Powerful CEOs and Stock Price Crash Risk

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Abstract

We find that firms with powerful CEOs lead to stock price crash. The effects of real and accrual earnings management, and CEO pay dominance on crash risk are more pronounced for firms with powerful founder CEOs. The effects of tax avoidance, CFO option incentives and CEO overconfidence on crash are more pronounced for firms with powerful CEOs. The takeover index, mitigates stock price crash for firms with non-powerful CEOs. Product market competition does not attenuate the impact of CEO power on crash. Our findings provide new insights on the importance of CEO power in driving stock price crash risk.

JEL Classifications: G3; G12; G32

Keywords: CEO power; stock price crash risk; Takeover index; earnings management; tax avoidance; CFO option incentives; CEO overconfidence

1. Introduction

Managers have a strong incentive to withhold bad news from investors (e.g., Ball, 2009; Graham, Harvey, and Rajgopal (2005), Kothari, Shu, and Wysocki (2009)). Once the accumulated bad news reaches an overwhelming level, managers give up and release it all together, leading to a stock price crash (Jin and Myers (2006) and Hutton, Marcus, and Tehranian (2009)). In line with this argument, Hutton et al. (2009) and Kim, Li, and Zhang (2011a) show that managers use earnings management and tax avoidance, respectively to hoard bad news, which in turn, lead to stock price crash. Graham, Harvey and Rajgopal (2005) survey and interview CFOs of U.S firms and show that managers are willing to sacrifice economic value to manage financial reporting perceptions. Indeed, 80% of the respondents in their survey report that they would decrease discretionary spending on R&D, advertising, and maintenance to meet an earnings target. Dichev, Graham, Harvey and Rajgopal (2013) survey and interview CFOs of U.S firms and find that earnings management occurs in an attempt to influence stock price, because of outside and inside pressure to hit earnings benchmarks, and to avoid adverse compensation and career consequences for senior executives. Further, Dichev et al. (2013, p.30) document that "CFOs believe that it is difficult for outside observers to unravel earnings management, especially when such earnings are managed using subtle unobservable choices or real actions. CFOs in Dichev et al. (2013) survey advocate paying close attention to the key managers running the firm ...".

In the spirit of the findings in Graham et al. (2005) and Dichev et al. (2013), we expand the literature on the stock price crashes by considering the key managers of firms, the CEOs. Our central argument is that the success of managers in withholding bad news hinges critically on their power to influence decisions. More specifically, it is the power in the hands of CEOs that gives them the means and justification to divert firm resources for their personal gain and withhold bad

news from investors, resulting in stock price crashes. Our prediction of a positive relation between CEO power and stock price crash risk builds on the recent literature that powerful CEOs are self-motivating, divert firms resources for their gains, pressure CFOs to engage in accounting manipulation, and have a negative impact on firm value (e.g., Grinstein and Hribar (2004), Feng, Ge, Luo, Shevlin (2011), Morse, Nanda, and Seru (2011), Friedman (2014), Coles, Daniel, and Naveen (2014) and Khanna, Kim, and Lu, (2015).

The literature on the market for corporate control shows that the threat of takeover provides additional incentives for the board of directors to discipline poorly performing CEOs (see Fama (1980), Fama and Jensen (1983), Hirshleifer and Thakor (1998) and Lel and Miller (2015)). Despite its importance as an external governance mechanism, there has been little research on the role of the external market for corporate control in mitigating crash risk. We argue that presence of a market for corporate control mechanism can curb the ability of a powerful CEO to hide bad news which leads to crash risk. Taken together, we provide new insights on powerful CEO's role on stock price crash risk by addressing the following research questions. Does CEO power lead to stock price crash risk? To what extent does market for corporate control mechanism mitigate the effect of CEO power on stock price crash risk?

We examine the role of CEO power in affecting crash risk by using a large sample of U.S. publicly listed firms during 1992–2013. We use various CEO power measures: CEO and founder (*CEOFO*), CEO founder and either the chair, the president, or both (*CEOFEPCB*) and CEO, president, and chair (*CEOPRCH*) as our main CEO power measures to examine the role of CEO power in hoarding bad news, which in turn, leads to stock price crash. We use the negative conditional skewness of future firm-specific weekly returns (*NCSKEW*) and down-to-up volatility (*DUVOL*) as our main crash risk measures. We find that firms with powerful CEOs are more likely

to experience future stock price crashes. This result holds controlling for earnings management, tax avoidance, CFO option incentives, and CEO overconfidence, indicating that CEO power has a significant incremental effect on stock price crash. Our results also hold when addressing endogeneity concerns, using instrumental variable regression for the CEO power measures: *CEOFO* and *CEOFEPCB*. CEO power variables still possess strong explanatory power on future stock price crash risk when we address for time-invariant firm-specific omitted variables using firm fixed effect regression.[1] The results are also robust to alternative measures of stock price crash risk and CEO power. Our results also hold controlling for excessive riskiness such as financial distress, firm age, CEO experience and R&D intensity. Since Adams et al. (2005) show higher variability in firms' performance when CEOs have the power to influence the decision-making process, we also examine whether the likelihood of a very good outcomes (price jump) is higher in firms with powerful CEOs. However, we do not find any evidence that firms with powerful CEOs have higher stock price jumps than others. These findings demonstrate that the CEO power has significant implication on future extreme negative stock returns and not on positive outcomes (price jump), indicating that decisions with extreme negative consequences are more likely to be taken when the CEOs are more powerful.

Further, we find that CEO power has significant impact on the effects of manipulation of real activities, accrual earnings management, tax avoidance, managerial incentives and CEO overconfidence on stock price crash risk. Specifically, we find that the effect of earnings

[1] The significance of earnings management, tax avoidance, CFO option incentive, and CEO overconfidence in explaining future stock price crash risk disappears, when controlling for firm and year fixed effects

management on future stock price crash risk, as documented in Hutton et al. (2009), is stronger among firms with powerful founder CEOs. Further, we find that real earnings management leads to crash only for those firms with powerful founder CEOs. Moreover, the effects of tax avoidance (Kim et al. (2011a), CFO option incentives (Kim, Li, and Zhang (2011b), CEO pay slice, and CEO overconfidence (Kim, Wang and Zhang (2016)) on future stock price crash risk are more pronounced among firms with powerful than non-powerful CEOs, irrespective of CEO power measures used. Our results complement prior findings that powerful CEOs rig incentive pay (Morse et al. (2011), and power leads to overconfident decision-making (Morrison, Rothman, and Soll (2011) and Fast, Sivanathan, Mayer, and Galinsky (2012)).

We next examine whether the presence of a market for corporate control mechanism can curb the ability of a powerful CEO to hide bad news which leads to crash risk. Cain, McKeon, and Solomon (2016) argue that the Takeover Index (*TOIND*), constructed from a full array of takeover laws, offers researchers the most comprehensive tool currently available to measure external forces on corporate governance engendered by the legal environment and provides new evidential support for the beneficial role that the disciplinary market for corporate control can play in corporate governance. We provide evidence that the takeover index curbs managerial bad news hoarding behaviour, which in turn, reduces stock price crash risk. More importantly, when we examine how the impact of the takeover index on stock price crash risk varies among firms with powerful and non-powerful CEOs, we find that the ability of the takeover index to curtail crash risk is more pronounced for firms with non-powerful CEOs. Further, we document that the takeover index has little or no significant impact in reducing the crash risk for firms with powerful founder CEOs. We also examine the role of the takeover index in reducing crash risk, controlling for other governance mechanisms such as founder director, dedicated institutional ownership and board independence.

We show that the takeover index serves as an effective market for corporate control mechanism in addition to the role of board independence and founder director on the board as internal control mechanisms, in reducing stock price crash risk. This is the first study to employ the takeover index in the context of the crash risk and provide support for the effectiveness of Takeover Index (*TOIND*) as an external corporate governance measure in the stock price crash literature.

Li, Lu and Philips (2015) argue that firms with powerful CEOs tend to invest and advertise more, and introduce more new products in dynamic and competitive product markets, and enhance firm value. They suggest that the cost of CEO power is likely to be reduced since product market competition can play a role in mitigating agency problems and disciplining CEOs. In the final set of analysis, we examine whether controlling for the product market competitive environment affects the relation between CEO power and stock price crash risk and between takeover index and stock price crash risk. We find that controlling for product market competition, the positive relation between powerful CEOs and stock price crash risk and negative relation between takeover index and stock price crash risk still holds.

Our paper contributes to the literature in the following ways. First, we show that the CEO power leads to stock price crash risk. We further show that the CEO power leads to stock price crash risk even after controlling for earnings management (Hutton et al. (2009)), tax avoidance (Kim et al. (2011a)), CFO option incentives (Kim et al. (2011b)) and CEO overconfidence (Kim et al. (2016)). Indeed, we show that the effects of previously documented channels such as earnings management, tax avoidance, CFO option incentives, and CEO overconfidence on stock price crash are stronger in firms with powerful than non-powerful CEOs. Our results imply that CEO power captures managers' unobservable choices and actions that is not captured by previously documented crash determinants.

Second, our findings that powerful CEOs lead to extreme negative stock price performance complement recent studies on the adverse consequences of CEO power, such as rigging incentive contract (Morse et al. (2011)) and likelihood of committing fraud (Khanna et al. (2015)). We further provide new insights on the effectiveness of *external monitoring mechanisms* in restraining powerful CEOs. We provide the first empirical finding that the external market for corporate control, as reflected by the takeover index, plays an important role in reducing crash risk. However, the effect of the takeover index and other external monitoring mechanism such as dedicated institutional ownership in curbing crash risk is significantly weaker in firms with powerful founder CEOs. This result extends prior findings by Fracassi and Tate (2012) that powerful CEO weakens the intensity of *internal monitoring* by boards of directors through director appointments with ties to CEOs. Our findings have significant policy implications on governance regulations to reduce the potential negative consequence of CEO power, in particular powerful founder CEOs.

The remainder of the paper is structured as follows. Section 2 outlines the hypotheses development. Section 3 presents the research design and describes the data and variable measurements. Section 4 discusses the baseline empirical results, results addressing endogeneity and firm fixed effect, the results using alternative proxies of CEO power and crash risk, and the results on the impact of CEO power on crash controlling for excessive riskiness such as financial distress, firm age, CEO experience and R & D intensity. Section 5 examines how the impacts of earnings management, tax avoidance, managerial pay incentives and CEO overconfidence on stock price crashes varies between powerful and non-powerful CEOs. Section 6 tests the impact of the takeover index on the crash, controlling for CEO power. Section 7 presents the results on the impact CEO power and takeover index on stock price crash controlling for product market competition. Section 8 concludes the paper.

2. Hypotheses development

The literature on firm-specific determinants of stock price crash risk is built on the agency perspective of hoarding of bad news. Kothari, Shu, and Wysocki (2009) show that management, on average, delays the release of bad news to investors. However, when it is impossible for managers to hide bad news, the sudden release of accumulated bad news leads to a significant decline in stock price or stock price crash (Hutton et al. (2009) and Jin and Myers (2006)). Prior research shows that discretionary accrual-based earnings management (Hutton et al. (2009)), tax avoidance (Kim et al. (2011a)), option incentives for chief financial officers (Kim et al. (2011b)), stock liquidity (Chang, Chen, Zolotoy (2016)), CEO age (Andreou, Louca, Panayides, Petrou (2016)), inefficient governance (Andreou, Antoniou, Horton, and Louca (2016)) and CEO overconfidence (Kim et al. (2016) lead to future stock price crash. In contrast, dedicated institutional ownership (An and Zhang, 2013), institutional ownership by public pension funds (Callen and Fang, 2013), industry-specific auditors (Robin and Zhang (2015)), religiosity in the firm headquarters' country (Callen and Fang (2015)), and accounting conservatism (Kim and Zhang (2016)) minimize the possibility of hoarding bad news, thereby mitigating future stock price crash risk.

Recent studies on CEO power suggest that CEO power has a negative impact on profitability and shareholder's wealth. Daily and Johnson (1997) argue that enhanced power provides CEOs with sufficient discretion to pursue objectives inconsistent with shareholder wealth maximization. Grinstein and Hribar (2004) find that CEOs with the power to influence board decisions receive significantly larger bonuses, engage in larger acquisition deals about the size of their firms, and experience more negative price reaction to their acquisition announcements. Morse et al. (2011) find that powerful CEOs induce boards to shift the weight on performance measures toward the better performing measures, thereby rigging incentive pay. Khanna et al. (2015) find

appointment-based CEO connectedness is positively related to the likelihood of corporate fraud and negatively related to detection of fraud. Friedman (2014) demonstrates earnings management does not take place in isolation and firms with powerful CEOs can potentially pressure CFOs to develop biased performance measures to augment additional compensation incentives. Feng et al. (2011) provide evidence that powerful CEOs with high equity incentives exert significant pressure on CFOs to engage in accounting manipulation for firms that were subject to SEC enforcement actions compared to matched firms with similar size in the same industry but not subject to SEC enforcement actions.

The case of WorldCom offers a stylized example of how powerful managers hide bad news from the investors. Records from the U.S. District Court, Southern District of New York [pp. 9–10, Indictment No. S2 O2 CR 1144 (BSJ)] reveals that

> In or about October 2000, rather than disclosing WorldCom's true financial condition and operating performance, BERNARD J. EBBERS, the CEO, president, and director, and Scott D. Sullivan, the CFO, instructed subordinates, in substance and in part, to falsely and fraudulently book certain entries in WorldCom's general ledger, which were designed to increase artificially WorldCom's reported revenue and to decrease artificially WorldCom's reported expenses, resulting in, among other things, artificially-inflated figures for WorldCom's EPS, EBITDA, and revenue growth rate.

In a detailed press release from WorldCom issued on June 25, 2002, the company confessed that its audit committee had uncovered $3.8 billion in expenses that had been improperly booked as capital expenditures and were not made in accordance with generally accepted accounting principles. Consequently, the company went bankrupt in July 2002.

Synthesizing these evidences, we argue that power in the hands of CEOs give them the means and justification to divert firm resources for their gain and withhold bad news from investors, which results in a stock price crash. Thus, we propose the following hypothesis.

H1: CEO power is positively associated with future stock price crash risk.

Lel and Miller (2015) suggest that the threat of takeover causes managerial discipline through the incentives that the market for corporate control provides to boards to monitor managers. Francis, Hasan, John, and Waisman (2010) find that firms issuing both public and private bonds in firms incorporated in unrestrictive takeover law states experience significantly higher costs of debt financing compared with firms incorporated elsewhere. However, governance mechanisms can be less effective in mitigating the effect of powerful CEOs. Khanna et al. (2015) document that powerful founder CEO increases the likelihood of committing fraud and decreases the likelihood of detection. They observe this relation even after controlling for various proxies for internal and external monitoring, such as independent director, board size, frequency of board meetings, institutional ownership, and analyst coverage. Cain et al. (2016) show that the takeover index (*TOIND*), constructed from a full array of takeover laws, is a better measure of firms' governance environment than the governance measures in prior studies that have focused almost exclusively on business combination law. We argue that stronger market for corporate control governance mechanism will discipline CEOs, which in turn, reduce the likelihood of stock price crash. Synthesizing these evidence, we formulate the following hypothesis:

H2: Takeover index curbs bad news hoarding behavior, which in turn, reduces stock price crash risk and this effect will be more pronounced among firms with non-powerful than powerful CEOs.

3. Research design

In this section, we describe the measures of stock price crash risk and CEO power, sample selection procedure and present descriptive statistics on measures of stock price crash risk, CEO power and other control variables.

3.1. Measures of stock price crash risk

We employ two main measures of crash risk. Our first measure of crash risk is the negative conditional return skewness (*NCSKEW*). We define *NCSKEW* as the negative of the third moments of the firm-specific weekly returns of each firm year normalized by the standard deviation of firm-specific weekly returns raised to the third power. Our second measure of stock price crash risk is down-to-up-volatility (*DUVOL*). This measure was developed by Chen, Hong, and Stein (2001) and followed by Hutton et al. (2009) and Kim et al. (2011a, 2011b). To calculate *DUVOL*, we separate specific weekly returns into down and up weeks. Specifically, down (up) weeks refer to those weeks during which firm-specific weekly returns are below (above) the annual average weekly return. We calculate *DUVOL* as the log of the ratio of the standard deviation of firm-specific down weekly returns to the standard deviation of up weekly returns during the fiscal year. Similar to Kim et al. (2011b) and Kim and Zhang (2016), we estimate our crash risk measures over a 12-month period starting three months after the fiscal year-end.

We also use alternatives stock price crash risk measures: *CRASHD* and *CRCOUNT* for robustness check. *CRASHD* is an indicator variable taking the value 1 for a firm–year that experiences one or more firm-specific weekly returns falling 3.2 standard deviations below the mean firm-specific weekly returns over the fiscal year. *CRCOUNT* is calculated as the number of firm-specific weekly returns exceeding 3.2 standard deviations below the average firm-specific weekly return over the fiscal year.

3.2. Measures of CEO power

Adams, Almeida, and Ferreira (2005) argue that the CEO will be more influential and powerful if he or she is one of the company's founders. Furthermore, CEO power increases monotonically with the number of decision-making positions the CEO holds. For example, the dual role of CEO and

chair implies CEOs' ability to direct board initiatives and impose their will on creating favorable board meeting outcomes (Morse et al., 2011). If a CEO is not the chair of the board, the CEO will have less power, since the chair has a greater influence on most strategic business decisions (Adams et al., 2005). Similarly, the CEO in the role of company president ensures that the board has limited choices for an in-training successor to tap if disagreement with the CEO ensues (Morse et al., 2011).

In line with the above arguments, we use CEO and founder (*CEOFO*) as our first CEO power measure which takes a value of one if the CEO is a founder and zero otherwise. Our second CEO power measure is a dummy variable taking a value of one if we have a founder CEO who is either the president or chair or both (*CEOFEPCB*). This variable allows us to accumulate the most influential positions in an organization's hierarchy of power, that is, CEO, founder, and either president or chair or both. Our third measure of CEO power is a dummy variable taking the value of one if the CEO is both the chair and president (*CEOPRCH*) and zero otherwise. We also use several titles a CEO holds (*NCEOTITLE*) as an alternative proxy for CEO power for robustness check.

3.3. Sample selection and descriptive statistics

We obtain a total of 147,480 firm–year observations for 1993–2013 from the Center for Research in Security Prices (CRSP) database by applying the following data filtering conditions to construct our crash risk variables: (a) minimum of 26 weeks of stock return data is available during the fiscal year; (b) fiscal year-end price is $1 or more; and (c) firm–year observations have positive book value of total assets. To develop our CEO power measures, we use firm–year observations from ExecuComp for the period 1992–2012. We remove finance and regulated utility firms from the sample, as well as firms with less than two firm–year observations over the sample period. If more

than one CEO is reported in a fiscal year, we check whether one of them served as CEO for the following or previous year. If neither did, we exclude that observation. These screening steps yield a sample of 25,375 firm–year observations. Our final match of CEO power variables from ExecuComp, crash risk variables from the CRSP, and firm characteristic variables from Compustat with non-missing values for various control variables generates a final sample of 24,300 firm–year observations. These correspond to our dependent variable at time *t* and independent and other control variables at time t - 1. We present the definitions of variables in the Appendix.

INSERT TABLE 1 HERE

Table 1 presents descriptive statistics of CEO power, crash risk measures, and control variables. The CEO power variables and control variables driving the link between CEO power and future stock price crash risk represent the 1992–2012 period, while the future stock price crash risk variables represent the 1993–2013 period. The mean values of *NCSKEW* and *DUVOL* are 0.1431 and -0.0062, respectively. With regard to powerful CEO measures, 15.19% of our sample CEOs are founder CEOs; 12.21% of our sample CEOs are the founder and either the president or chair or both, while 20.16% of our sample CEOs are both the chair and president. With respect to our control variables, the mean $DTURN_{t-1}$ is 0.0041. The mean RET_{t-1} is -0.1953 and the mean $SIGMA_{t-1}$ is 0.0534. These summary statistics are comparable to those reported in the literature on the determinants of stock price crash risk.

4. Empirical results: CEO power and stock price crash

4.1. Baseline results

To investigate the relation between CEO power and future stock price crash risk, we employ the following regression model:

$$CR_{it} = \beta_0 + \beta_1 * CEOPOWER_{i,t-1} + \gamma' Control\ Variables_{i,t-1} + \varepsilon_{i,t} \ \ldots\ldots (1)$$

Where, CR_{it} is stock price crash risk for firm *i* in year *t* and *CEOPOWER* is a dummy variable that takes a value of one for firms with powerful CEOs and zero otherwise. We use *NCSKEW* and *DUVOL* as main crash variables and *CEOFO*, *CEOFEPCB* and *CEOPRCH* as main CEO power variables. We use firm and year clustering to correct the standard error, consistent with Kim et al. (2011a, 2011b), and alleviate the concern about potential time-scale and cross-sectional dependence in the panel. We also control for year and industry (Fama and French's 49-industry classification) fixed effects in all models. The dependent variable in the regression models is measured at time year t, while the regressors are measured at time t - 1. Following Chen et al. (2001), Hutton et al. (2009), and Kim et al. (2011a, 2011b), we include several control variables: $DTURN_{t-1}$, $SIGMA_{t-1}$, RET_{t-1}, $LMVE_{t-1}$, MTB_{t-1}, LEV_{t-1}, and ROA_t. The variable $DTURN_{t-1}$ is the detrended average monthly stock turnover in year t - 1, which captures differences of opinion among investors; $SIGMA_{t-1}$ is the standard deviation of weekly stock returns over the fiscal year t - 1; RET_{t-1} is the average firm-specific weekly return over the fiscal year t - 1; $LMVE_{t-1}$ is the log of the market value of equity; MTB_{t-1}, a proxy for growth, is measured as the market value of equity divided by the book value of equity; LEV_{t-1} is a ratio of long-term debt to total assets; and ROA_t is income before extraordinary items to total assets in year t.[2]

Since our focus is on examining the impact of powerful CEOs on future stock price crash risk, we also use CEO tenure (measured as the log of tenure, *LTENURE*), CEO tenure squared (*LTENURESQ*), CEO ownership (*CEOOWN*), and CEO ownership squared (*CEOOWNSQ)* as

[2] Following Kim et al. (2011a) we use ROA_t. We obtain similar results when we use ROA_{t-1} instead of ROA_t.

additional control variables. Ali and Zhang (2015) show that earnings overstatement is higher in the early years than in the later years of CEOs' service. They also find that earnings overstatement is also greater in the final year of CEOs' service after controlling for earnings overstatement in the early years of CEOs' service. We control for CEO ownership (*CEOOWN*) as Adams et al. (2005) suggest that *CEOOWN* is a proxy for managerial risk-taking attitude. Lilienfeld-Toal and Ruenzi (2014) also show that firms with high CEO ownership have higher stock market returns than firms with low ownership.

Following Hutton et al. (2009) we use *OPAQUE* as a proxy for earnings management. As Hutton et al. (2009) find a concave relation between opacity and stock price crash we use *OPAQUE* and *OPAQUESQ* in our regressions. Following Kim et al. (2011a), we use *PRSHELT* as a proxy for tax sheltering activities. The variable *PRSHELT* is the estimated probability of engaging in tax sheltering activities based on Wilson's (2009). We use model 1 of Table 4 in Lisowsky (2010, p. 1709) to calculate *PRSHELT*. We follow Kim et al. (2011b) to calculate CFO's option incentives (*CFOPOIN*). We follow Campbell, Gallmeyer, Johnson, Rutherford, and Stanley (2011) to construct our CEO overconfidence measure. We classify CEOs as overconfident if they hold options at least twice during the sample period that are more than 100% in the money. Our measure of CEO overconfidence, *HOLD100*, takes the value of one after two years CEO holds options that are more than 100% in the money and zero otherwise.

INSERT TABLE 2 HERE

Panels A and B of Table 2 present our main regression results using *NCSKEW* and *DUVOL*, respectively, as our crash variables. As can be seen in Models (1) and (4) of Table 2, CEO power is significantly and positively related to stock price crash risk, irrespective of CEO power and the crash risk measures used. We further examine the effect of CEO power on stock price crash risk,

controlling for the determinants of crash risk as documented in prior studies. Specifically, in Models (2) and (5), we document a concave relation between earnings management and stock price crash risk, as documented in Hutton et al. (2009). Similar to Kim et al. (2011a), in Models (3) and (6), we observe a positive relation between tax avoidance and stock price crash risk. Stock price crash risk is also positively related to CFO option incentives (Kim et al. (2011b)) and CEO overconfidence (Kim et al. (2016)). More importantly, we show that the relation between CEO power and stock price crash risk still holds after controlling for the effect of earnings management, tax avoidance, CFO option incentives and CEO overconfidence on crash risk. These results indicate that the relation between CEO power and stock price crash risk is not subsumed by the role of previously documented crash risk determinants.

Bad news could have been withheld during the tenure of the previous CEO and subsequently released when the new, powerful CEO arrived. Thus, the positive relation between CEO power and crash risk might not be due to the power of the current CEO but, instead, bad news hoarding by the previous CEO. In unreported results, we examine the impact of CEO power on crash risk on a subsample of firms with CEOs with tenures of at least three years and still find that CEO power has a positive effect on future crash risk.[3] Overall, we find support for our main hypothesis that CEO power is positively linked with future stock price crash risk.

4.2. Endogeneity

In this section, we use the instrumental variable approach to isolate other sources of variation in the impact of powerful CEOs on future stock price crash risk. Similar to Adams et al. (2005), we

[3] In unreported results, we find positive relation between CEO power and stock price crash risk when we exclude the dotcom crash (2001-2002) and Global Financial Crisis (2007-2009) periods.

use two instruments for our power measures related to founder: *CEOFO* and *CEOFEPCB*. Since dead founders cannot be CEOs, we use the dead founder as our first instrument. The death of a founder CEO is a fairly exogenous event that affects the likelihood of a current CEO being the founder (*CEOFO*) or current CEO being the founder and either chair or president, or both (*CEOFEPCB*), and is less likely to have an effect on stock price crash. We use the number of founders alive as our second instrument. The number of founders alive increases the probability that a CEO is a founder and is unlikely to have any impact on firm crash risk. Thus, choosing the dead founder and number of founders alive as instruments fulfill the exclusion restriction for the endogeneity test. In constructing the dead founder variable (*DFO*), we manually collect the data from various sources.[4] The dummy variable *DFO* would take the value of one if the founder died before the firm enters into our sample. For firms with multiple founders, we assign the value of one if the last founder died before the firm enters into our sample.

Following Fahlenbrach (2009), we use additional control variables such as CEO age (*CEOAGE*), CEO ownership (*CEOOWN*), the log of firm age (*LNFAGE*), the log of total assets (*LOGAT*), Delaware dummy (*DDELAWARE*) and S&P 500 dummy (*DS&P500*) in our first-stage regression. We also control for CEO pay using the variable the log of CEO pay (*LOGCEOPAY*) and use dummy variables for the company listed on the American Stock Exchange (*DAMEX*) and NASDAQ (*DNASDAQ*). We also use year and industry fixed effects. Panel A of Table 3 presents first-stage regression of the determinants for *CEOFO* and *CEOFEPCB*. We use *CEOFO* and

[4] We use google.com, Execucom, fundinguniverse.com, bloomberg.com, company websites, businessweek.com, and the SEC Edgar database to cross-check and construct the dead founder variable, the number of founders, and firms' founding dates.

CEOFEPCB in year *t - 1* as a dependent variable. Control variables are based on year *t - 2*. We use the log of one plus the number of founders alive (*LNFOALIVE*) as the second instrument.

The estimated coefficient of the dead founder variable is significantly negative for both CEO power measures: *CEOFO* and *CEOFEPCB* in the first-stage regression. The coefficient of the number of founders alive is significantly positive for the CEO power measure *CEOFO* and positive but insignificant for *CEOFEPCB*. The coefficients of other control variables are consistent with those of Fahlenbrach (2009). Panel B presents the second-stage regressions based on the predicted value of *CEOFO* (*ECEOFO).* Panel C presents the second-stage regressions based on the predicted value of *CEOFEPCB* (*ECEOFEPCB).* As can be seen in Panels B and C, the coefficients of *ECEOFO* and *ECEOFEPCB* are positive and significant across alternative measures of stock price crash risk. In unreported results, we also follow a technique suggested by Wooldridge (2002) that involves using the predicted value of *CEOFO* and *CEOFEPCB* as an instrument in the instrumental regressions and find similar results. These results indicate that powerful CEO leads to crash controlling for endogeneity.

INSERT TABLE 3 HERE

4.3. Firm fixed effect regression

We strengthen our main findings by performing additional robustness checks. It is possible that the relation observed between CEO power and stock price crash risk is driven by the presence of time-invariant firm-specific omitted variables. We mitigate this concern by performing an additional robustness check using firm and year fixed effects. We document two main results for this analysis in Table 4. First, CEO power variables still possess strong explanatory power on future stock price crash risk. Second, controlling for firm and year fixed effects the significance of earnings management, tax avoidance, CFO option incentive, and CEO overconfidence in explaining future

stock price crash risk disappears. We conclude that our main finding on the positive relation between CEO power and crash risk is robust to the use of firm and year fixed effects.

INSERT TABLE 4 HERE

4.4. Alternative measures of stock price crash risk

In this section, we examine the relation between CEO power and stock price crash risk using two alternative measures of stock price crash risk. The first measure is the dummy variable *CRASHD,* which takes a value of one for a firm–year that experiences one or more firm-specific weekly returns falling 3.2 standard deviations below the mean firm-specific weekly returns over the fiscal year, and zero otherwise. The second measure is *CRCOUNT*, calculated as the number of firm-specific weekly returns exceeding 3.2 standard deviations below the mean firm-specific weekly return. We present the results of this robustness check in Panel A of Table 5. We still find that CEO power increases future stock price crash risks, using all the alternative measures of stock price crash risk, controlling for earnings management, tax avoidance, CFO option incentives and CEO overconfidence.[5]

INSERT TABLE 5 HERE

4.5. Alternative measures of CEO power

In this section, we examine the relation between CEO power and stock price crash risk using number titles a CEO holds (*NCEOTITLE*) as an additional measure of CEO power. We calculate

[5] We also address the endogeneity concern in a similar method as described in Section 4 and Table 3. We obtain consistent results that the predicted value of *CEOFO* (*CEOFEPCB)* is positively related to future stock price crash risk, when we measure crash risk based on *CRASHD* and *CRCOUNT.*

the number of titles a CEO holds by assigning a value of one for each title a CEO holds and then summing them. Specifically, a nominal CEO without additional titles receives a value of one and receives an extra point for each additional title, namely, founder, chair, president, chief operating officer, CFO, vice president, vice chair, directorship, and membership to key committees. We present the results in Panel B of Table 5. The results indicate that the positive relation between CEO power and future stock price crash risk holds for the alternative measure of CEO power.

4.6 CEO Power, Excessive Risk Taking and Crash

It is possible that the positive relation between CEO power and stock price crash risk is driven by excessive risk taking activities. Therefore, we perform an additional robustness test controlling for experience of the CEO, company age, financial distress and R&D intensity and present the results in Table 6. We use R&D intensity (the ratio of R&D expenditure to total assets) as proxy for excessive risk-taking (Hoskisson et al. 1993); CEO age to proxy for CEO experience; firm-age to proxy for firm's maturity in dealing with external and internal difficulties; and the modified Z-score (Hasan et al., 2014) to proxy for financial distress.

We document that controlling for these additional variables, CEO power still increases crash. Further, we document that older firms, R&D intensity, and firms with financial distress are less likely to experience crash. Finally, CEO experience exhibits a negative but insignificant effect on crash. Overall, we conclude that our main finding on the positive relation between CEO power and crash risk is not driven by CEO experience, company life cycle, financial distress and excessive risk-taking.

INSERT TABLE 6 HERE

4.7 CEO Power and Price JUMP

Since, Adams et al. (2005) show that powerful CEOs lead to higher variability in firm performance, we further examine the effect of CEO power on stock price jump, defined as a dummy variable, which takes a value of one for a firm–year that experiences one or more firm-specific weekly returns that are 3.2 standard deviations above the mean firm-specific weekly returns over the fiscal year, and zero otherwise. We do not find any evidence that firms with powerful CEOs have higher stock price jumps than others.[6] These findings demonstrate that the CEO power has significant implication on future extreme negative stock returns and not on positive outcomes (price jump), indicating that decisions with extreme negative consequences are more likely to be taken when the CEOs are more powerful.

5. The impact of crash determinants on stock price crash for firms with powerful and non-powerful CEOs

The literature on stock price crash risk finds that earnings management (Hutton et al., 2009), tax avoidance (Kim et al., 2011a), CFO option incentives (Kim et al., 2011b), and CEO overconfidence (Kim et al., 2016) lead to future crash risk. We posit that managers require both the intention and the ability to hide bad news. CEO power will provide an opportunity for CEOs to hide bad news. In this section, we examine how the impact of these factors on stock price crashes varies between firms with powerful and non-powerful CEOs.

Prior studies examine the determinants of crash risk using the following regression:

$$CR_{it} = \beta_0 + \beta_1 * CRdet_{\mathrm{i,t-1}} + \gamma' Control_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

[6] We do not report the results to conserve space.

where CR_{it} is a measure of crash risk and $CRdet_{\mathrm{i,t-1}}$is a crash determinant.

Since $CRdet_{\mathrm{i,t-1}} = CRdet_{\mathrm{i,t-1}} * CEOPOWER + CRdet_{\mathrm{i,t-1}} * (1 - CEOPOWER)$, we examine how the impact of these factors on stock price crash risk varies between firms with powerful and non-powerful CEOs, as in the following model:

$$CR_{it} = \beta_0 + \beta_1 CEOPOWER * CRdet_{i,t-1} + \beta_1 (1 - CEOPOWER\ ) * CRdet_{\mathrm{i,t-1}} + \gamma' Control_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

The following sections examine how the impact of earnings management (Hutton et al., 2009), tax avoidance (Kim et al., 2011a), CFO option incentives (Kim et al., 2011b), and CEO overconfidence (Kim et al., 2016) on stock price crash risk varies between firms with powerful and non-powerful CEOs.

5.1. Earnings management

Using earnings management as a measure of opacity (*OPAQUE*), in Panel A of Table 7, we examine how the concave relation between *OPAQUE* and stock price crash risk, as documented in Hutton et al. (2009), varies among firms with powerful and non-powerful CEOs. We find strong support for the concave relation between *OPAQUE* and stock price crash risk for firms with powerful CEOs, irrespective of crash and CEO power measures used. We find weaker results for the firm without powerful CEOs. Indeed, the relation between *OPAQUE* and crash risk becomes insignificant for firms with non-powerful CEOs when we use *CEOFO* and *CEOFEPCB* as power measures and *DUVOL* as crash measure. The test for the difference in coefficients indicates that the estimated coefficient of *CEOPOWER*OPAQUE* (*CEOPOWER*OPAQUESQ*) is significantly larger than the estimated coefficient of (1 - *CEOPOWER*)**OPAQUE* ((1-*CEOPOWER*OPAQUESQ*)), when using *CEOFO* and *CEOFEPCB* as CEO power measure for

all crash measures. Taken together, we interpret the results in Panel A as evidence that powerful CEOs, especially powerful founder CEOs, provide a shield behind earnings management, which leads to significantly higher levels of crash risk among firms with powerful CEOs.

INSERT TABLE 7 HERE

Roychowdhury (2006) shows that managers can manipulate real activities to meet certain earnings target. Cohen, Dey, and Lys (2008) show that firms switch from accrual-based to real earnings management after SOX. We also examine whether the impact of earnings management through real on stock price crash is stronger for firms with powerful than non-powerful CEOs. Following Cohen and Zarowin (2010) and Ali and Zhang (2015) we use the abnormal discretionary expenses (ADISEX) as a measure for real earnings management. As can be seen in Panel B of Table 7, we find that real earnings management leads to crash only for firms with powerful founder CEOs. This supports our prediction that powerful CEOs, provide a shield behind manipulating real activities, which leads to significantly higher levels of crash risk among firms with powerful CEOs.

5.2. Tax avoidance

In this section, we examine whether the impact of tax avoidance on stock price crashes varies between firms with powerful and non-powerful CEOs. We find in Panel C of Table 7 that *PRSHELT* is significantly and positively related to crash risk for firms with powerful CEOs, irrespective of crash and CEO power measures used. However, the relation between *PRSHELT* and crash risk is weaker for firms with non-powerful CEOs. Further, the test for the difference in coefficients indicates that the estimated coefficient of *CEOPOWER*PRSHELT* is significantly larger than the estimated coefficient of (1 - *CEOPOWER*)**PRSHELT,* irrespective of crash and

CEO power measures used.[7] These findings show that the impact of tax avoidance on future stock price crash risk is more pronounced among firms with powerful CEOs than among those with non-powerful CEOs.

5.3. CFO option incentives

In this section, we extend the work of Kim et al. (2011b) and examine whether the impact of CFO option incentives on stock price crashes varies between firms with powerful and non-powerful CEOs. The results are reported in Panel D of Table 7. We find a significantly positive relation between CFO option incentives and future stock price crash risk for firms with powerful CEOs, irrespective of the crash or CEO power measures used. The relation between CFO option incentives and future stock price crash risk is weaker for firms with non-powerful CEO, and even becomes insignificant when using *DUVOL,* as a measure of crash risk. Moreover, the test for the difference in coefficients indicates that the estimated coefficient of *CEOPOWER*CFOOPIN* is significantly larger than the estimated coefficient of (1 - *CEOPOWER*)* *CFOOPIN*. Overall, our findings support that the effect of CFO incentive on stock price crash risk is more pronounced for firms with powerful CEOs.

5.4. CEO overconfidence

Kim et al. (2016) argue that overconfident CEOs continue to invest in negative NPV project believing that they will maximize long-term firm value and show that firms with overconfident CEOs have higher stock price crash risk than firms with non-overconfident CEOs. Given that

[7] In unreported results, we also use BTDF, a common factor extracted from three book-tax difference measures (see Kim et al. (2011a) as a proxy for tax avoidance and find similar results.

overconfidence is a physiological bias (Galasso, and Simcoe, 2011) and power leads to overconfident decision-making (Morrison et al. (2011) and Fast et al. (2012)), we predict that the impact of overconfidence on the crash will be more pronounced among firms where CEO enjoys power.

Kim et al. (2016) also show that CEO overconfidence leads to crash only among firms with CEO pay dominance, measured by the CEO pay slice (CPS) developed by Bebchuk et al. (2011).[8] Powerful CEOs also get benefits by consuming other forms of perks, such for instance, entrenched behaviors pertaining to sub-optimal capital allocations to a firm's divisions, etc. Bebchuk et al. (2011) contend that a high level of *CPS,* a substantial departure from the optimal *CPS* level ─ is an indication of significant governance problems and a state of affairs in which the CEO is powerful enough to extract rents. Given that *CPS* reflects governance problem and can be driven by CEO power, we further examine whether *CPS* affects stock price crash and test how this effect varies between powerful and non-powerful CEOs.

We present the results on how the impact of CEO overconfidence on stock price crash risk varies among firms with powerful and non-powerful CEOs in Panel E of Table 7. For all measures of crash risk and CEO power, we find that the positive relation between CEO overconfidence and future stock price crash risk is evident for firms with powerful CEOs. In the case of firms with non-powerful CEOs, we find a positive relation between CEO overconfidence and future stock price crash risk using both crash measures. Further, the estimated coefficient for *CEOPOWER*HOLD100* is significantly larger than (1 - *CEOPOWER*)**HOLD100* for all models,

[8] CEO pay slice (*CPS*) is defined as the fraction of the CEO's aggregate compensation to that of the top five executives.

except using *CEOFO* as a CEO power measure and *DUVOL* as a crash measure. We also use the 67% in the money options threshold to classify overconfident CEOs (*HOLD67*). In unreported results, we find that the coefficient estimates for *CEOPOWER*HOLD67* are statistically and significantly larger than those for (1 - *CEOPOWER*) **HOLD67* and the differences among these coefficients are statistically significant, irrespective of crash risk or CEO power measures used.

We present the results on the impact of *CPS* on stock price crash and how this impact varies between powerful and non-powerful CEOs in Table 8. We find that the effect of *CPS* on crash risk generally works only in firms with powerful CEOs. The result is stronger in founder-CEO firms, irrespective of the crash measures used.[9] Our findings support that the effect of CEO overconfidence and CEO pay dominance on stock price crash risk is more pronounced for firms with powerful CEOs. Our findings reaffirm our prediction that the implication of CEO overconfidence and CEO pay dominance on stock price crash risk in a corporate setting is subject to the CEO's power to influence decisions.

INSERT TABLE 8 HERE

Overall, we find that the effects of real and accrual earnings management, and CEO pay dominance on crash risk are more pronounced for firms with powerful founder CEOs, whereas the effects of tax avoidance, CFO option incentives and CEO overconfidence on crash are more pronounced for firms with powerful CEOs, indicating the significance of the role of CEO power in extreme negative outcomes.

[9] Using *CEOPRCH* as a CEO power measure we find that CPS instigate crash for firms with powerful CEOs only when we use *CRASHD* and *CRCOUNT* as crash measures.

6. CEO power, monitoring mechanisms and stock price crash

In this section, we examine the impact of the takeover index developed by Cain et al. (2016) on stock price crash risk and how this impact varies between firms with powerful and non-powerful CEOs. We use the takeover index as it focuses on the hostile takeovers, which are disciplinary in nature. Further, the index is constructed from takeover laws, aggregate capital liquidity and firm age, all of which are outside the control of the firm. [10]

As can be seen in Panel A of Table 9, *TOIND* curtails future stock price crash risk, irrespective of the CEO power or crash measures used. More importantly, CEO power leads to crash risk controlling for *TOIND*. When we examine how the impact of takeover index on stock price crash varies between firms with powerful and non-powerful CEOs, we find that *TOIND* mitigate future stock price crash risk for firms with non-powerful CEOs. However, *TOIND* does not mitigate future stock price crash risk for firms with powerful founder CEOs, irrespective of any crash measures used. In the case of powerful CEOs using *CEOPRCH* as a power measure *TOIND* mitigates crash risk; however, the coefficient estimates for *(1- CEOPOWER) * TOIND* is significantly higher (more negative) than those for *CEOPOWER* TOIND.* Overall, the market for corporate control monitoring mechanism is unable to curtail the power of founder CEOs to mitigate the stock price crash risk.

INSERT TABLE 9 HERE

[10] In untabulated results, we find that governance indices based on firm-level variables such as the G-index (Gompers, Ishii, and Metrick, 2003) and the E-index (Bebchuck, Cohen, and Ferrell, 2009) do not reduce stock price crash risk.

We also use dedicated institutional ownership as a proxy for external monitoring and present the results in Panel B of Table 9. We calculate the yearly percentages of shares outstanding held by dedicated institutional investors (*IODED*), taking the average over the four quarters of the firm's fiscal year using data from the Thomson Reuters Institutional Holdings (13F) database. Our classification of dedicated institutions is based on Bushee (1998). As can be seen in Panel B of Table 9, with the presence of CEO power variable, *IODED* is significantly negatively related to stock price crash risk only when using *NCSKEW* as a crash risk measure and not controlling for other crash determinants. Further, we do not find any evidence for *IODED* to mitigate stock price crash risk in firms with powerful CEOs, irrespective of CEO power measures used.

In addition to external governance mechanisms such as the takeover index and dedicated institutional ownership, we also consider the roles of other internal governance mechanisms, such as founder director (Li and Srinivasan, 2011), and board independence in mitigating the bad news hoarding behavior, which in turn, reduce stock price crash risk. Our results in Table 10 show that controlling for these governance mechanisms, we still observe a positive relation between powerful founder CEO and stock price crash risk. We also find that the estimated coefficients of founder director (FDIR) and board independence (BIND) are significantly negative, indicating that they serve as effective internal governance mechanisms in curbing bad news hoarding behavior, which in turn, reduce crash risk. [11] We still observe a negative relation between *TOIND* and stock price

[11] We do not consider the effect of founder director and board independence in reducing crash risk for firms with powerful versus without non-powerful CEOs because the number of observations with both founder directors and founder CEO is very small (77 in total); and board independence

crash risk, controlling for other internal and external governance mechanisms: dedicated institutional ownership, board independence and founder director on the board, indicating the significance of *TOIND* as an external corporate control mechanism in the crash literature.

INSERT TABLE 10 HERE

Overall, we find strong support that the takeover index serves as an effective external monitoring mechanism in addition to the role of board independence and founder director on the board as internal control mechanisms, in curbing bad news hoarding behavior and hence, reducing stock price crash risk. Our findings have significant implications for governance literature.

7. CEO power, product market competition and crash

In this section, we examine how the relation between CEO power and stock price crash risk varies among firms operating in competitive versus non-competitive environment. Prior studies argue that product market is an important external governance mechanism to mitigate agency problems (Giroud and Mueller (2010), Kim and Lu (2011)). Li et al. (2015) find that the announcement of granting more power to the CEO by appointing him/her as the chairman of the board is associated with significantly higher abnormal returns when a firm operates in a more dynamic and competitive product market. They also find that firms with powerful CEOs tend to invest and advertise more, and introduce more new products. Thus, product market competition may attenuate the impact of CEO power on crash risk. Following, Hoberg, Phillips and Prabhala (2014) we use product market fluidity variable, a 10-K based measures of the structure and evolution of the product space occupied by a firm, as a proxy for product market competition (*PMC*).

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can be influenced by the decision of the powerful CEOs, especially the appointment of directors with ties to the CEOs (Fracassi and Tate (2012)).

We present the results in Table 11. Controlling for PMC, we still observe a significantly positive relation between powerful CEOs and stock price crash risk and significantly negative relation between takeover index and stock price crash risk. Although, the CEO power measure *CEOPRCH* is significantly and positively related to stock price crash risk only at the 10% significance level. *PMC* is significantly and positively related to future stock price crash risk only when we use *NCSKEW* as crash measure and *CEOPRCH* as power measure. We further examine how CEO power affects crash in high and low PMC environment. We find that the estimated coefficient of *HPMC*CEOPOWER* is significantly positive for all measures of crash risk and CEO power. However, the estimated coefficient of *LPMC*CEOPOWER* is significantly positive at least at the 10% significance level for powerful founder CEOs except using *CEOFEPCB* as a powerful founder CEO measure and *DUVOL* as a crash measure. Overall, our results imply that the competitive pressure from the product market does not restrain the effects of powerful founder CEO in increasing future stock price crash risk and the takeover index in mitigating bad news hoarding behaviour, which in turn, reduce crash risk.

INSERT TABLE 11 HERE

8. Conclusion

We investigate the impact of CEO power on future stock price crash risk and provide strong evidence that the presence of a powerful CEO is positively related to firm-specific future stock price crash risk. Our results hold controlling for earnings management, tax avoidance, CFO option incentives, and CEO overconfidence, which lead to crash risk. Our results also hold when controlling for endogeneity. Our findings are robust to the use of various proxies of CEO power and stock price crash risk. Further, we find that the impacts of tax avoidance, CFO option incentives and CEO overconfidence on stock price crash risk are stronger for firms with powerful than non-

powerful CEOs, irrespective of the CEO power and crash measures used. However, the impact earnings management on crash risk is stronger for firms with powerful than non-powerful CEOs only when we use founder CEOs (*CEOFEPCB* and *CEOFO*) as CEO power measure. Further, we find real earnings management leads to crash only for firms with powerful founder CEOs. We further consider the role of CEO pay dominance on stock price crash and find that it increases stock price crash risk only for firms with powerful founder CEOs.

We find evidence to support the role of the takeover index as an external governance mechanism in curbing bad news hoarding behavior to reduce stock price crash. We further examine how the impact of takeover index on stock price crash risk varies between firms with powerful and non-powerful CEOs and find that takeover index curtails crash risk for firms with non-powerful CEOs, however, has little or no significant impact in reducing the crash risk for firms with founder CEOs. We also find evidence to support the role of board independence and founder director in curbing bad news hoarding behavior to reduce stock price crash. The effect of the takeover index on stock price crash risk still holds controlling for other internal and external governance mechanisms such as board independence, founder director, and dedicated institutional ownership. Our findings indicate the incremental effect of takeover index as a market for corporate control mechanism in mitigating bad news hoarding behavior, resulting in reduction in stock price crash risk. Finally, we show that the effect of CEO power on stock price crash risk still holds controlling for the product market competitive environment. However, we do not find any evidence that firms with powerful CEOs have higher stock price jumps than others.

Overall, our findings demonstrate that the CEO power has significant implication on future extreme negative stock returns and not on positive outcomes (price jump), indicating that decisions with extreme negative consequences are more likely to be taken when the CEOs are more powerful.

The takeover index, a proxy for external corporate governance engendered by the legal environment mitigates bad news hoarding behavior, which in turn, reduces crash risk for firms without powerful founder CEOs. Our findings have significant implications for the governance literature.

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Table 1: Descriptive statistics

This table presents the summary statistics on measures of stock price crash risk, CEO power, and other control variables. The crash variables represent the period 1993–2013, while the control variables represent the period 1992–2012. All variables, except the dummy variables, are winsorized at 1%. Variables definitions are provided in the Appendix.

Variable	N	Mean	Min.	Max	SD	Med.	Skew.
CEO power variables at t - 1							
CEOFO	24300	0.1519	0.0000	1.0000	0.3590	0.0000	1.9393
CEOFEPCB	24300	0.1221	0.0000	1.0000	0.3274	0.0000	2.3091
CEOPRCH	24300	0.2016	0.0000	1.0000	0.4012	0.0000	1.4875
NCEOTITLE	24300	3.4524	1.0000	8.0000	0.8285	3.0000	0.2188
Crash risk variables at t							
DUVOL	24300	-0.0062	-1.0795	0.9734	0.3909	-0.0160	0.1200
NCSKEW	24300	0.1431	-2.8471	3.0383	1.0309	0.0845	0.2745
CRASHD	24300	0.2062	0.0000	1.0000	0.4046	0.0000	1.4526
CRCOUNT	24300	0.2148	0.0000	4.0000	0.4334	0.0000	1.8092
Other variables							
ADISEX	23390	0.0304	-2.1745	2.0409	0.2198	0.0101	0.1670
BIND	18182	0.6840	0.0000	1.0000	0.1868	0.7143	-1.1904
$CEOAGE_{t-1}$	24300	55.0004	29.0000	95.0000	7.6639	55.0000	0.2734
$CEOOWN_{t-1}$	24300	0.0110	0.0000	0.2137	0.0302	0.0012	4.9064
$CFOOPIN_{t-1}$	17926	0.0820	0.0000	0.4601	0.0887	0.0536	1.9751
DFO_{t-1}	24300	0.3066	0.0000	1.0000	0.4611	0.0000	0.8388
$DTURN_{t-1}$	24300	0.0041	-0.2905	0.3089	0.0830	0.0027	0.1158
FAGE	24300	50.4117	3.0000	285.0000	41.0766	36.0000	1.2375
FDIR	17060	0.1026	0.0000	1.0000	0.3035	0.0000	2.6186
$HOLD100_{t-1}$	21706	0.0596	0.0000	1.0000	0.2368	0.0000	3.7199
$IODED_{t-1}$	24300	0.0837	0.0000	0.8129	0.0735	0.0681	1.5624
LEV_{t-1}	24300	0.1721	0.0000	0.5991	0.1541	0.1534	0.6740
$LMVE_{t-1}$	24300	7.1837	1.6796	11.5374	1.6048	7.0115	0.3680
$LNFOALIVE_{t-1}$	24300	0.8908	0.0000	8.0000	0.8548	1.0000	1.5706
$LOGAT_{t-1}$	24300	7.0730	1.2331	13.5896	1.6191	6.9147	0.4278
$LCEOPAY_{t-1}$	24300	6.6264	0.0000	11.2635	0.9392	6.6694	-2.2171
$LTENURE_{t-1}$	24300	0.8112	0.3010	1.5563	0.3278	0.7782	0.1715
MTB_{t-1}	24300	3.3397	0.4903	20.9090	3.1882	2.3841	3.1055
$NCSKEW_{t-1}$	24300	0.1384	-2.8471	3.0233	1.0006	0.0727	0.3431
$OPAQUE_{t-1}$	22027	0.5026	0.0306	4.1183	0.7401	0.2451	3.2643
$PRSHELT_{t-1}$	23555	0.6185	0.0004	0.9993	0.3440	0.74958	-0.29453
RDINTENSITY	24300	0.0333	0.0000	0.2762	0.0557	0.0026	2.1929
RET_{t-1}	24300	-0.1953	-3.9948	2.3515	.85660	-0.15029	-0.4192
ROA_t	24300	0.0545	-0.2644	0.2625	0.0947	0.0585	-0.8825
$SIGMA_{t-1}$	24300	0.0534	0.0162	0.1877	0.0265	0.0474	1.4744
$TOIND_{t-1}$	22965	0.2228	0.0012	1.9309	0.1419	0.1984	2.1790
Z-SCORE	23571	1.9773	-3.5876	5.3281	1.3735	2.0094	-0.7664

Table 2: CEO power and stock price crash risk—Main results

This table presents the results on the impact of CEO power on stock price crash risk. The dependent variable is the negative conditional skewness of future firm-specific weekly returns (*NCSKEW*) and down-to-up volatility (*DUVOL*). The main independent variable is CEO power using various measures: CEOFO, CEO and founder; CEOFEPCB, CEO, founder and either the president or the chair, or both; and CEOPRCH, CEO, president and chair. Panels A, B and C report the results using CEOFO, CEOFEPCB and CEOPRCH, respectively, as CEO power measures. The t-values are reported in parentheses and clustered by both firm and year. Industry and year fixed effects are included in all the regressions. The 1%, 5%, and 10% significance levels of the coefficients are denoted by [a], [b], and [c], respectively. The variables are winsorized at the 1% level. We present the variable definitions in the Appendix.

Panel A: CEO Power measure is CEOFO						
	NCSKEW			DUVOL		
	1	2	3	4	5	6
CEOFO	0.096[a]	0.099[a]	0.114[a]	0.023[a]	0.022[b]	0.029[a]
	(4.12)	(4.08)	(3.75)	(2.78)	(2.45)	(2.72)
NCSKEW	0.058[a]	0.055[a]	0.055[a]	0.021[a]	0.020[a]	0.021[a]
	(7.53)	(6.97)	(7.01)	(6.86)	(6.39)	(6.64)
SIGMA	-1.394[b]	-1.380[b]	-1.412[c]	-0.537[a]	-0.539[a]	-0.532[b]
	(-2.13)	(-2.14)	(-1.95)	(-2.77)	(-2.67)	(-2.04)
RET	0.138[a]	0.138[a]	0.154[a]	0.054[a]	0.052[a]	0.057[a]
	(7.94)	(7.23)	(6.95)	(7.05)	(7.15)	(7.17)
ROA	-1.242[a]	-1.274[a]	-1.361[a]	-0.142[a]	-0.159[a]	-0.206[a]
	(-13.86)	(-14.01)	(-10.08)	(-3.05)	(-3.44)	(-3.27)
DTURN	0.236[b]	0.227[b]	0.203[c]	0.105[a]	0.107[a]	0.103[a]
	(2.57)	(2.42)	(1.79)	(3.23)	(3.44)	(2.67)
LEV	-0.354[a]	-0.336[a]	-0.359[a]	-0.082[a]	-0.068[a]	-0.077[a]
	(-5.69)	(-5.13)	(-4.44)	(-4.21)	(-3.38)	(-3.32)
LMVE	0.049[a]	0.056[a]	0.042[a]	0.015[a]	0.017[a]	0.015[a]
	(6.10)	(7.02)	(4.92)	(5.33)	(6.88)	(5.02)
MTB	0.014[a]	0.014[a]	0.013[a]	0.002[c]	0.001	0.002
	(4.73)	(4.76)	(3.33)	(1.71)	(1.17)	(1.11)
LTENURE	0.107	0.094	-0.076	0.056	0.056	-0.012
	(0.85)	(0.69)	(-0.47)	(1.19)	(1.12)	(-0.20)
LTENURESQ	-0.047	-0.040	0.049	-0.028	-0.028	0.009
	(-0.62)	(-0.50)	(0.51)	(-1.01)	(-0.95)	(0.27)
CEOOWN	0.840	0.495	-0.846	0.220	0.098	-0.286
	(1.05)	(0.61)	(-1.39)	(0.75)	(0.33)	(-1.27)
CEOOWNSQ	-4.304	-2.517	4.022	-1.407	-0.684	1.217
	(-1.04)	(-0.60)	(1.24)	(-0.91)	(-0.44)	(0.94)
OPAQUE		0.142[a]	0.139[a]		0.034[b]	0.032[c]
		(4.54)	(3.33)		(2.51)	(1.84)
OPAQUESQ		-0.033[a]	-0.032[a]		-0.009[a]	-0.008[c]
		(-4.24)	(-3.19)		(-2.59)	(-1.95)
PRSHELT			0.057[a]			0.016[b]
			(2.92)			(2.25)
CFOOPIN			0.373[a]			0.083[b]
			(2.61)			(1.97)
HOLD100			0.059[a]			0.016[a]

			(4.53)			(2.69)
Adjusted R^2	0.034	0.035	0.037	0.036	0.035	0.039
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Y & I. Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	24300	22027	16393	24300	22027	16393

Panel B: CEO Power measure is CEOFEPCB

	NCSKEW			DUVOL		
	1	2	3	4	5	6
CEOFOEPOCB	0.146[a]	0.142[a]	0.126[a]	0.037[a]	0.035[a]	0.034[a]
	(5.21)	(4.92)	(4.13)	(3.81)	(3.56)	(3.02)
NCSKEW	0.057[a]	0.055[a]	0.055[a]	0.021[a]	0.020[a]	0.021[a]
	(7.52)	(6.95)	(6.99)	(6.85)	(6.37)	(6.63)
SIGMA	-1.380[b]	-1.380[b]	-1.413[c]	-0.535[a]	-0.543[a]	-0.533[b]
	(-2.09)	(-2.12)	(-1.95)	(-2.74)	(-2.67)	(-2.05)
RET	0.138[a]	0.138[a]	0.154[a]	0.054[a]	0.052[a]	0.057[a]
	(7.97)	(7.28)	(6.95)	(7.03)	(7.17)	(7.18)
ROA	-1.237[a]	-1.272[a]	-1.359[a]	-0.141[a]	-0.159[a]	-0.205[a]
	(-13.67)	(-13.98)	(-10.05)	(-3.02)	(-3.44)	(-3.27)
DTURN	0.238[b]	0.230[b]	0.202[c]	0.106[a]	0.108[a]	0.103[a]
	(2.57)	(2.43)	(1.78)	(3.22)	(3.44)	(2.67)
LEV	-0.355[a]	-0.337[a]	-0.361[a]	-0.082[a]	-0.068[a]	-0.077[a]
	(-5.63)	(-5.09)	(-4.45)	(-4.19)	(-3.36)	(-3.34)
LMVE	0.049[a]	0.056[a]	0.042[a]	0.014[a]	0.017[a]	0.015[a]
	(6.11)	(7.04)	(4.99)	(5.31)	(6.89)	(5.06)
MTB	0.014[a]	0.014[a]	0.013[a]	0.002[c]	0.001	0.002
	(4.80)	(4.78)	(3.34)	(1.74)	(1.18)	(1.11)
LTENURE	0.120	0.104	-0.081	0.059	0.060	-0.013
	(0.96)	(0.77)	(-0.51)	(1.27)	(1.21)	(-0.22)
LTENURESQ	-0.060	-0.050	0.051	-0.031	-0.031	0.009
	(-0.80)	(-0.64)	(0.55)	(-1.15)	(-1.09)	(0.28)
CEOOWN	0.727	0.412	-0.875	0.190	0.072	-0.295
	(0.93)	(0.51)	(-1.45)	(0.65)	(0.25)	(-1.31)
CEOOWNSQ	-3.943	-2.263	4.154	-1.314	-0.616	1.252
	(-0.96)	(-0.54)	(1.28)	(-0.85)	(-0.39)	(0.97)
OPAQUE		0.142[a]	0.139[a]		0.034[b]	0.032[c]
		(4.52)	(3.32)		(2.50)	(1.84)
OPAQUESQ		-0.033[a]	-0.032[a]		-0.009[a]	-0.008[c]
		(-4.22)	(-3.19)		(-2.58)	(-1.95)
PRSHELT			0.057[a]			0.016[b]
			(2.91)			(2.24)
CFOOPIN			0.373[a]			0.082[b]
			(2.60)			(1.96)
HOLD100			0.060[a]			0.016[a]
			(4.60)			(2.73)
Adjusted R^2	0.035	0.035	0.037	0.036	0.036	0.039
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Y & I. Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	24300	22027	16393	24300	22027	16393

Panel C: CEO Power measure is CEOPRCH						
			NCSKEW			DUVOL
	1	2	3	4	5	6
CEOPRCH	0.070[a]	0.070[a]	0.031[c]	0.026[a]	0.028[a]	0.018[b]
	(3.75)	(3.58)	(1.70)	(3.99)	(3.92)	(2.43)
NCSKEW	0.057[a]	0.054[a]	0.055[a]	0.021[a]	0.020[a]	0.021[a]
	(7.56)	(7.00)	(7.04)	(6.85)	(6.38)	(6.67)
SIGMA	-1.198[c]	-1.210[c]	-1.260[c]	-0.484[b]	-0.495[b]	-0.488[c]
	(-1.78)	(-1.83)	(-1.72)	(-2.45)	(-2.43)	(-1.87)
RET	0.137[a]	0.137[a]	0.154[a]	0.053[a]	0.052[a]	0.057[a]
	(7.78)	(7.11)	(6.83)	(7.00)	(7.10)	(7.10)
ROA	-1.220[a]	-1.251[a]	-1.340[a]	-0.136[a]	-0.153[a]	-0.199[a]
	(-13.43)	(-13.49)	(-9.70)	(-2.89)	(-3.26)	(-3.12)
DTURN	0.224[b]	0.216[b]	0.194[c]	0.102[a]	0.104[a]	0.100[a]
	(2.45)	(2.30)	(1.72)	(3.12)	(3.31)	(2.59)
LEV	-0.369[a]	-0.349[a]	-0.370[a]	-0.086[a]	-0.072[a]	-0.080[a]
	(-5.94)	(-5.32)	(-4.59)	(-4.43)	(-3.58)	(-3.52)
LMVE	0.047[a]	0.055[a]	0.040[a]	0.014[a]	0.017[a]	0.015[a]
	(5.96)	(6.90)	(4.75)	(5.18)	(6.74)	(4.94)
MTB	0.014[a]	0.014[a]	0.013[a]	0.002[c]	0.001	0.002
	(4.83)	(4.82)	(3.33)	(1.78)	(1.23)	(1.13)
LTENURE	0.041	0.027	-0.145	0.036	0.037	-0.033
	(0.32)	(0.19)	(-0.91)	(0.76)	(0.73)	(-0.57)
LTENURESQ	0.002	0.010	0.105	-0.014	-0.015	0.025
	(0.02)	(0.13)	(1.12)	(-0.51)	(-0.49)	(0.75)
CEOOWN	0.958	0.620	-0.671	0.240	0.116	-0.244
	(1.20)	(0.77)	(-1.08)	(0.82)	(0.39)	(-1.05)
CEOOWNSQ	-4.382	-2.592	3.951	-1.406	-0.685	1.183
	(-1.06)	(-0.62)	(1.19)	(-0.90)	(-0.44)	(0.89)
OPAQUE		0.144[a]	0.144[a]		0.034[b]	0.033[c]
		(4.55)	(3.39)		(2.51)	(1.88)
OPAQUESQ		-0.034[a]	-0.033[a]		-0.009[a]	-0.009[b]
		(-4.27)	(-3.27)		(-2.60)	(-1.99)
PRSHELT			0.055[a]			0.016[b]
			(2.83)			(2.17)
CFOOPIN			0.385[a]			0.084[b]
			(2.69)			(2.02)
HOLD100			0.061[a]			0.016[a]
			(4.73)			(2.78)
Adjusted R^2	0.034	0.034	0.036	0.036	0.036	0.039
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Y & I. Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	24300	22027	16393	24300	22027	16393

Table 3: Endogeneity – predicted CEO power measure

This table presents the test results addressing endogeneity in the relation between CEO power measure and stock price crash risk using two-stage least squares. Panel A presents the first stage, predicting the expected CEO power using *CEOFEPCB and CEOFO* as power measures. In the first stage, the CEO power measure is regressed on two instruments: a dead founder (*DFO*) and the number of founders alive (*LNFOALIVE*). The dummy variable *DFO* takes the value of unity if the founder died before the firm enters into our sample. If there is more than one founder, we check whether the last founder died before the firm enters into our sample. We use the log of one plus the number of founders alive (*LNFOALIVE*) as the second instrument. We control for the number of additional variables suggested by prior studies in the first stage. In the second stage, the measures of stock price crash risk are regressed on the fitted value of CEO power obtained from the first stage. Panels B presents the result of the second stage using expected *CEOFO (ECEOFO).* Panel C presents the result of the second stage using expected *CEOFEPCB (ECEOFEPCB).* Significance levels of 1%, 5%, and 10% of the coefficient are denoted [a], [b], and [c], respectively. The variables are winsorized at the 1% level. The variable definitions are provided in the Appendix.

Dependent variable	$CEOFO_{t-1}$	$CEOFEPCB_{t-1}$
DFO_{t-2}	-5.136[a]	-5.750[a]
	(-4.96)	(-5.60)
$LNFOALIVE_{t-2}$	0.386[c]	0.196
	(1.86)	(1.00)
$LNFAGE_{t-2}$	-0.746[a]	-0.739[a]
	(-9.12)	(-9.11)
LAT_{t-2}	-0.145[a]	-0.153[a]
	(-2.96)	(-3.18)
$CEOOWN_{t-2}$	10.322[a]	12.506[a]
	(2.85)	(3.48)
$CEOOWNSQ_{t-2}$	-21.336	-35.111[b]
	(-1.20)	(-2.02)
$LTENURE_{t-2}$	-0.738[b]	-0.159
	(-2.45)	(-0.49)
$LTENURESQ_{t-2}$	0.387[a]	0.261[a]
	(5.26)	(3.45)
$CEOAGE_{t-2}$	0.005	0.009
	(0.75)	(1.21)
$DDELWARE_{t-1}$	-0.066	-0.044
	(-0.52)	(-0.35)
$DS\&P500_{t-1}$	0.083	0.708[a]
	(0.96)	(7.29)
$DAMEX_{t-1}$	0.444	0.230
	(1.33)	(0.60)
$DNASDAQ_{t-1}$	0.380[a]	0.303[b]
	(2.74)	(2.15)
$LCEOPAY_{t-2}$	-0.012	0.080
	(-0.17)	(1.18)
Constant	0.390	-2.950[a]
	(0.51)	(-3.77)
Pseudo-R^2	0.285	0.272
Year & Industry Effects	Yes	YES
N	23873	23743

Panel B: Second-stage regression – CEO power measure ECEOFO						
	NCSKEW			DUVOL		
	1	2	3	4	5	6
ECEOFO	0.323[a]	0.385[a]	0.438[a]	0.071[a]	0.086[a]	0.098[a]
	(5.27)	(5.15)	(4.97)	(4.04)	(3.62)	(4.17)
OPAQUE		0.149[a]	0.150[a]		0.037[a]	0.036[b]
		(4.93)	(3.59)		(2.89)	(2.17)
OPAQUESQ		-0.034[a]	-0.034[a]		-0.010[a]	-0.009[b]
		(-4.46)	(-3.44)		(-2.90)	(-2.28)
PRSHELT			0.060[a]			0.018[b]
			(3.04)			(2.42)
CFOOPIN			0.315[b]			0.071
			(2.07)			(1.62)
HOLD100			0.058[a]			0.016[a]
			(4.80)			(2.81)
Adjusted R^2	0.034	0.035	0.038	0.036	0.036	0.039
Constant & Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Y & I. Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	23873	21649	16117	23873	21649	16117
Panel C: Second-stage regression - CEO power measure ECEOFEPCB						
	NCSKEW			DUVOL		
	1	2	6	7	8	12
ECEOFEPCB	0.456[a]	0.516[a]	0.500[a]	0.092[a]	0.115[a]	0.110[a]
	(6.35)	(6.44)	(5.51)	(4.52)	(4.55)	(4.30)
OPAQUE		0.150[a]	0.151[a]		0.037[a]	0.037[b]
		(4.93)	(3.56)		(2.92)	(2.18)
OPAQUESQ		-0.034[a]	-0.034[a]		-0.010[a]	-0.009[b]
		(-4.47)	(-3.43)		(-2.93)	(-2.29)
PRSHELT			0.060[a]			0.018[b]
			(2.98)			(2.42)
CFOOPIN			0.325[b]			0.072[c]
			(2.18)			(1.68)
HOLD100			0.056[a]			0.016[a]
			(4.84)			(2.92)
Adjusted R^2	0.035	0.036	0.038	0.036	0.036	0.039
Constant & Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Y & I. Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	23743	21521	16020	23743	21521	16020

Table 4: Robustness checks: Firm fixed effects

This table presents additional robustness checks of the linkage between CEO power and stock price crash risk using firm and year fixed effects models. The t-values reported in the parentheses are clustered by both firm and year. The 1%, 5%, and 10% significance levels of the coefficients are denoted [a], [b], and [c], respectively. The variables are winsorized at 1.0%. The variable definitions are provided in the Appendix.

	CEOFO		CEOFEPCB		CEOPRCH	
	NCSKEW	DUVOL	NCSKEW	DUVOL	NCSKEW	DUVOL
	1	2	3	4	5	6
CEOPOWER	0.139[b]	0.057[b]	0.151[b]	0.061[a]	0.101[a]	0.039[a]
	(2.20)	(2.42)	(2.51)	(2.76)	(3.34)	(3.43)
OPAQUE	0.077	0.014	0.077	0.015	0.073	0.013
	(1.58)	(0.79)	(1.58)	(0.79)	(1.50)	(0.71)
OPAQUESQ	-0.015	-0.003	-0.015	-0.003	-0.014	-0.003
	(-1.20)	(-0.70)	(-1.21)	(-0.70)	(-1.15)	(-0.64)
PRSHELT	0.073[c]	0.024	0.074[c]	0.024	0.069[c]	0.022
	(1.76)	(1.53)	(1.78)	(1.55)	(1.67)	(1.43)
CFOOPIN	0.113	0.058	0.112	0.058	0.093	0.051
	(0.60)	(0.85)	(0.60)	(0.85)	(0.50)	(0.74)
HOLD100	0.017	0.014	0.017	0.014	0.014	0.013
	(0.51)	(1.16)	(0.51)	(1.16)	(0.41)	(1.06)
Adjusted R^2	0.079	0.069	0.079	0.069	0.079	0.069
Const. & Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Y & I. Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	16393	16393	16393	16393	16393	16393

Table 5: Robustness checks: Alternative proxies for stock price crash risk and CEO power

Panel A of this table presents the link between CEO power and stock crash risk using alternative proxies of stock price crash risk. We use two alternative crash risk measures: CRASHD and CRCOUNT. Panel B of this table presents the link between CEO power and stock crash risk using the number of titles a CEO holds (NCEOTITLE) as an alternative proxy for CEO power. The 1%, 5%, and 10% significance levels of the coefficient are denoted [a], [b], and [c], respectively. The variables are winsorized at the 1% level. The variable definitions are provided in the Appendix.

Panel A - Alternative proxies for stock price crash risk

	CEOFO		CEOFEPCB		CEOPRCH	
	CRASHD	CRCOUNT	CRASHD	CRCOUNT	CRASHD	CRCOUNT
	1	2	3	4	5	6
CEOPOWER	0.288[a]	0.046[b]	0.270[a]	0.044[b]	0.194[a]	0.037[a]
	(4.70)	(2.54)	(4.33)	(2.42)	(4.23)	(4.72)
OPAQUE	0.317[a]	0.050[a]	0.318[a]	0.050[a]	0.325[a]	0.051[a]
	(3.67)	(3.16)	(3.68)	(3.16)	(3.76)	(3.13)
OPAQUESQ	-0.075[a]	-0.011[a]	-0.075[a]	-0.011[a]	-0.077[a]	-0.011[a]
	(-3.34)	(-2.81)	(-3.35)	(-2.83)	(-3.44)	(-2.83)
PRSHELT	0.191[a]	0.030[b]	0.190[a]	0.030[b]	0.184[a]	0.029[b]
	(2.96)	(2.38)	(2.95)	(2.37)	(2.84)	(2.30)
CFOOPIN	0.284	0.056	0.289	0.057	0.292	0.057
	(1.04)	(1.10)	(1.06)	(1.11)	(1.07)	(1.11)
HOLD100	0.095[b]	0.014	0.098[b]	0.014	0.099[b]	0.014
	(2.11)	(1.49)	(2.17)	(1.52)	(2.20)	(1.54)
Adjusted R^2	0.028	0.019	0.028	0.019	0.028	0.020
Const. & Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Y & I. Effects	Yes	Yes		Yes	Yes	Yes
N	16382	16393	16382	16393	16382	16393

Panel B - Alternative proxies for CEO power

	NCSKEW	DUVOL	CRASHD	CRCOUNT
	1	2	3	4
NCEOTITLES	0.027[b]	0.014[a]	0.143[a]	0.023[a]
	(2.30)	(3.12)	(5.81)	(4.34)
OPAQUE	0.143[a]	0.032[c]	0.321[a]	0.050[a]
	(3.38)	(1.87)	(3.72)	(3.11)
OPAQUESQ	-0.033[a]	-0.009[b]	-0.076[a]	-0.011[a]
	(-3.28)	(-1.99)	(-3.40)	(-2.80)
PRSHELT	0.055[a]	0.016[b]	0.183[a]	0.029[b]
	(2.82)	(2.15)	(2.82)	(2.30)
CFOOPIN	0.383[a]	0.084[b]	0.287	0.057
	(2.68)	(2.01)	(1.05)	(1.12)
HOLD100	0.060[a]	0.016[a]	0.096[b]	0.014
	(4.70)	(2.72)	(2.12)	(1.47)
Adjusted R^2	0.036	0.039	0.029	0.020
Const. & Other controls	Yes	Yes	Yes	Yes
Y & I. Effects	Yes	Yes	Yes	Yes
N	16393	16393	16382	16393

Table 6 Robustness checks: Controlling for firm and CEO related variables

This table presents additional robustness checks of the linkage between CEO power and stock price crash risk addressing concern related to excessive-riskiness such as R&D intensity, CEO experience, financial distress, firm age, using NCSKEW and DUVOL as crash measures. The t-values reported in the parentheses are clustered by both firm and year. The 1%, 5%, and 10% significance levels of the coefficients are denoted [a], [b], and [c], respectively. The variables are winsorized at 1.0%. The variable definitions are provided in the Appendix.

	CEOFO		CEOFEPCB		CEOPRCH	
	NCSKEW	DUVOL	NCSKEW	DUVOL	NCSKEW	DUVOL
	1	2	3	4	5	6
CEOPOWER	0.080[a]	0.024[b]	0.092[a]	0.028[b]	0.033[c]	0.018[b]
	(2.70)	(2.18)	(3.16)	(2.51)	(1.83)	(2.40)
LCEOAGE	-0.001	-0.000	-0.001	-0.000	-0.001	-0.000
	(-0.71)	(-0.64)	(-0.69)	(-0.63)	(-0.81)	(-0.73)
Z-SCORE	0.068[a]	0.020[a]	0.068[a]	0.020[a]	0.068[a]	0.020[a]
	(7.57)	(6.41)	(7.53)	(6.38)	(7.58)	(6.43)
RDINTENSITY	-0.531[a]	-0.176[b]	-0.535[a]	-0.177[b]	-0.556[a]	-0.181[b]
	(-2.68)	(-2.36)	(-2.69)	(-2.38)	(-2.75)	(-2.41)
LFAGE	-0.068[a]	-0.012[a]	-0.067[a]	-0.011[a]	-0.076[a]	-0.014[a]
	(-5.68)	(-3.09)	(-5.81)	(-3.07)	(-6.20)	(-3.75)
OPAQUE	0.118[a]	0.026	0.118[a]	0.026	0.120[a]	0.027
	(2.75)	(1.50)	(2.75)	(1.50)	(2.77)	(1.51)
OPAQUESQ	-0.028[a]	-0.007[c]	-0.028[a]	-0.007[c]	-0.028[a]	-0.007[c]
	(-2.70)	(-1.65)	(-2.69)	(-1.65)	(-2.73)	(-1.67)
PRSHELT	0.046[b]	0.013[c]	0.046[b]	0.013[c]	0.045[b]	0.012[c]
	(2.27)	(1.79)	(2.27)	(1.79)	(2.20)	(1.72)
CFOOPIN	0.313[b]	0.075[c]	0.313[b]	0.075[c]	0.309[b]	0.072[c]
	(2.23)	(1.74)	(2.23)	(1.74)	(2.21)	(1.69)
HOLD100	0.047[a]	0.013[b]	0.048[a]	0.013[b]	0.048[a]	0.013[b]
	(3.49)	(2.07)	(3.54)	(2.11)	(3.60)	(2.12)
Adjusted R^2	0.043	0.042	0.044	0.042	0.043	0.042
Const. & controls	Yes	Yes	Yes	Yes	Yes	Yes
Y & I. Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	16359	16359	16359	16359	16359	16359

Table 7: CEO power, earnings management, tax avoidance, CFO option incentives, CEO overconfidence and stock price crash risk

This table presents the results on how the impact of earnings management, tax avoidance, CFO option incentives and CEO overconfidence on future stock price crash risk varies among firms with powerful and non-powerful CEOs using NCSKEW and DUVOL as proxies for crash risk. Panel A provides the results on the impact of earnings management on stock price crash risk. Panel B presents the results on how the real earnings management affect stock price crash risk and how this impact varies among firms with powerful and non-powerful CEOs. Panel C provides the results on the impact of tax avoidance on stock price crash risk. Panel D provides the results on the impact of CEO option incentives on stock price crash risk. Panel E provides the results on the impact of CEO overconfidence on stock price crash risk. We use earnings management (Hutton et al., 2009), abnormal discretional expenses (Cohen and Zarowin (2010) and Ali and Zhang (2015)), and PRSHELT (Kim et al., 2011a) as proxies for opacity, real earnings management and tax avoidance measures, respectively. We follow Kim et al. (2011b) to calculate CFO option incentives. We use HOLD100 as a measure of overconfidence. The t-values, reported in parentheses, and clustered by both firm and year. The coefficient test statistics are in square brackets for the differences in coefficients between CEOPOWER*CRdet and (1 - CEOPOWER)*CRdet. The variable CRdet represents OPAQUE and OPAQUESQ in Panel A, ADISEX in Panel B, PRSHELT in Panel C, CFOOPIN in Panel D and HOLD100 in Panel E. The 1%, 5%, and 10% significance levels of the coefficient are denoted [a], [b], and [c], respectively. The variables are winsorized at the 1% level. The variable definitions are provided in the Appendix.

Panel A: Opaque, CEO Power and Crash						
	CEOFO		CEOFEPCB		CEOPRCH	
	NCSKEW	DUVOL	NCSKEW	DUVOL	NCSKEW	DUVOL
	1	2	3	4	5	6
CEOPOWER*	0.359[a]	0.095[a]	0.378[a]	0.103[a]	0.154[a]	0.039[c]
OPAQUE	(5.09)	(3.74)	(5.53)	(4.18)	(2.76)	(1.66)
(1-CEOPOWER)*	0.090[b]	0.017	0.091[b]	0.017	0.141[a]	0.031[c]
OPAQUE	(2.23)	(0.94)	(2.25)	(0.95)	(3.28)	(1.84)
Coefficient test	[21.75][a]	[10.49][a]	[28.03][a]	[14.30][a]	[0.09]	[0.28]
CEOPOWER*	-0.094[a]	-0.029[a]	-0.099[a]	-0.030[a]	-0.038[b]	-0.011[c]
OPAQUESQ	(-4.22)	(-3.63)	(-4.57)	(-3.96)	(-2.46)	(-1.65)
(1-CEOPOWER)*	-0.018[c]	-0.003	-0.018[c]	-0.004	-0.032[a]	-0.008[c]
OPAQUESQ	(-1.86)	(-0.73)	(-1.93)	(-0.77)	(-2.92)	(-1.84)
Coefficient test	[13.12][a]	[8.31][a]	[16.15] [a]	[10.23] [a]	[0.17]	[0.22]
PRSHELT	0.055[a]	0.016[b]	0.056[a]	0.016[b]	0.056[a]	0.016[b]
	(2.80)	(2.14)	(2.83)	(2.16)	(2.87)	(2.23)
CFOOPIN	0.389[a]	0.089[b]	0.387[a]	0.088[b]	0.390[a]	0.087[b]
	(2.73)	(2.15)	(2.72)	(2.12)	(2.71)	(2.09)
HOLD100	0.059[a]	0.016[a]	0.060[a]	0.016[a]	0.061[a]	0.016[a]
	(4.66)	(2.74)	(4.72)	(2.80)	(4.76)	(2.82)
Adjusted R^2	0.037	0.039	0.037	0.039	0.036	0.038
Const. & controls	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes
N	16393	16393	16393	16393	16393	16393

Panel B - CEO power, real earnings management and stock price crash risk

	NCSKEW						DUVOL					
	CEOFO		CEOFEPCB		CEOPRCH		CEOFO		CEOFEPCB		CEOPRCH	
	1	2	3	4	5	6	7	8	9	10	11	12
ADISEX	0.028		0.029		0.016		0.001		0.002		-0.001	
	(0.54)		(0.57)		(0.32)		(0.08)		(0.11)		(-0.05)	
CEOPOWER	0.109[a]		0.123[a]		0.023		0.028[a]		0.032[a]		0.016[b]	
	(3.63)		(3.97)		(1.26)		(2.62)		(2.91)		(2.09)	
CEOPOWER*		0.253[b]		0.285[b]		0.105		0.078		0.084[c]		0.048
ADISEX		(2.06)		(2.19)		(0.98)		(1.64)		(1.65)		(1.28)
(1-CEOPOWER) *		-0.029		-0.031		-0.009		-0.016		-0.016		-0.015
ADISEX		(-0.53)		(-0.57)		(-0.14)		(-0.89)		(-0.88)		(-0.70)
Coefficient test		[5.19] [b]		[5.90] [a]		[0.81]		[4.08] [b]		[3.93] [b]		[2.06]
OPAQUE	0.142[a]	0.148[a]	0.141[a]	0.148[a]	0.146[a]	0.147[a]	0.033[c]	0.035[c]	0.033[c]	0.035[c]	0.034[c]	0.035[c]
	(3.22)	(3.28)	(3.22)	(3.29)	(3.29)	(3.33)	(1.81)	(1.87)	(1.81)	(1.87)	(1.85)	(1.89)
OPAQUESQ	-0.033[a]	-0.034[a]	-0.033[a]	-0.034[a]	-0.034[a]	-0.034[a]	-0.009[c]	-0.009[c]	-0.009[c]	-0.009[c]	-0.009[c]	-0.009[b]
	(-3.07)	(-3.13)	(-3.07)	(-3.14)	(-3.15)	(-3.20)	(-1.88)	(-1.92)	(-1.88)	(-1.93)	(-1.92)	(-1.97)
PRSHELT	0.055[a]	0.054[b]	0.055[a]	0.053[b]	0.054[a]	0.055[a]	0.015[c]	0.014[c]	0.015[c]	0.014[c]	0.014[c]	0.015[c]
	(2.68)	(2.57)	(2.67)	(2.56)	(2.60)	(2.63)	(1.93)	(1.86)	(1.92)	(1.86)	(1.86)	(1.91)
CFOOPIN	0.379[a]	0.405[a]	0.378[a]	0.408[a]	0.395[a]	0.399[a]	0.088[b]	0.095[b]	0.087[b]	0.096[b]	0.090[b]	0.093[b]
	(2.63)	(2.77)	(2.62)	(2.79)	(2.73)	(2.76)	(2.13)	(2.29)	(2.11)	(2.31)	(2.20)	(2.28)
HOLD100	0.056[a]	0.059[a]	0.057[a]	0.059[a]	0.058[a]	0.058[a]	0.014[b]	0.015[b]	0.014[b]	0.015[b]	0.015[b]	0.015[b]
	(4.06)	(4.30)	(4.14)	(4.33)	(4.26)	(4.27)	(2.29)	(2.45)	(2.33)	(2.47)	(2.38)	(2.41)
Adjusted R^2	0.037	0.037	0.037	0.037	0.036	0.036	0.038	0.038	0.038	0.038	0.038	0.038
Const. & controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	15894	15894	15894	15894	15894	15894	15894	15894	15894	15894	15894	15894

Panel C: PRSHELT, CEO Power and Crash						
	CEOFO		CEOFEPCB		CEOPRCH	
	NCSKEW	DUVOL	NCSKEW	DUVOL	NCSKEW	DUVOL
	1	2	3	4	5	6
CEOPOWER*	0.193[a]	0.051[a]	0.215[a]	0.058[a]	0.164[a]	0.060[a]
PRSHELT	(4.04)	(3.07)	(4.34)	(3.32)	(5.15)	(5.04)
(1-CEOPOWER)*	0.031[c]	0.010	0.030	0.009	0.018	0.000
PRSHELT	(1.65)	(1.30)	(1.62)	(1.26)	(0.99)	(0.06)
Coefficient test	[12.68][a]	[5.87][a]	[15.96][a]	[8.00][a]	[33.07][a]	[36.50][a]
OPAQUE	0.139[a]	0.032[c]	0.139[a]	0.031[c]	0.142[a]	0.032[c]
	(3.30)	(1.83)	(3.29)	(1.82)	(3.34)	(1.84)
OPAQUESQ	-0.032[a]	-0.008[c]	-0.032[a]	-0.008[c]	-0.033[a]	-0.009[b]
	(-3.16)	(-1.94)	(-3.16)	(-1.94)	(-3.23)	(-1.98)
CFOOPIN	0.376[a]	0.083[b]	0.375[a]	0.083[b]	0.375[a]	0.081[c]
	(2.62)	(1.99)	(2.62)	(1.97)	(2.59)	(1.93)
HOLD100	0.059[a]	0.016[a]	0.059[a]	0.016[a]	0.060[a]	0.016[a]
	(4.50)	(2.66)	(4.56)	(2.70)	(4.75)	(2.75)
Adjusted R^2	0.037	0.039	0.038	0.039	0.038	0.040
Const. & controls	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes
N	16393	16393	16393	16393	16393	16393
Panel D: CFO option incentives, CEO Power and Crash						
	CEOFO		CEOFEPCB		CEOPRCH	
	NCSKEW	DUVOL	NCSKEW	DUVOL	NCSKEW	DUVOL
	1	2	3	4	5	6
CEOPOWER*	0.945[a]	0.264[a]	1.025[a]	0.291[a]	0.612[a]	0.214[a]
CFOOPIN	(4.55)	(3.50)	(4.76)	(3.66)	(3.04)	(3.29)
(1-CEOPOWER)*	0.269[c]	0.048	0.274[c]	0.050	0.318[b]	0.046
CFOOPIN	(1.71)	(1.04)	(1.78)	(1.08)	(2.31)	(1.16)
Coefficient test	[8.55][a]	[6.23][a]	[10.56][a]	[7.01][a]	[4.54][b]	[10.31][a]
OPAQUE	0.142[a]	0.032[c]	0.141[a]	0.032[c]	0.145[a]	0.033[c]
	(3.34)	(1.85)	(3.33)	(1.84)	(3.41)	(1.91)
OPAQUESQ	-0.033[a]	-0.009[b]	-0.033[a]	-0.009[b]	-0.034[a]	-0.009[b]
	(-3.25)	(-1.98)	(-3.23)	(-1.97)	(-3.29)	(-2.02)
PRSHELT	0.056[a]	0.016[b]	0.056[a]	0.016[b]	0.055[a]	0.016[b]
	(2.88)	(2.23)	(2.87)	(2.22)	(2.80)	(2.14)
HOLD100	0.061[a]	0.016[a]	0.061[a]	0.016[a]	0.061[a]	0.017[a]
	(4.66)	(2.75)	(4.68)	(2.77)	(4.72)	(2.78)
Adjusted R^2	0.037	0.039	0.037	0.039	0.036	0.039
Const. & controls	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes
N	16393	16393	16393	16393	16393	16393

Panel E: CEO overconfidence, CEO Power and Crash						
	CEOFO		CEOFEPCB		CEOPRCH	
	NCSKEW	DUVOL	NCSKEW	DUVOL	NCSKEW	DUVOL
	1	2	3	4	5	6
CEOPOWER*	0.140[a]	0.034[b]	0.156[a]	0.038[a]	0.104[a]	0.035[b]
HOLD100	(3.98)	(2.48)	(4.40)	(2.70)	(3.04)	(2.27)
(1-CEOPOWER) *	0.046[a]	0.013[b]	0.045[a]	0.013[b]	0.048[a]	0.011[b]
HOLD100	(3.28)	(2.06)	(3.33)	(2.12)	(4.26)	(2.55)
Coefficient test	[6.08][a]	[2.09]	[9.02][a]	[3.10][c]	[2.80][c]	[3.04][c]
OPAQUE	0.141[a]	0.032[c]	0.140[a]	0.032[c]	0.143[a]	0.032[c]
	(3.36)	(1.87)	(3.34)	(1.86)	(3.38)	(1.87)
OPAQUESQ	-0.033[a]	-0.009[b]	-0.033[a]	-0.009[b]	-0.033[a]	-0.009[b]
	(-3.25)	(-1.98)	(-3.23)	(-1.97)	(-3.27)	(-1.99)
PRSHELT	0.056[a]	0.016[b]	0.056[a]	0.016[b]	0.055[a]	0.016[b]
	(2.88)	(2.23)	(2.87)	(2.22)	(2.81)	(2.16)
CFOOPIN	0.385[a]	0.086[b]	0.384[a]	0.086[b]	0.386[a]	0.085[b]
	(2.68)	(2.05)	(2.66)	(2.04)	(2.67)	(2.04)
Adjusted R^2	0.036	0.038	0.037	0.038	0.036	0.038
Const. & controls	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes
N	16393	16393	16393	16393	16393	16393

Table 8: CEO power, CEO pay slice and stock price crash risk

This table presents the results on the impact of CPS on future stock price crash risk and how this impact varies between firms with powerful and non-powerful CEOs using NCSKEW and DUVOL as proxies for crash risk. The t-values reported in parentheses are clustered by both firm and year. The difference-in-coefficients test provides the test statistics are in square brackets for the difference in the coefficients between the two interaction terms. The 1%, 5%, and 10% significance levels of the coefficient are denoted [a], [b], and [c], respectively. The variables are winsorized at 1% level. The variable definitions are presented in the Appendix.

	NCSKEW						DUVOL					
	CEOFO		CEOFEPCB		CEOPRCH		CEOFO		CEOFEPCB		CEOPRCH	
	1	2	3	4	5	6	7	8	9	10	11	12
CEOPOWER	0.114[a]		0.127[a]		0.031		0.030[a]		0.034[a]		0.017[b]	
	(3.74)		(4.13)		(1.61)		(2.73)		(3.02)		(2.33)	
CPS	0.032		0.028		0.011		0.027		0.026		0.018	
	(0.42)		(0.36)		(0.14)		(0.95)		(0.91)		(0.63)	
CEOPOWER * CPS		0.243[b]		0.274[a]		0.071		0.077[b]		0.086[b]		0.048
		(2.51)		(3.01)		(0.98)		(2.07)		(2.34)		(1.64)
(1- CEOPOWER) *		-0.022		-0.025		-0.006		0.014		0.013		0.011
CPS		(-0.28)		(-0.31)		(-0.07)		(0.50)		(0.46)		(0.36)
Coefficient test		[16.27][a]		[18.67][a]		[3.52][b]		[6.63][a]		[8.00][a]		[5.63][a]
OPAQUE	0.140[a]	0.139[a]	0.139[a]	0.139[a]	0.144[a]	0.144[a]	0.032[c]	0.032[c]	0.032[c]	0.032[c]	0.033[c]	0.033[c]
	(3.33)	(3.31)	(3.32)	(3.30)	(3.39)	(3.40)	(1.85)	(1.85)	(1.84)	(1.84)	(1.88)	(1.89)
OPAQUESQ	-0.032[a]	-0.032[a]	-0.032[a]	-0.032[a]	-0.033[a]	-0.033[a]	-0.008[c]	-0.008[c]	-0.008[c]	-0.008[c]	-0.009[b]	-0.009[b]
	(-3.19)	(-3.17)	(-3.19)	(-3.17)	(-3.27)	(-3.27)	(-1.95)	(-1.95)	(-1.95)	(-1.94)	(-1.99)	(-2.00)
PRSHELT	0.057[a]	0.057[a]	0.056[a]	0.057[a]	0.055[a]	0.055[a]	0.016[b]	0.016[b]	0.016[b]	0.016[b]	0.016[b]	0.016[b]
	(2.91)	(2.92)	(2.90)	(2.92)	(2.82)	(2.81)	(2.24)	(2.24)	(2.23)	(2.24)	(2.16)	(2.16)
CFOOPIN	0.374[a]	0.377[a]	0.373[a]	0.378[a]	0.385[a]	0.386[a]	0.083[b]	0.084[b]	0.083[b]	0.084[b]	0.085[b]	0.085[b]
	(2.61)	(2.63)	(2.60)	(2.64)	(2.69)	(2.69)	(1.98)	(2.02)	(1.97)	(2.02)	(2.03)	(2.05)
HOLD100	0.059[a]	0.058[a]	0.059[a]	0.059[a]	0.061[a]	0.061[a]	0.016[a]	0.016[a]	0.016[a]	0.016[a]	0.016[a]	0.016[a]
	(4.50)	(4.43)	(4.58)	(4.50)	(4.69)	(4.69)	(2.66)	(2.63)	(2.70)	(2.67)	(2.75)	(2.75)
Adjusted R^2	0.037	0.037	0.037	0.037	0.036	0.036	0.039	0.039	0.039	0.039	0.038	0.038
Const. and controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16393	16393	16393	16393	16393	16393	16393	16393	16393	16393	16393	16393

Table 9: CEO power, External Governance, and stock price crash risk

This table presents the results on the impact of external governance on future stock price crash risk and how this impact varies between firms with powerful and non-powerful CEOs using NCSKEW and DUVOL as proxies for crash. Panel A uses takeover index (TOIND) as a proxy for external governance. Panel B uses dedicated institutional ownership as a proxy for external governance. Both industry and year fixed effects are included in all the regressions. The t-values reported in parentheses are clustered by both firm and year. The difference-in-coefficients test provides the test statistics are in square brackets for the difference in the coefficients between the two interaction terms. The 1%, 5%, and 10% significance levels of the coefficient are denoted [a], [b], and [c], respectively. The variables are winsorized at 1% level. The variable definitions are presented in the Appendix.

Panel A - Takeover index (TOIND) as proxy for external governance

	NCSKEW						DUVOL					
	CEOFO		CEOFEPCB		CEOPRCH		CEOFO		CEOFEPCB		CEOPRCH	
	1	2	3	4	5	6	7	8	9	10	11	12
CEOPOWER	0.099[a]		0.112[a]		0.040[b]		0.029[a]		0.033[a]		0.020[b]	
	(3.26)		(3.75)		(1.98)		(2.76)		(3.10)		(2.51)	
TOIND	-0.626[a]		-0.624[a]		-0.688[a]		-0.123[a]		-0.122[a]		-0.142[a]	
	(-7.05)		(-7.21)		(-8.01)		(-4.58)		(-4.65)		(-5.65)	
CEOPOWER*		0.058		0.132		-0.543[a]		0.078		0.091		-0.071[b]
TOIND		(0.29)		(0.74)		(-5.16)		(0.98)		(1.25)		(-2.46)
(1-CEOPOWER)*		-0.675[a]		-0.676[a]		-0.741[a]		-0.137[a]		-0.138[a]		-0.168[a]
TOIND		(-7.83)		(-7.87)		(-8.11)		(-5.41)		(-5.47)		(-5.81)
Coefficient test		[15.06][a]		[21.30][a]		[5.26][b]		[8.52][a]		[10.80][a]		[10.06][a]
OPAQUE	0.118[a]	0.120[a]	0.118[a]	0.120[a]	0.121[a]	0.122[a]	0.028	0.028	0.028	0.028	0.029	0.029
	(2.60)	(2.61)	(2.59)	(2.61)	(2.64)	(2.66)	(1.59)	(1.60)	(1.58)	(1.60)	(1.61)	(1.63)
OPAQUESQ	-0.026[b]	-0.026[b]	-0.026[b]	-0.026[b]	-0.027[b]	-0.027[b]	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007
	(-2.39)	(-2.40)	(-2.39)	(-2.40)	(-2.44)	(-2.45)	(-1.58)	(-1.59)	(-1.58)	(-1.59)	(-1.61)	(-1.63)
PRSHELT	0.071[a]	0.069[a]	0.070[a]	0.069[a]	0.070[a]	0.069[a]	0.020[b]	0.020[b]	0.020[b]	0.020[b]	0.020[b]	0.020[b]
	(3.21)	(3.14)	(3.19)	(3.11)	(3.13)	(3.11)	(2.51)	(2.46)	(2.50)	(2.44)	(2.44)	(2.41)
CFOOPIN	0.271[c]	0.267[c]	0.271[c]	0.265[c]	0.274[c]	0.271[c]	0.060	0.058	0.060	0.058	0.060	0.058
	(1.86)	(1.83)	(1.86)	(1.82)	(1.89)	(1.87)	(1.43)	(1.39)	(1.42)	(1.38)	(1.43)	(1.40)
HOLD100	0.056[a]	0.054[a]	0.057[a]	0.055[a]	0.057[a]	0.057[a]	0.016[a]	0.016[a]	0.017[a]	0.016[a]	0.017[a]	0.017[a]
	(4.66)	(4.48)	(4.74)	(4.56)	(4.81)	(4.83)	(2.77)	(2.69)	(2.83)	(2.74)	(2.83)	(2.83)
Adjusted R^2	0.040	0.040	0.040	0.040	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039
Const. & controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	15503	15503	15503	15503	15503	15503	15503	15503	15503	15503	15503	15503

Panel B – Dedicated institutional ownership (IODED) as proxy for external governance.

	NCSKEW						DUVOL					
	CEOFO		CEOFEPCB		CEOPRCH		CEOFO		CEOFEPCB		CEOPRCH	
	1	2	3	4	5	6	7	8	9	10	11	12
CEOPOWER	0.114[a]		0.126[a]		0.031[c]		0.029[a]		0.034[a]		0.018[b]	
	(3.77)		(4.15)		(1.69)		(2.73)		(3.03)		(2.43)	
IODED	-0.212[c]		-0.212[c]		-0.213[c]		-0.056		-0.056		-0.057	
	(-1.73)		(-1.73)		(-1.71)		(-1.45)		(-1.46)		(-1.45)	
CEOPOWER *		0.193		0.308		-0.072		0.040		0.082		0.013
IODED		(0.74)		(1.23)		(-0.58)		(0.41)		(0.85)		(0.27)
(1- CEOPOWER)*		-0.280[b]		-0.290[b]		-0.254[c]		-0.072[b]		-0.077[b]		-0.077[c]
IODED		(-2.25)		(-2.31)		(-1.82)		(-1.96)		(-2.05)		(-1.76)
Coefficient test		[3.53][c]		[6.05][a]		[1.87]		[1.50]		[2.97][c]		[2.80][c]
OPAQUE	0.140[a]	0.143[a]	0.139[a]	0.142[a]	0.144[a]	0.144[a]	0.032[c]	0.033[c]	0.032[c]	0.032[c]	0.033[c]	0.033[c]
	(3.35)	(3.40)	(3.34)	(3.39)	(3.41)	(3.43)	(1.85)	(1.89)	(1.85)	(1.88)	(1.89)	(1.90)
OPAQUESQ	-0.033[a]	-0.033[a]	-0.033[a]	-0.033[a]	-0.033[a]	-0.033[a]	-0.008[b]	-0.009[b]	-0.008[b]	-0.009[b]	-0.009[b]	-0.009[b]
	(-3.22)	(-3.28)	(-3.22)	(-3.27)	(-3.30)	(-3.31)	(-1.96)	(-2.00)	(-1.96)	(-1.99)	(-2.00)	(-2.01)
PRSHELT	0.057[a]	0.056[a]	0.056[a]	0.056[a]	0.055[a]	0.056[a]	0.016[b]	0.016[b]	0.016[b]	0.016[b]	0.016[b]	0.016[b]
	(2.92)	(2.87)	(2.91)	(2.87)	(2.83)	(2.87)	(2.25)	(2.23)	(2.24)	(2.23)	(2.17)	(2.24)
CFOOPIN	0.380[a]	0.393[a]	0.379[a]	0.391[a]	0.392[a]	0.394[a]	0.084[b]	0.088[b]	0.084[b]	0.087[b]	0.086[b]	0.087[b]
	(2.67)	(2.76)	(2.67)	(2.75)	(2.75)	(2.76)	(2.04)	(2.12)	(2.03)	(2.10)	(2.09)	(2.12)
HOLD100	0.059[a]	0.060[a]	0.060[a]	0.061[a]	0.061[a]	0.061[a]	0.016[a]	0.016[a]	0.016[a]	0.016[a]	0.016[a]	0.017[a]
	(4.54)	(4.64)	(4.62)	(4.68)	(4.75)	(4.73)	(2.69)	(2.75)	(2.73)	(2.77)	(2.78)	(2.78)
Adjusted R^2	0.037	0.036	0.038	0.037	0.036	0.036	0.039	0.038	0.039	0.038	0.039	0.038
Const. and other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16393	16393	16393	16393	16393	16393	16393	16393	16393	16393	16393	16393

Table 10: CEO power, Governance, and Stock Price Crash

This table presents the results on the impact of various other governance measures on future stock price crash risk using NCSKEW and DUVOL as crash measures. Both industry and year fixed effects are included in all the regressions. The t-values reported in parentheses are clustered by both firm and year. The difference-in-coefficients test provides the test statistics are in square brackets for the difference in the coefficients between the two interaction terms. The 1%, 5%, and 10% significance levels of the coefficient are denoted [a], [b], and [c], respectively. The variables are winsorized at 1% level. The variable definitions are presented in the Appendix.

	CEOFO		CEOFEPCB		CEOPRCH	
	NCSKEW	DUVOL	NCSKEW	DUVOL	NCSKEW	DUVOL
	1	2	3	4	5	6
FDIR	-0.063[c]	-0.030[b]	-0.062[c]	-0.030[b]	-0.074[b]	-0.032[b]
	(-1.86)	(-2.30)	(-1.82)	(-2.28)	(-2.11)	(-2.37)
BIND	-0.199[a]	-0.072[a]	-0.200[a]	-0.072[a]	-0.224[a]	-0.080[a]
	(-3.19)	(-4.58)	(-3.20)	(-4.61)	(-3.46)	(-5.10)
IODED	-0.104	-0.024	-0.104	-0.024	-0.114	-0.026
	(-0.76)	(-0.59)	(-0.76)	(-0.59)	(-0.81)	(-0.63)
TOIND	-0.349[a]	-0.077[c]	-0.347[a]	-0.076[c]	-0.368[a]	-0.081[b]
	(-4.13)	(-1.95)	(-4.09)	(-1.92)	(-4.60)	(-2.14)
CEOPOWER	0.101[a]	0.024[b]	0.115[a]	0.028[b]	0.034	0.014[c]
	(3.14)	(2.08)	(3.69)	(2.37)	(1.60)	(1.70)
OPAQUE	0.155[b]	0.041[c]	0.155[b]	0.041[c]	0.157[b]	0.041[c]
	(2.51)	(1.74)	(2.49)	(1.73)	(2.52)	(1.74)
OPAQUESQ	-0.035[b]	-0.010[c]	-0.035[b]	-0.010[c]	-0.036[b]	-0.010[c]
	(-2.35)	(-1.77)	(-2.33)	(-1.76)	(-2.36)	(-1.77)
PRSHELT	0.076[a]	0.023[b]	0.075[a]	0.023[b]	0.075[a]	0.022[b]
	(2.64)	(2.47)	(2.62)	(2.46)	(2.60)	(2.44)
CFOOPIN	0.234[c]	0.063[c]	0.233[c]	0.063[c]	0.241[c]	0.064[c]
	(1.75)	(1.74)	(1.73)	(1.71)	(1.80)	(1.76)
HOLD100	0.065[a]	0.017[a]	0.066[a]	0.017[a]	0.067[a]	0.018[a]
	(3.68)	(2.65)	(3.72)	(2.70)	(3.79)	(2.72)
Adjusted R^2	0.042	0.039	0.042	0.039	0.041	0.039
Const. & all controls	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes
N	12092	12092	12092	12092	12092	12092

Table 11: CEO power, competition, and stock price crash risk

This table presents the results on the impact of CEO Power on future stock price crash risk controlling for product market competition using NCSKEW and DUVOL as proxies for crash risk. Both industry and year fixed effects are included in all the regressions. The t-values reported in parentheses are clustered by both firm and year. The difference-in-coefficients test provides the test statistics are in square brackets for the difference in the coefficients between the two interaction terms. The 1%, 5%, and 10% significance levels of the coefficient are denoted [a], [b], and [c], respectively. The variables are winsorized at 1% level. The variable definitions are presented in the Appendix.

	NCSKEW						DUVOL					
		CEOFO		CEOFEPCB		CEOPRCH		CEOFO		CEOFEPCB		CEOPRCH
	1	2	3	4	5	6	7	8	9	10	11	12
PMC	0.006		0.006		0.007[c]		0.001		0.001		0.001	
	(1.61)		(1.63)		(1.88)		(0.86)		(0.86)		(1.12)	
CEOPOWER	0.116[a]		0.127[a]		0.044[c]		0.032[b]		0.035[a]		0.017[c]	
	(3.19)		(3.50)		(1.67)		(2.51)		(2.69)		(1.81)	
HPMC*CEOPOWER		0.135[a]		0.150[a]		0.065[b]		0.036[b]		0.042[a]		0.025[b]
		(3.01)		(3.13)		(2.07)		(2.34)		(2.66)		(2.20)
LPMC*CEOPOWER		0.094[b]		0.101[b]		0.022		0.027[c]		0.026		0.010
		(2.38)		(2.38)		(0.72)		(1.86)		(1.62)		(0.88)
Coefficient test		[0.76]		[0.74]		[1.46]		[0.28]		[0.77]		[1.41]
TOIND	-0.568[a]	-0.589[a]	-0.567[a]	-0.589[a]	-0.641[a]	-0.664[a]	-0.104[a]	-0.107[a]	-0.104[a]	-0.107[a]	-0.125[a]	-0.128[a]
	(-5.43)	(-5.64)	(-5.57)	(-5.82)	(-6.24)	(-6.45)	(-3.46)	(-3.66)	(-3.57)	(-3.77)	(-4.46)	(-4.74)
OPAQUE	0.128[b]	0.129[b]	0.128[b]	0.128[b]	0.129[b]	0.130[a]	0.035[c]	0.035[c]	0.035[c]	0.035[c]	0.035[c]	0.035[c]
	(2.56)	(2.56)	(2.55)	(2.55)	(2.58)	(2.59)	(1.76)	(1.76)	(1.75)	(1.75)	(1.76)	(1.77)
OPAQUESQ	-0.030[b]	-0.030[b]	-0.030[b]	-0.030[b]	-0.030[a]	-0.030[a]	-0.009[c]	-0.009[c]	-0.009[c]	-0.009[c]	-0.009[c]	-0.009[c]
	(-2.56)	(-2.55)	(-2.55)	(-2.53)	(-2.59)	(-2.59)	(-1.82)	(-1.82)	(-1.82)	(-1.81)	(-1.83)	(-1.83)
PRSHELT	0.065[a]	0.064[a]	0.064[a]	0.063[a]	0.064[a]	0.064[a]	0.015[c]	0.015[c]	0.015[c]	0.015[c]	0.015[c]	0.015[c]
	(2.98)	(2.90)	(2.96)	(2.84)	(2.94)	(2.95)	(1.78)	(1.74)	(1.76)	(1.69)	(1.74)	(1.74)
CFOOPIN	0.221	0.234	0.220	0.232	0.219	0.230	0.064	0.066	0.063	0.065	0.063	0.064
	(1.37)	(1.43)	(1.36)	(1.42)	(1.37)	(1.44)	(1.37)	(1.41)	(1.36)	(1.39)	(1.35)	(1.40)
HOLD100	0.057[a]	0.057[a]	0.058[a]	0.058[a]	0.058[a]	0.058[a]	0.014[c]	0.014[c]	0.014[c]	0.014[c]	0.014[c]	0.014[c]
	(3.81)	(3.77)	(3.89)	(3.85)	(3.91)	(3.81)	(1.87)	(1.87)	(1.92)	(1.92)	(1.92)	(1.87)
Adjusted R^2	0.044	0.044	0.044	0.044	0.043	0.043	0.041	0.041	0.041	0.041	0.040	0.040
Const. & all controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Yr. effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	12316	12316	12316	12316	12316	12316	12316	12316	12316	12316	12316	12316

Appendix - Variable definitions

CEO power	
CEOFEPCB	A binary variable equal to 1 if the CEO is the founder and either the president, the chair, or both.
CEOFO	A binary variable equal to 1 if the CEO is also the founder.
CEOPRCH	A binary variable equal to 1 if the CEO is both the president and the chair.
ECEOFO	Predicted value of CEO power using CEOFO as a power measure.
ECEOFEPCB	Predicted value of CEO power using CEOFEPCB as a power measure.
NCEOTITLE	The number of titles the CEO holds. A nominal CEO without an additional title receives one point and a powerful CEO receives extra one point for each additional title: chair, president, chief operating officer, CFO, vice president, vice chair, directorship of the board, and founder, member of the nomination committee, and member of the compensation committee.
Crash risk variables	
CRCOUNT	The number of firm-specific weekly returns exceeding 3.2 standard deviations below the mean firm-specific weekly return over the fiscal year.
CRASHD	A crash dummy is an indicator variable taking the value 1 for a firm–year that experiences one or more firm-specific weekly returns falling 3.2 standard deviations below the mean firm-specific weekly returns over the fiscal year. We follow Kim et al. (2011a, 2011b) to calculate this variable.
DUVOL	The log of the ratio of the standard deviation of firm-specific down weekly returns to the standard deviation of up weekly returns during the fiscal year. We follow Kim et al. (2011a) to calculate DUVOL.
NCSKEW	The negative skewness of firm-specific weekly returns over the fiscal year. We follow Kim et al. (2011a, 2011b) to calculate NCSKEW.
Other variables	
ADISEX	Similar to Cohen and Zarowin (2010) and Ali and Zhang (2015) we calculate the abnormal discretionary expenses (ADISEX) as the residual from the following cross-sectional two-digit sic code industry and year wise regression: $\frac{DISEXP_{it}}{Assets_{i,t-1}} = \beta_0 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{\Delta SALES_{it}}{Assets_{i,t-1}} + \beta_2 \frac{SALES_{it}}{Assets_{i,t-1}} + \varepsilon_{it}$. DISEXP is sum of selling, general and administration, advertisement, and research and development expenses.
BIND	The percentage of independent directors on the board.
CEOAGE	CEO age.
CEOOWN	The percentage of shares owned by CEO.
CFOOPIN	The incentive ratio for CFO option holdings, defined similarly as in Kim et al. (2011a).

CPS	The CEO pay slice, defined as the fraction of the CEO's aggregate compensation to that of the top five executives.
DAMEX	Dummy variable for firms listed in American Stock Exchange (AMEX)
DDELAWARE	Dummy variable for firms incorporated in Delaware
DFO	A binary variable that takes a value of 1 if the founder died before the firm enters into our sample. In the case of multiple founders, we consider the death of the last founder.
DNASDAQ	Dummy variable for firms listed in NASDAQ
DS&P500	Dummy variable for S&P500 firms
DTURN	The average monthly share turnover over the fiscal year minus the average monthly share turnover over the last fiscal year. The monthly share turnover is the ratio of the monthly trading volume of total shares outstanding during the month.
FAGE	Firm age in years. We manually collect the founding year of the firm or its ancestor to determine the firm's age.
FDIR	A binary variable equal to 1 if the founder is the director of the firm.
HOLD100	A measure of CEO overconfidence. We classify a CEO as overconfident if the CEO holds stock options that are more than 100% in the money at least two years during the sample period. We follow Campbell et al. (2011) to estimate the average CEO stock option moneyness for each year. Then we assign an indicator value of 1 for an overconfident CEO beginning with the second time the CEO exhibits the optimistic behavior.
HPMC	HPMC is dummy variable takes the value of one if PMC is greater than our sample median.
IODED	Dedicated institutional ownership. We calculate the yearly percentages of shares outstanding held by dedicated institutional investors, taking the average over the four quarters of the firm's fiscal year using data from the Thomson Reuters Institutional Holdings (13F) database. Our classification of dedicated institutions is based on Bushee (1998).
LCEOAGE	Natural logarithm of CEO age.
LEV	Leverage, or total long-term debt scaled by total assets.
LMVE	Log of the market value of equity on the balance sheet date.
LPMC	LPMC is dummy variable takes value of one if PMC is less than or equal to our sample median.
LNFAGE	Log of firm age.
LNFOALIVE	Log of one plus the number of founders alive in fiscal year t - 2.
LOGAT	Log of total assets.
LOGCEOPAY	Log of the CEO's salary and bonus.
LTENURE	Log of one plus the tenure of the CEO for a firm at the end of the fiscal year.
LTENURESQ	Square of LTENURE.
MTB	The market value of equity divided by the book value of equity

MVE	Market value of equity, a measure of size, is the firm's market value of equity on the balance sheet date.
OPAQUE	The moving sum of the absolute value of discretionary accruals over the three-year period from t - 1 to t - 3, where discretionary accruals are calculated based on the modified Jones model (Dechow, Sloan, and Sweeney, 1995).
OPAQUESQ	Square of OPAQUE.
PMC	PMC is a proxy for product market competition. We use Hoberg et al. (2014) product market fluidity variable, a 10-K based measures as a proxy for product market competition.
PRSHELT	The variable PR*SHELT* is the estimated probability of engaging in tax sheltering activities based on Wilson's (2009) model in Table 4 of Lisowsky (2010). We use model 1 of Table 4 of Lisowsky (2010, p. 1709) to calculate PR*SHELT*.
RDINTENSITY	R&D expenditure to total assets.
RET	Average firm-specific weekly return during the fiscal year.
ROA	Income before extraordinary items divided by lagged total assets.
SIGMA	Standard deviation of firm-specific weekly returns over the entire fiscal year.
TENURE	The tenure of the CEO for a firm at the end of the fiscal year.
TOIND	The takeover index, obtained from Cain et al. (2016)
ZSCORE	Following Hasan et al. (2014) we use modified Altman's (1968) Z-score =(1.2WCAP+1.4RE+3.3PI+0.999SALE)/AT, where WCAP is working capital, RE is retained earnings, PI is pretax income, SALE is total sales, and AT is total assets. We exclude market-to-book(M/B), since M/B is a control to our main regression (Hasan et al. 2014)