZE</i>	7.096	1.676	5.992	7.022	8.172
<i>MTB</i>	3.022	3.505	1.413	2.159	3.542
<i>LEV</i>	0.235	0.207	0.062	0.210	0.353
<i>DTURN</i>	0.004	0.108	-0.023	0.002	0.029
<i>SIGMA</i>	0.047	0.028	0.028	0.040	0.058
<i>RET</i>	-0.001	0.003	-0.002	-0.001	-0.000
<i>ROA</i>	0.121	0.121	0.071	0.122	0.176
<i>KURTOSIS</i>	2.212	3.411	0.282	1.157	2.783

Table 2: Crash risk

This table reports the results of regressions of stock price crash risk on the family firm dummy and control variables for a sample of public firms incorporated in the U.S. from 1992 through 2019. Regressions are run with both firm and year fixed effects. The table also presents the number of observations and the adjusted R^2 . Robust t statistics are corrected for clustering of the residual at both the firm and year level. One asterisk indicates significance at the 10% level; two indicate significance at the 5% level; three indicate significance at the 1% level.

Dependent Variable	(1)	(2)	(3)	(4)
	<i>COUNT</i>	<i>COUNT</i>	<i>NCSKEW</i>	<i>NCSKEW</i>
<i>FAMILY</i>	0.046** (2.76)	0.051*** (3.05)	0.043** (2.46)	0.050*** (2.84)
<i>SIZE</i>		0.074*** (9.46)		0.113*** (10.44)
<i>MTB</i>		0.000** (2.73)		0.000*** (4.16)
<i>LEV</i>		-0.155*** (-4.83)		-0.201*** (-5.85)
<i>DTURN</i>		0.204*** (5.26)		0.275*** (5.88)
<i>NCSKEW_LAG</i>		-0.040*** (-8.18)		-0.051*** (-9.55)
<i>SIGMA</i>		-1.841*** (-4.18)		-2.661*** (-5.08)
<i>RET</i>		0.676 (0.23)		0.879 (0.25)
<i>ROA</i>		-0.292*** (-6.06)		-0.335*** (-4.37)
<i>KURTOSIS</i>		0.002* (1.84)		0.002 (0.86)
Firm and year FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.02	0.03	0.02	0.04
Observations	40,292	40,292	39,770	39,770

Table 3: Opacity and crash risk

This table reports the cross-sectional regression results that compare information opacity's impact on crash risk between family and non-family firms. Regressions are run with both firm and year fixed effects. The table also presents the number of observations and the adjusted R^2 . Robust t statistics are corrected for clustering of the residual at both the firm and year level. One asterisk indicates significance at the 10% level; two indicate significance at the 5% level; three indicate significance at the 1% level.

Dependent Variable	(1) <i>COUNT</i>	(2) <i>NCSKEW</i>
<i>FAMILY * OPACITY</i>	0.072** (2.40)	0.071** (2.11)
<i>OPACITY</i>	0.018 (1.12)	0.037** (2.18)
<i>FAMILY</i>	0.034* (1.77)	0.025 (1.27)
<i>SIZE</i>	0.073*** (8.55)	0.113*** (9.14)
<i>MTB</i>	0.000*** (2.93)	0.000*** (4.44)
<i>LEV</i>	-0.146*** (-3.74)	-0.187*** (-4.36)
<i>DTURN</i>	0.242*** (5.88)	0.308*** (6.62)
<i>NCSKEW_LAG</i>	-0.042*** (-8.21)	-0.055*** (-9.83)
<i>SIGMA</i>	-2.114*** (-4.63)	-3.077*** (-5.54)
<i>RET</i>	-0.478 (-0.16)	-0.735 (-0.19)
<i>ROA</i>	-0.289*** (-5.92)	-0.366*** (-4.73)
<i>KURTOSIS</i>	0.003** (2.38)	0.003 (1.42)
Firm and year FE	Yes	Yes
Adjusted R^2	0.03	0.04
Observations	36,544	36,077

Table 4: Board independence and crash risk

This table reports the cross-sectional regression results that compare board independence's impact on crash risk between family and non-family firms. Regressions are run with both firm and year fixed effects. The table also presents the number of observations and the adjusted R^2 . Robust t statistics are corrected for clustering of the residual at both the firm and year level. One asterisk indicates significance at the 10% level; two indicate significance at the 5% level; three indicate significance at the 1% level.

Dependent Variable	(1) <i>COUNT</i>	(2) <i>NCSKEW</i>
<i>FAMILY * IND</i>	-0.460* (-2.18)	-0.705*** (-3.35)
<i>IND</i>	0.126 (0.75)	0.269 (1.72)
<i>FAMILY</i>	0.354* (1.97)	0.552** (2.90)
<i>SIZE</i>	0.175*** (4.54)	0.256*** (4.80)
<i>MTB</i>	0.000 (0.97)	0.000 (1.59)
<i>LEV</i>	-0.163* (-2.10)	-0.198* (-2.02)
<i>DTURN</i>	0.247*** (3.22)	0.205* (1.86)
<i>NCSKEW_LAG</i>	-0.068*** (-7.70)	-0.094*** (-7.66)
<i>SIGMA</i>	-3.172*** (-3.12)	-3.801*** (-3.66)
<i>RET</i>	-3.241 (-0.48)	-4.705 (-0.48)
<i>ROA</i>	-0.424** (-2.81)	-0.614** (-3.10)
<i>KURTOSIS</i>	0.007*** (3.42)	0.007* (1.86)
Firm and year FE	Yes	Yes
Adjusted R^2	0.04	0.04
Observations	12,507	12,293

Table 5: Instrumental variable estimation

This table reports the results of the two-stage least squares regression. Column 1 reports the first-stage regression, where the dependent variable is *FAMILY*. The instrumental variables are *AGE*, *HHI*, and *VOL*. All control variables are included. Column 2-3 report the second-stage regression, where the dependent variable is one of the two measures of stock crash risk. The variable of interest is the predicted value of *FAMILY*. Regressions are run with both firm and year fixed effects. The table also presents the number of observations and the adjusted R^2 . Robust t statistics are corrected for clustering of the residual at both the firm and year level. One asterisk indicates significance at the 10% level; two indicate significance at the 5% level; three indicate significance at the 1% level.

Dependent Variable	(1) <i>FAMILY</i>	(2) <i>COUNT</i>	(3) <i>NCSKEW</i>
<i>FAMILY</i> (predicted)		0.432* (1.81)	0.696* (2.00)
<i>AGE</i>	0.002*** (4.03)		
<i>HHI</i>	0.029*** (3.71)		
<i>VOL</i>	-0.004*** (-2.93)		
<i>SIZE</i>	-0.031*** (-3.15)	0.077*** (7.78)	0.116*** (8.98)
<i>MTB</i>	0.000 (0.97)	0.000 (1.60)	0.000*** (3.36)
<i>LEV</i>	-0.070** (-2.57)	-0.143*** (-3.24)	-0.178*** (-3.31)
<i>DTURN</i>	0.050** (2.53)	0.228*** (4.51)	0.337*** (5.77)
<i>NCSKEW_LAG</i>	0.002 (1.20)	-0.037*** (-3.75)	-0.049*** (-3.43)
<i>SIGMA</i>	0.588** (2.68)	-1.438** (-2.64)	-2.494*** (-3.58)
<i>RET</i>	2.000* (2.05)	3.692 (1.62)	3.329 (1.24)
<i>ROA</i>	0.080 (1.47)	-0.279*** (-3.87)	-0.309*** (-3.40)
<i>KURTOSIS</i>	-0.002** (-2.57)	0.001 (0.33)	0.001 (0.25)
Firm and year FE	Yes	Yes	Yes
Adjusted R^2	0.85	0.03	0.05
Observations	18,429	18,429	18,429