Tailoring Compensation Contracts to Mitigate Behavioral Attributes: Evidence from CEO Early Life Disaster Exposure

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Abstract

CEO behavioral attributes significantly influence corporate outcomes. We hypothesize and show that firms can moderate this impact via compensation contracts. We examine how firms tailor compensation contracts based on CEOs' early life disaster exposure, which can shape their risk aversion. On average, firms mitigate risk aversion by offering a 5.24% higher compensation delta and a 6.43% higher compensation vega, with a more significant proportion of compensation comprising stock grants and options. The ability to adjust compensation depends on governance and corporate attributes. Compensation adjustments significantly moderate the impact of disaster exposure (risk aversion) on corporate outcomes, such as innovation and risk-taking. We bolster identification by exploring exogenous CEO turnovers and a quasi-experiment utilizing the option expensing rule, FAS123R. We highlight the importance of including moderating effects, such as compensation, when analyzing the impact of CEO attributes on corporate outcomes.

JEL: G34, G41, M12, M48, M52, O32

Keywords: Executive Compensation, Corporate Governance, Accounting Standards, Innovations

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1 Introduction

CEOs' behavioral attributes and characteristics can have a significant impact on corporate outcomes, including corporate risk-taking, innovation, and performance. Much prior literature has focused on the *direct* or *average* effect of CEO behavioral attributes (e.g. Ditmar et al., 2016; Malmendier et al., 2011). However, we posit that the impact of CEO behavioral attributes can be contingent on, and moderated by, other factors, such as how compensation contracts incentivize the CEO to behave. That is, the CEO's behavior is shaped by both their latent behavioral attribute and how that is subsequently moderated. We explore this through the lens of CEOs' early life disaster exposure, which Bernile et al. (2017) show to influence risk aversion, on average.

We highlight that compensation practices can moderate the impact of disaster exposure (risk aversion) on corporate outcomes. Whether firms can effectively do so is itself contingent on the firm environment including corporate governance characteristics such as CEO entrenchment and institutional ownership. In firms that do tailor compensation contracts, the impact of disaster exposure (risk aversion) is significantly moderated (compared to those that do not tailor compensation). The adverse impacts of CEO disaster experience (risk aversion) on corporate outcomes primarily concentrate in firms that fail to tailor compensation contracts. We demonstrate that it is important to consider the entire firm environment when analyzing behavioral attributes. We show that firms can still utilize skilled – but behaviorally mismatched – CEOs if they properly incentivize them.

CEOs' behavioral biases, such as excess risk aversion, can be a significant concern for corporations. For example, while some level of risk aversion is desirable, excessive risk aversion can impede the firm's ability to innovate, grow, and remain competitive in dynamic markets. Managerial risk aversion might stem from the fear that the market might undervalue long-dated and innovative investments, thereby exposing the manager to the risk of being removed, such as via an opportunistic acquisition (Stein, 1988, 1989). It might also arise indirectly due to managerial entrenchment, whereby entrenched managers seek the 'quiet life' and under-invest in innovation or in 'risky' projects (Bertrand and Mullainathan, 2003).

Risk aversion could also be a behavioral attribute that is influenced by personal characteristics or experiences (Galasso and Simcoe, 2011; Hirshleifer et al., 2012). Such experiences can include living through the Great Depression (Malmendier et al., 2011), early work environments (Schoar and Zuo, 2017), past corporate distress (Faulkner and García-Feijóo, 2022) or being exposed to fatal disasters (Bernile et al., 2017). However, CEOs could still convey useful skills and experience, even if they are unduly risk averse. Therefore, firms might want to avoid – or moderate – nonstandard risk preferences (following Pan et al., 2017). Compensation contracts provide an avenue through which risk preferences could be moderated. This raises the question of how firms might structure compensation contracts to mitigate risk aversion as emphasized in Dittman et al. (2017).

Compensation contracts aim to align managers' interests with those of shareholders. However, there is some nuance. On the one hand, companies might simply design compensation contracts to cater to CEOs' existing risk preferences. For example, Graffin et al. (2020) argue that politically conservative CEOs – whom they argue would be more risk averse – tend to receive relatively more of their pay from cash rather than equity or options. On the other hand, compensation contracts can mitigate managerial risk aversion (Smith and Stulz, 1985). Thus, Carline et al. (2023) highlight that an exogenous reduction in risk taking incentives results in managers 'playing it safe' and reducing corporate risk. Further, Laux (2012) and Baranchuk et al. (2014) suggest that compensation arrangements, such as long-dated option contracts, can encourage managers to focus on innovation and risk-taking. Dittmann et al. (2017) argue that optimal compensation contracts do contain risk taking incentives, with their model implying that such incentives should depend on the CEO's underlying risk aversion.

Compensation characteristics should vary with firm type and risk (Kole, 1997; Gormley et al., 2013) and with the risk preferences of individual managers (Humphery-Jenner et al., 2016). Such tailoring is important: a CEO might be excessively risk averse, or risk taking, but might nevertheless have useful skills. Therefore, the firm would want to avail itself of those skills while mitigating undesirable characteristics.

Many firms would be aware of the level of CEO risk aversion as most new CEO appointments are insiders and the firm can observe their prior activities and risk taking. Insider CEOs account for 80% of CEOs in S&P500 firms (Cziraki and Jenter,2022) and

76% of CEOs in our sample. Further, insider CEOs on average have a long tenure with the firm before appointment as CEO (11 years on average, in our sample).[1]

CEO risk aversion is difficult to measure empirically, creating challenges when analyzing its impact on corporate outcomes and how to mitigate it. Indeed, disentangling intrinsic corporate risk levels from managerial risk aversion is empirically fraught. Previous studies suggest that CEO risk aversion may be impacted by life experiences and events such as natural disasters, wars, and recessions and these have also been shown to be associated with variation in managerial risk-taking even several decades after their occurrence (Bernile et al., 2017; Malmendier et al., 2011; Bucciol and Zarri, 2015; Guiso et al., 2018; Malmendier and Nagel, 2011).

Following Bernile et al. (2017), we focus on a quasi-exogenous measure of managerial risk aversion: early life disaster exposure. For a given disaster, the psychological impact will depend on the damage the CEO witnesses. Bernile et al., (2017) analyze 'fatal' disasters. These natural disasters have the *potential* to cause significant fatalities. However, through luck or happenstance, only some are 'extreme' whereas others are more 'moderate'. Bernile et al. (2017) highlight that the impact of disaster exposure depends on the severity of the consequences witnessed. Experiencing a fatal disaster that has severe consequences reinforces downside risks, increasing risk aversion. By contrast, experiencing a fatal disaster that only has moderate consequences de-emphasizes downside risks, reducing risk aversion. Chen et al. (2021) find a similar result, showing that CEOs' exposed to 'extreme' disasters have lower crash risk whereas those exposed to 'marginal' ones have higher stock crash risk.

We hypothesize that firms adjust compensation contracts to CEO risk version. Firms with CEOs with high levels of risk aversion (proxied by extreme disaster exposure) would tilt compensation towards risk-taking incentives. This would involve more stock and option-based compensation and higher compensation delta and vega. CEOs with lower levels of risk aversion (proxied by exposure to disasters with moderate fatalities), would be relatively unimpacted and would have similar compensation to other CEOs. Pan et al. (2017) suggests that there is a persistence in risk attitudes in firms. This thus

[1] For outside CEOs, firms undertake extensive due diligence when hiring expensive outside senior executives and should be aware of incoming CEO risk preferences. We control for inside CEOs in robustness tests and find consistent results.

implies that to the extent the CEO's risk preferences might not innately align, firms could use compensation contracts to bridge the divide.

The alternate hypothesis is that firms merely cater to managerial risk preferences (as suggested in Graffin et al., 2020), which has the opposite prediction, in that risk averse investors would receive relatively more of their pay from cash rather than equity or options. However, we note that the results in Graffin et al. (2020) focus on risk preferences (as proxied by political ideology) formed during adulthood, potentially leading to different implications.

We explore the impact of CEO risk aversion by collecting a firm-year panel sample of firms from 1992 – 2011. We explore compensation practices in the S&P 1500 and analyze whether CEO compensation differs based on risk aversion, where the level of risk aversion is proxied by whether the CEO was exposed to either an extreme or medium fatality disaster in their early life (i.e., in their county of birth between 5 and 15 years old). We control for several combinations of fixed effects and myriad control variables that might otherwise influence compensation practices. We also analyze a quasi-exogenous natural experiment to alleviate endogeneity concerns.

We find that CEO risk aversion, as proxied by early life disaster exposure, has a significant impact on CEO compensation. Risk aversion does not significantly influence total compensation. However, it does influence the structure of compensation. CEOs that are more risk averse (exposed to extreme early-life disasters) receive significantly higher compensation delta and vega relative to CEOs with no fatality experience. This appears consistent with the theoretical observations in Dittmann et al. (2017). This is both statistically and economically significant. More risk averse CEOs (exposed to extreme fatality disasters) have 5.24% higher compensation delta and 6.43% higher compensation vega, on average. By contrast, CEOs that are only exposed to 'moderate' early life disasters do not have significantly different compensation packages relative to those with no disaster exposure. Further, more risk averse CEOs (those exposed to early-life extreme disasters) receive a significantly greater amount of compensation from stock and options, both in number and in dollar value. This suggests that firms adjust compensation packages to individual risk preferences in order to mitigate latent agency conflicts of managerial risk aversion.

We show that several governance-related factors influence the impact of risk aversion on compensation. We hypothesize that corporate characteristics might moderate this effect. These could include whether a CEO is protected from career threats (Manso, 2011; Skeie, 2004) and the nature of the corporation (Kole, 1997). We find that the impact of risk aversion concentrates in firms with "entrenched" managers. We hypothesize that this is because managerial entrenchment can exacerbate latent agency conflicts and enable CEOs to 'live the quiet life' (Bertrand and Mullainathan, 2003). This would especially impact CEOs that are already more risk averse – such as those exposed to extreme early life disasters.

We explore the impact of these compensation practices on corporate outcomes. We argue that firms increase compensation vega in order to encourage risk-taking. We explore this by analyzing the impact of disaster exposure on risk taking and whether this differs between firms with above median, or below median, compensation vega or compensation delta. We highlight that compensation practices significantly influence the impact of CEO risk aversion (disaster exposure) on innovation. Disaster exposure has a muted impact on innovation, *on average*. However, extreme disaster exposed (more risk averse) CEOs that have above median vega compensation, have significantly higher patents, patent citations, and patent values. Compensation practices significantly influence whether more risk averse (extreme disaster-exposed) CEOs engage in innovation, and the value thereof.

We further find that, on average, CEOs exposed to extreme disasters take less risk (i.e., have lower stock volatility, higher cash holdings, and lower book leverage). However, this effect is weaker-to-non-existent if the firm pays above-median compensation vega. This is consistent with the idea that compensation vega can help to offset disaster-exposed CEOs' latent risk aversion. While it is possible that risk averse CEOs might select into less risky firms, that the relationship varies with compensation practices, suggests that compensation can help to mitigate issues of a risk averse CEO selecting a low-risk company and further reducing that firm's risk levels.

We also take steps to ensure that the results are robust to econometric concerns. The results include myriad fixed effects, including firm, year, CEO birth state, and CEO birth year fixed effects. As Bernile et al. (2017) indicate, such an array of fixed effects enable us to control for myriad unobserved factors (in addition to control variables) that might influence compensation practices. They also enable us to compare disaster-exposed CEOs to a relevant counterfactual cohort to better ensure identification. We find that the results are robust to myriad combinations of fixed effects, variable definitions, and controlling for other CEO characteristics.

We deploy a quasi-exogenous shock to compensation practices: FAS 123R. FAS 123R made option compensation significantly more expensive for firms and is associated, on average, with significantly lower levels of post-regulation option compensation (Hayes et al., 2012). Thus, we hypothesize and show that FAS 123R has an even greater impact on more risk averse CEOs (those with extreme disaster exposure) as they were being paid super-normally high levels of option compensation prior to the regulation.

We further ensure that the results are well identified by examining exogenous unexpected CEO turnovers. These turnovers are due to unexpected deaths and health shocks. Such turnovers force the firm to obtain a new CEO, thereby forcing them to potentially recalibrate their compensation packages for the new CEO. We find that firms do indeed match compensation practices to the risk aversion of the incoming CEO.

The results make significant contributions to the literature. We provide additional texture and detail to the literature on CEOs' behavioral biases and the impact thereof. Bernile et al. (2017) highlight that early life experiences can influence risk aversion. They show that, *on average,* CEOs exposed to extreme disasters in early life are significantly more risk averse. We find that this effect concentrates in firms that fail to tailor compensation contracts to moderate such risk aversion. We highlight how other factors, such as CEO compensation, can moderate the negative impacts of CEO risk aversion. Not all firms can, or do, tailor compensation contracts. For example, other corporate governance attributes such as CEO entrenchment and institutional ownership influence whether firms can adjust compensation contracts effectively.

Dittmann et al. (2017) show that optimal contracts contain risk taking incentives. Implicit in their model is that CEOs' underlying risk aversion should influence the nature and level of those incentives. Our analysis adds additional texture to the implications of their model. We show how firms adjust or tailor compensation packages in response to CEOs' risk preferences. Prior studies suggest that pilot CEOs (personal risk-taking CEOs) are associated with compensation structures that are more sensitive to changes in equity volatility and that these CEOs are more likely to have high performance-based pay (Cain and Mckeon, 2016). Overconfident CEOs receive more incentive-based compensation (options) in order to exploit their positively biased views of firm prospects (Humphery-Jenner et al., 2016). We examine the impact of CEO risk preferences on compensation structure and use a CEO's early life exposure to fatal disasters to proxy for CEO risk aversion. We highlight that firms attempt to mitigate this risk aversion through their compensation practices.

Further, we show that compensation practices significantly influence the impact of CEO risk aversion on corporate outcomes. While Bernile et al. (2017) suggest that CEOs' risk aversion is associated with risk avoidance, our findings suggest that firms can negate this latent risk aversion through incentive contracts. Specifically, we show that risk averse CEOs can be incentivized to undertake innovation. We further show that the main results in Bernile et al. (2017) on stock volatility, cash holdings, and book leverage concentrates in firms that do not provide high levels of incentive contracts.

Our results suggest that tailored compensation can ameliorate the impact of CEO risk aversion on stock volatility, cash holdings, and book leverage. The results emphasize that firms – and proxy advisory companies – should avoid a one-size-fits-all approach to compensation practices.

2 Literature and Hypotheses

2.1 CEO risk aversion, disaster exposure and compensation

Some level of corporate risk-taking is often beneficial to shareholders. The most obvious manifestation is in R&D and innovation, as innovation has been shown to improve corporate value (Cooper et al., 2022). Risk-taking can also involve entering new product lines or markets. By contrast, shareholders often aim to avoid agency conflicts of excess risk aversion and/or managers 'living the quiet life' (see Bertrand and Mullainathan, 2003). Therefore, firms often aim to encourage appropriate levels of risk-taking.

Managerial incentives interface with CEOs' latent risk aversion. Firms often grapple with how to incentivize risk taking. Therefore, Dittmann et al. (2017) highlight that risk taking incentives are an important part of CEOs' compensation packages, and should usually optimally include options. However, different CEOs have different levels of risk aversion. Such risk-taking incentives can have an observed impact. Firms will adjust compensation to mitigate undesirable behavioral attributes in an otherwise desirable CEO. Carline et al. (2023) explore a quasi-exogenous shock to managerial risk taking preferences. They show that after this shock (FAS 123R), corporate risk-taking falls significantly in the impacted firms. This implies that increased risk-taking incentives have a non-negative impact on corporate risk. However, there are mixed predictions about how managerial risk aversion influences compensation contracts. On the one hand, risk averse CEOs might seek out companies that pay low-risk compensation. Similarly, these CEOs might negotiate compensation packages that suit their inherent risk aversion. For example, Graffin et al. (2020) argue that politically conservative CEOs – who they estimate are more risk averse – push for more cash-based compensation. This suggests that compensation contracts could amplify CEOs' existing risk preferences.

Corporations might alternatively aim to incentivize risk averse CEOs to take additional corporate risk. This quadrates with the model in Dittmann et al (2017) and also implies that firms should tailor risk taking incentives to the CEO's latent risk aversion. This is especially the case if the company wishes to hire a candidate for his/her skills and abilities while off-setting 'undesirable' behavioral attributes. Pan et al. (2017) indicate that this could be important: firms often seek employees whose risk preferences align with those of the firm. Therefore, if the candidate has the required skills, but different risk preferences, the firm might use compensation to mitigate this. Analogously, Humphery-Jenner et al. (2016) find that firms adjust compensation contracts to reflect individual behavioral attributes, such as CEO overconfidence. Further, Cain and Mckeon (2016) highlight that risk averse CEOs[2] have greater compensation convexity, suggesting an attempt to adjust compensation to match CEO attributes.

Customizing compensation to fit the CEO's risk aversion is consistent with standard contract theory. Here, corporate risk impacts the CEO's utility through wealth, risk, and effort-related effects (Guay, 1999; Smith and Stulz, 1985). A more-risk averse CEO is relatively more sensitive to the risk effect. Similarly, with greater risk aversion, higher corporate risk could increase psychological distress, which would increase the

[2] Risk aversion is proxied by personal risk taking- holding a pilot license.

perception of effort. Thus, compensation contracts must calibrate CEOs' incentives in order to counter-balance the impact of risk aversion.

Firms are likely to be aware of the CEO's risk aversion. Most new CEOs are known to the board before their appointment (Harrison et al., 2023), with up to 90% of new CEOs being either insiders or connected to the board through prior employment (Cziraki and Jenter, 2022). Insiders make up 76% of CEOs in our sample and on average have a long tenure with the firm before appointment as CEO (11 years on average, in our sample), allowing the firm to observe their prior activities and risk taking. Given the magnitude of CEO compensation, firms would undertake extensive due diligence into external CEO's personal circumstances and background. [3]

Firms can ameliorate CEO risk aversion by increasing compensation 'delta' and 'vega'. Compensation delta is the sensitivity of compensation to changes in stock price, and compensation vega is the compensation sensitivity to risk. Higher compensation delta, or vega, suggests that compensation is more sensitive to stock price changes or to risk, respectively. Stock-based compensation increases compensation delta, and option-based compensation increases both delta and vega. Option based compensation is often calibrated to focus on increasing risk-taking incentives.

Compensation delta and vega do impact CEOs' risk-taking activities. Increasing compensation delta per se (without also adjusting compensation vega) can have unintended consequences on risk-taking. It can exacerbate risk aversion as CEOs are often highly undiversified, with significant human and financial capital already tied to the firm. Thus, exacerbating such wealth concentration could worsen risk aversion. For example, CEOs with higher delta might hedge more (Knopf et al., 2002), or decrease R&D and leverage (Coles et al., 2006). By contrast, increasing compensation vega encourages risk-taking. For example, CEOs with higher vega tend to hedge less (Knopf et al., 2002), diversify less and increase leverage more (Coles et al., 2006; Hagendorff and Vallascas, 2011; Low, 2009).

CEOs' behavioral attributes and experiences can influence risk-taking. For example, overconfident CEOs generally take more risks, which can result in greater innovation (Galasso and Simcoe, 2011; Hirshleifer et al., 2012) but also in less

[3] We control for inside CEOs in our robustness tests (unreported).

conservative accounting practices and reckless or intentional actions/disclosures (Ahmed and Duellman, 2013; Banerjee et al., 2018). Similarly, life experiences can influence risk-taking. This can include living through a recession (Malmendier et al., 2011) or being exposed to disasters during early life (Bernile et al., 2017).

Exposure to disasters can significantly alter CEOs' risk preferences. Bernile et al. (2017) highlight that CEOs exposed to disasters with 'severe' fatalities in early life are more risk averse, whereas those exposed to 'moderate' ones are not. This risk aversion (or lack thereof) then influences corporate risk taking through policies such as leverage, cash balances and acquisition activity (Chava and Purnanandam, 2010; Dittmar and Duchin, 2016; Malmendier et al., 2011). Chen et al. (2021) find that crash risk is related to CEO risk aversion with risk tolerant CEOs (those exposed to 'marginal' disasters) having higher crash risk.

We proxy a CEO's risk aversion using their early life exposure to disasters (Bernile et al., 2017) and test two alternative hypotheses. Our baseline hypothesis is that risk averse CEOs (those exposed to extreme disasters) receive relatively more compensation vega and a higher proportion of compensation from stock and options as companies aim to incentivize these CEOs to take more risk. The increased option-based pay will especially increase compensation vega, but would also increase compensation delta as well. We test this against the alternative that firms calibrate their compensation contracts to CEOs' latent risk-taking preferences. This drives the opposite prediction that risk averse CEOs (those exposed to extreme disasters) receive lower compensation vega due to their risk aversion. We capture this in the following two hypotheses.

> ***Hypothesis 1a****: more risk averse CEOs (those with early life exposure to extreme disasters) receive relatively greater risk-taking incentives (i.e., compensation delta and vega, and a higher proportion of compensation from stock and options).*

> ***Hypothesis 1b****: more risk averse CEOs (those with early life exposure to extreme disasters) receive relatively lower risk-taking incentives (i.e., a greater proportion of compensation coming from cash).*

2.2 Corporate governance and entrenchment

We anticipate that managerial entrenchment will influence the relationship between CEO risk aversion and compensation. As indicated, we expect that if a CEO has extreme fatality experience, he/she will be more risk averse. However, competitive pressures can mitigate this. For example, if the CEO fears being removed in a hostile takeover, this could discipline the CEO and force him/her to act more in shareholders' best interests (see e.g., Scharfstein, 1988).

Entrenched managers are less exposed to hostile takeovers which reduces the disciplinary effect of the market for corporate control. In turn, this can exacerbate latent behavioral biases and agency conflicts. Some managers might use entrenchment to make self-interested investments, which ultimately destroy shareholder wealth (Harford et al., 2012; Masulis et al., 2007). However, a more risk averse manager is likely to use this entrenchment to 'live the quiet life' and take less risk than shareholders might otherwise want (Bertrand and Mullainathan, 2003).

We expect that entrenchment will exacerbate the impact of risk aversion. Extreme-disaster exposure likely makes managers more risk averse, and thus, entrenchment enables these managers to reduce risk-taking. By contrast, without entrenchment, hostile takeovers would force these managers to behave more like their non-disaster-exposed peers. Therefore, we anticipate that firms will especially increase compensation delta and vega for more risk averse CEOs (those exposed to extreme disasters) in entrenched firms. We capture this in the following hypothesis.

> ***Hypothesis 2****: The impact of CEO risk aversion on CEO compensation concentrates in firms that have entrenched managers.*

2.3 Institutional ownership

We hypothesize that firms with higher levels of institutional ownership are more likely to shape compensation to match CEOs' risk aversion. Institutional owners engage with firms in two main ways: (1) direct interactions with firms' governance teams and (2) trading behavior. Both factors can influence firms' governance practices.

Institutional investors often engage with firms' management teams (McCahery et al., 2016), including interactions with the board and executives. This can involve encouraging the firm to pursue internal governance practices that better maximize shareholder wealth. Therefore, when an institutional investor files to become an 'activist' investor, the market typically responds positively (Brav et al., 2008).

Institutional investors can also influence corporate governance by credibly threatening to sell shares or indicating a disinclination to buy shares in poor governance companies (Edmans and Manso, 2011; Gallagher et al., 2013). Supporting this, institutional investors tend to gravitate towards better-governed firms (Chung and Zhang, 2011). Given that institutional ownership often conveys signaling, credibility, and liquidity benefits, firms would likely improve governance to attract institutional investors. These firms would then maintain and enhance that governance to retain these institutional investors lest they exit their shares (per Gallagher et al., 2013).

Given their skills and expertise, we expect that institutional investors are more likely to have developed the knowledge and dedicated the time to recognize that compensation should fit the CEO's characteristics. We, therefore, anticipate that institutional owners are more likely to encourage firms to customize compensation to CEOs' risk aversion. This includes both delta and vega, given that institutional owners take steps to mitigate CEO shirking, and can be associated with greater risk-taking and innovation (Aghion et al., 2013). Thus, we make the following hypothesis.

> ***Hypothesis 3****: The relationship between CEO risk aversion and CEO compensation is stronger in firms with higher levels of institutional ownership.*

3 Data

We obtain data on CEOs' early life disaster experiences used in Bernile et al. (2017)[4] and supplement this with data on executive characteristics and other firm-level data. The sample is a firm-year panel spanning 1992-2011. The unbalanced panel data includes 8,070 firm-year observations for which we have non-missing data for all main variables of interest (i.e., related to CEOs' compensation design) and relevant firm-level control variables.

[4] We thank Gennaro Bernile for making this data available.

The CEO disaster experience data includes information on whether the CEO was exposed to an "extreme" fatality or "medium" fatality disaster. We follow Bernile et al. (2017) to construct these variables (see Appendix A1 for detailed variable definitions). The disaster experience data focuses on disasters in the CEO's birth county when the CEO was between 5 and 15-years old. Bernile et al. (2017) focus on disasters in the CEO's birth county as these will be the most salient. They argue that disasters experienced from the 5th to 15th birthday are the most important in forming "early childhood" memories. Table 1 contains the summary statistics for disaster experience in our sample. Unsurprisingly, CEOs in our sample have similar disaster experience to those in Bernile et al. (2017),[5] with small differences arising due to differences in the set of required additional variables.

We obtain data on CEO compensation characteristics from Execucomp. We measure the CEO's total pay, compensation *Vega* and compensation delta. The compensation *Delta* is the change in the dollar value of the executive's wealth for a one percentage point change in stock price. Conversely, Vega is defined as the change in the dollar value of the executive's wealth for a 0.01 change in the annualized standard deviation of stock returns. (following Guay (1999), Core and Guay (2002), and Coles, Daniel, and Naveen (2006)). These are standard CEO compensation measures in the literature. We also measure the compensation that comes from the dollar value of the stock (i.e., "Stock Dollar ($)"), and the dollar value of stock and option grants (i.e., "Equity Dollar ($)").

We supplement the disaster experience data with data on other CEO and corporate characteristics. The summary statistics are in Table 1 and are consistent with prior literature. CEOs are 57 years old, on average. Our firm-year observations have a market-to-book ratio of 1.85. On average, 72% of firm-year observations pay dividends, and only 2% of our firm-year observations involve a female CEO.

[5] In Bernile et al. (2017), 11% of CEOs have "extreme" fatality experience, and 56% have "medium" fatality experience. In our sample, 10% have "extreme," and 57% have "medium" fatality experience.

4 Results and analysis

4.1 How does risk aversion influence compensation contracts?

We start by using early-life disaster exposure to proxy risk aversion and analyzing the influence on compensation contracts. We begin by exploring the impact of both extreme and medium fatality exposure on total compensation, compensation delta, and compensation vega. Delta captures the sensitivity of compensation to stock prices, and Vega the sensitivity to risk. We control for other factors that could influence compensation levels and structure. We further ensure that the results are robust to controlling for firm, year, birth-state, and birth-year fixed effects (and combinations thereof). We correct standard errors for clustering at the executive (CEO) level since our main variable of interest is CEOs with specific types of disaster exposure in their formative years[6].

The results are in Table 2 and are consistent with expectations. Total pay itself, as opposed to the structure of the pay, does not appear to depend on risk aversion in our tests (as proxied by the disaster exposure variables in Column 1). However, there is a significant relationship between risk aversion and renumeration composition. We find that more risk averse CEOs (those with extreme fatality exposure) have higher and statistically significant compensation delta and vega. That is, firms structure CEO compensation to encourage both value creation and risk-taking if the CEO is more risk averse (exposed to extreme fatality disasters). By contrast, less risk averse CEOs (those exposed to medium fatality disasters) have similar compensation to other CEOs, suggesting that such CEOs are relatively less impacted.

More importantly, consistent with the central hypothesis, we find that high risk aversion (proxied by extreme fatality experience) is positively associated with the provision of compensation Vega (i.e., risk-taking incentives) and compensation Delta (i.e., performance incentives). The economic magnitudes of the estimates are large. For example, column (4) suggests that relative to CEOs with no fatality experience, CEOs with extreme fatality experience (more risk averse) receive 5.24% more compensation delta, and the results are statistically significant at the 1% level (t-ratio=2.619).

[6] Our results are also robust to the clustering of standard errors at the firm level.

Additionally, extreme fatality experience is associated with a 6.44% higher CEO compensation Vega and is statistically significant at the 5% level (*t*-ratio=2.216)[7].

The coefficients on the control variables are consistent with expectations. Larger firms pay more compensation, which is consistent with prior literature (see, e.g., Dang et al., 2018). Similarly, higher growth (i.e., higher market to book) firms have higher compensation delta. More profitable firms exhibit higher total pay, delta, and vega. This pattern could reflect the relationship between past performance and future profitability (He, 2009). We further supplement these results by exploring the relationship between risk aversion (fatality exposure) and the value and number of stock and option grants. These results are in

Table 3. We find that more risk averse CEOs (those who experience extreme fatalities) are more likely to have more stock compensation (i.e., both more stock grants in dollar value and in number (unreported)) and more option compensation. This is robust to the inclusion of firm, birth-state, year, and birth-year fixed effects. The results are economically meaningful. For example, a more risk averse CEO (extreme fatality experience) has 25.54% more stock compensation.[8] By contrast, less risk averse CEOs (medium fatality experience) do not have statistically significantly different compensation from other CEOs.

The control variables are similar to those used in the previous analysis. However, in

Table 3, we also control for the CEO's total compensation. This is correlated with firm size and profitability. Thus, whereas total compensation is positively correlated with the amount of stock and equity compensation, we find that firm size and profitability become negatively correlated. Other control variables are mostly statistically insignificant. This could reflect the number of additional fixed effects in the regression.

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[7] The mean value of log(1+Delta) is 5.74. Therefore, Extreme Fatality experience is associated with 0.301/5.74 or 5.24% more compensation Delta. Additionally, the mean value of log(1+Vega) is 4.07. Thus, Extreme Fatality experience is associated with 0.262/4.07 or 6.44% more compensation Vega.

[8] This result comes from

Table 3, column 2. Here, CEOs that experience extreme early childhood fatalities have 0.692 points more stock compensation. The average stock compensation is 2.71. Thus, these CEOs have 25.54% more stock compensation than do other CEOs with no fatality experience.

4.2 The role of CEO entrenchment

We further explore whether corporate governance moderates the impact of CEO risk aversion. Managerial entrenchment can enable managers to shirk or under-invest (Bertrand and Mullainathan, 2003). Thus, entrenchment could exacerbate latent agency conflicts and enable risk averse CEOs (disaster-exposed) to act on their underlying risk aversion. Therefore, we expect that firms will especially adjust risk averse (disaster-exposed) CEOs' compensation contracts when those CEOs are also potentially entrenched.

We analyze the impact of managerial entrenchment in Table 4. We proxy managerial entrenchment with the Gompers et al. (2003) G-index of 24 anti-takeover provisions (ATPs). Here, we split the sample into firms that have a below-median G-index (Columns 1 and 2) or an above-median G-index (Columns 3 and 4). This follows the approach in Harford et al. (2012), which notes that entrenchment requires a preponderance of ATPs (i.e., firms with an above-median level of ATPs). The main finding is that entrenched CEOs that are more risk averse (extreme fatality exposure) receive statistically significantly greater delta and vega, whereas less entrenched CEOs (i.e., Low G Index) do not. The increase in compensation sensitivity is economically meaningful. More risk averse CEOs (those with extreme fatality exposure) in entrenched firms have a 15% higher compensation delta.[9]

4.3 The impact of institutional investors

Institutional investors can significantly influence corporate governance, and we anticipate that they could moderate the role of CEO risk aversion. Institutional investors often engage with managers to shape corporate practices, which can include contributing their insight and experience to the firm's corporate governance (McCahery et al., 2016). Institutional investors can also threaten to sell their shares should the firm's governance and performance underwhelm (Edmans and Manso, 2011; Gallagher et al.,

[9] We obtain this from Column 3 of Table 4. Here, the coefficient on the "Extreme Fatality" indicator is 0.863. The sample average compensation delta is 5.74 (see Table 1). Thus, CEOs with extreme fatality exposure have 15% = 0.863/5.74 greater compensation delta.

2013). Given their skills and expertise, we expect that institutional investors are more likely to have developed the knowledge and dedicated the time to recognize that compensation should fit the CEO's characteristics. That is, institutional investors would recognize that compensation contracts should be heterogenous. Therefore, we expect that firms with more institutional ownership are more likely to customize their compensation plans to the CEO's personal attributes, thereby improving governance.

We divide the sample into sub-samples based on whether the firm has high or low levels of institutional ownership. We use the sample median value of institutional ownership to split the sample into high (above median) or low (below median) subsamples. We then explore the relationship between CEO risk aversion (proxied by disaster exposure) and compensation within these sub-samples. We also report regressions both with and without institutional ownership as a control variable.

The results are in Table 5 and are consistent with expectations. We find that high risk aversion (extreme fatality experience) is related to compensation delta and vega if the firm has a significant level of institutional investment. This is consistent with the idea that institutional investors help to shape the firm's compensation practices. CEOs with lower risk aversion (exposed to more moderate disasters) also experience a slightly higher compensation delta if the firm has higher institutional ownership. However, this impact is lower in both magnitude and statistical significance than it is for CEOs exposed to extreme disasters. Additionally, institutional ownership is positively and significantly related to compensation delta. This suggests that institutional investors push for, and potentially gravitate towards, greater pay-to-performance sensitivity (per Hartzell and Starks, 2003). The results are consistent with expectations and highlight the role of governance in shaping compensation practices.

4.4 How do compensation practices influence corporate outcomes?

We next explore the impact of these compensation practices on corporate outcomes. Firms might attempt to encourage risk taking by increasing compensation vega. We expect this to be especially evident in the more risk averse (Extreme fatality experience) sub-sample as these are the CEOs for whom risk taking incentives are especially necessary.

4.4.1 Disaster experience, compensation, and innovation

We start by analyzing the relationship between CEO risk aversion (disaster experience), compensation structure, and innovation. Our innovation measures include patents, patent citations, and patent value (per Kogan et al., 2017). The Kogan et al. (2017) patent value measure is based on the market's response to patent grants.

To analyze the impact of early life disaster exposure, we explore the interaction between CEO risk aversion (disaster experience), compensation structures, and innovation. Here, we interact the 'extreme fatality' and 'medium fatality' variable with indicators representing whether the CEO's compensation vega or delta is above median. We analyze both contemporaneous and future innovation outcomes. In this firm-year panel sample, we include firm, CEO birth-state, year, and CEO birth-year fixed effects. We control for myriad firm and CEO characteristics in order to control for factors that the literature has shown can influence innovation.

The results are in Table 6 and highlight the importance of compensation practices in driving innovation. Disaster exposure has a muted impact on innovation, on average. However, compensation vega is associated with innovation, especially for highly risk averse CEOs (that have experienced extreme fatalities). These CEOs have significantly higher patent counts, patent values, and patent forward citations when compensation vega is above median. In contrast, extreme fatality exposure significantly reduces innovation when vega is below median.[10] The results suggest that firms are able to offset extreme disaster-exposed CEOs' latent risk aversion through compensation structures. In so doing, they are able to leverage those CEOs' latent skills and improve innovation outcomes.

The coefficients on the dependent variables are largely consistent with expectations. For example, firms with higher R&D intensity have more patents, forward citations, and higher patent values. Similarly, firms with higher market-to-book ratios, which is often associated with higher growth prospects, have more patents, forward citations, and higher patent values. Interestingly, larger firms, and firms with more

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[10] We split the sample into firms that have high (above median) or low (below median) CEO compensation vega and find significant negative results for the low vega subsample and significant positive results for the high vega sample for highly risk averse CEOs (that have experienced extreme fatalities).

tangible assets, also have more innovation outcomes. However, this can reflect larger firms being better resourced; and thus, more able to finance innovation (see e.g., Bena and Li, 2014).

4.4.2 Disaster experience, compensation, and corporate outcomes

We next explore the impact of compensation practices with respect to book leverage, cash holdings, and stock volatility. This follows a similar approach to that in Bernile et al. (2017). Notably, volatile stock prices are not necessarily negative for the firm. Volatility can stem from risk-taking, which can include entering new markets and engaging in innovation. Such risk-taking can manifest in both firm-specific (i.e., idiosyncratic) risk and market risk, stemming from the firm increasing its exposure to economic events. Similarly lower cash holdings can benefit firms given evidence that excess cash holdings can enliven agency conflicts and reduce corporate value (Harford, 1999).

We analyze the impact of compensation by exploring the impact of risk aversion (disaster exposure) on corporate outcomes in the full sample of firms and in sub-sample with high or low compensation vega or delta (for four subsamples in total). The results are in Table 7 and are consistent with expectations. Panel A analyzes the impact of disaster exposure on book leverage, Panel B on cash holdings, and Panel C on stock volatility. We control for myriad fixed effects and control variables that might otherwise influence corporate risk-taking. Column 1 contains the full sample of all firms. Column 2 contains the sub-sample of firms where the CEO has above-median compensation vega (and Column 3 above median compensation delta). Column 4 and Column 5 have the sub-samples with below-median vega and delta, respectively.

Several findings emerge. First, consistent with Bernile et al. (2017), if the CEO was exposed to extreme fatality disasters, the firm has significantly lower book leverage and volatility, and significantly higher cash holdings. This supports the idea that extreme fatality exposure can make the CEO more risk averse. Second, we find that compensation contracts can moderate this. For example, in Panel A, extreme fatality exposure only significantly reduces leverage in the low vega and low delta sub-samples. In Panel B, extreme fatality exposure is associated with higher cash holdings in all sub-samples. In Panel C, extreme fatality exposure significantly reduces volatility in the low vega and low delta sub-samples. However, this effect disappears in the high vega and high delta sub-samples.

These results both buttress our foregoing results and are consistent with our hypotheses. Specifically, we argue that higher compensation delta and vega can ameliorate managerial risk aversion. Given that CEOs with extreme fatality exposure are likely more risk averse, firms might believe that higher compensation vega and delta could mitigate this issue. The results in Table 7 support this hypothesis. They highlight that paying higher compensation delta and vega does indeed mitigate risk aversion in risk averse CEOs.

5 Identification Strategies and other robustness checks

5.1 Identification and causation

We take steps to ensure that the results are causal in nature. The concern is that risk aversion (proxied by disaster experience) and compensation are merely correlated potentially due to random data quirks or unobserved variables. The primary results take significant steps to ameliorate identification and causation concerns by including firm, year, CEO birth-state, and CEO birth-year fixed effects (following Bernile et al. 2017). This approach controls for myriad unobserved factors that might otherwise inhibit identification. Bernile et al. (2017) note that such fixed effects enable the tests to 'exploit within-cohort heterogeneity'. That is, they enable us to compare disaster-exposed CEOs to non-disaster-exposed CEOs after controlling for the myriad of other unobserved factors that might also influence compensation practices. Nevertheless, we undertake additional robustness tests to ensure that the results are causal in nature and well-identified.

5.1.1 Exogenous CEO turnovers

We first explore exogenous CEO turnovers to determine whether firms adjust compensation when the new CEO is more (or less) risk tolerant. An issue with CEO turnovers is that they can be endogenous. A related concern is that the correlation between CEO risk aversion (disaster exposure) and compensation practices might merely reflect other latent factors. Thus, we partially address this by examining exogenous CEO departures that are due to health issues or death, similar to the approach in Bernile et al. (2017).

Analyzing exogenous CEO turnover helps to mitigate identification concerns relating to unobserved latent factors and spurious correlation. We note that there can still be non-random matching between the new CEO and the firm. However, in our case, this does not impugn the results. While certain individuals might have specific risk preferences, and their demand for certain compensation contracts can cause them to move towards a firm, this is consistent with the two-sided matching market of firms with CEOs. Furthermore, given the 'shock' nature of the turnover, these unexpected CEO turnovers force firms to re-evaluate their compensation packages when considering new hires.

We undertake the analysis as follows. First, among the sample of firms that experienced CEO turnovers during our sample period, we identify the subsample of firms that experienced an exogenous turnover following Eisfeldt and Kuhnen (2013). They classify a CEO turnover as exogenous if the CEO's departure was not forced and was announced at least six months before the anticipated succession date or was caused by well-specified health-related problems. Many of these cases are caused by health shocks resulting in death (e.g., car accidents, plane and helicopter crashes as in Jenter et al. (2024),). Since Eisfieldt and Kuhnen (2013) provide data for 1992-2006, we hand-collect the remaining data for the later years in our sample (2007-2011).

There are 26 exogenous turnovers of CEOs where the incoming CEOs have more risk tolerance than the outgoing CEOs. Specifically, following Bernile et al. (2017), we classify turnovers where the CEOs change from No Fatality to Medium Fatality, Extreme Fatality to Medium Fatality, or Extreme Fatality to No Fatality as *"Incoming CEO being less risk averse than the outgoing CEO"*. In a further 32 exogenous CEO turnovers, we find that the CEO's disaster experience changes from No Fatality to Extreme Fatality, Extreme Fatality to No Fatality, Medium Fatality to No Fatality, and Medium Fatality to Extreme Fatality. Following Bernile et al. (2017), we classify these turnovers as *"Incoming CEOs being more risk averse than the outgoing CEOs*". We then analyze how the relative risk aversion (disaster exposure) of the new CEO influences compensation practices. For an event to be included in the analysis, we require non-missing data for all our relevant variables for at least two years before and two years after the CEO exogenous turnover events.

The results are in Table 8 and are consistent with expectations. If the incoming CEO is less risk averse than the predecessor, then they receive comparatively lower vega and stock-based compensation. However, if the CEO is relatively more risk averse, they receive relatively more stock and equity. The compensation vega results are relatively weak. This is unsurprising given that compensation vega builds up over time. And thus, vega from immediately after a turnover might not have had enough time to reflect the totality of the CEO's compensation arrangements. Overall, these results suggest that firms tailor compensation to match the CEO's risk preferences. They also imply that our results do not merely reflect endogeneity concerns.

5.1.2 FAS 123R: a shock to option-based compensation

We take further steps to mitigate endogeneity concerns by exploring how an exogenous shock to compensation practices (FAS123R) moderates the relationship between risk aversion (disaster experience) and compensation. FAS123R significantly changed the accounting rules surrounding option compensation. This change made it more expensive for firms to pay options to their executives and caused a significant reduction in option compensation on average (Hayes et al., 2012). Therefore, we expect that the passage of FAS123R in 2005 significantly reduces the relationship between high risk aversion (extreme fatalities) and compensation delta and vega. We construct an indicator that equals one for whether the observation post-dates FAS123R and equals zero otherwise. We interact this variable with the extreme and medium fatality indicators.

The results are in Table 9 and are consistent with expectations: FAS123R significantly reduces the impact of risk aversion (extreme fatality exposure) on delta and vega. In Table 9, Columns 1 and 2 include firm, birth-state, and birth-year fixed effects; Columns 3 and 4 also add year-fixed effects. Thus, Columns 1 and 2 report the FAS123R indicator, whereas Columns 3 and 4 do not. Several findings are notable. First, high risk aversion (extreme fatality exposure) is positively and significantly related to delta and vega, at least in the pre-FAS123R period. Second, FAS123R is significantly and negatively related to compensation delta and vega (consistent with Hayes et al., 2012). Third, after FAS123R, the impact of high risk aversion (extreme fatality exposure) is significantly reduced. The magnitude is such that FAS123R almost eliminates the impact of high risk aversion (extreme fatality exposure), on average.

These findings help to ensure that our results are causal in nature. High risk aversion (extreme fatality exposure) responds to an exogenous shock in a manner consistent with expectations. Further, the results highlight that policy interventions can have unintended consequences and emphasize the importance of policymakers ensuring that regulations can adjust to the nuance of each individual firm.

5.2 Other CEO level control variables

We check that the results are robust to variable definitions and to alternative control variables. We include these additional control variables in robustness tests, given that their inclusion reduces the sample size due to data availability. We ensure that the results are robust to controlling for CEO tenure, given that longer-tenured CEOs might have more power over their compensation. We also control for the CEO compensation pay slice as per Bebchuk et al. (2011). This is the ratio of the CEO's compensation to that of the next three highest-paid executives. We further control for whether the CEO is also a founder. Founder CEOs might be better incentivized than other CEOs but might also have more stock in the firm, given their role as founders. Thus, founder CEOs can influence myriad corporate outcomes (following Islam and Zein, 2020), which could also include executive compensation. Further, we ensure that the results are robust to controlling for a CEO power index (Humphery-Jenner et al., 2022): More powerful CEOs are more likely to be able to influence their compensation.

The results in Table 10 are consistent with expectations. CEOs with extreme disaster exposure still have statistically significantly higher compensation delta and vega. This suggests that the results do not merely reflect an unobserved correlation between disaster exposure and CEO power. Further, we find that some CEO power metrics are also statistically significantly associated with compensation. These include whether the CEO is a founder, CEO tenure (which results in a significantly greater compensation delta), and the CEO power index. We also control for inside CEOs in untabulated results and find consistent evidence. These results highlight that the results are robust to controlling for CEO-level characteristics.

6 Conclusion

CEOs' behavioral attributes such as risk aversion can significantly influence corporate outcomes. We hypothesize and find that the impact of behavioral attributes (such as CEO risk aversion) is moderated by compensation contracts. In turn, the firm's ability to amend compensation contracts is influenced by its circumstances, such as its corporate governance attributes. Thus, the totality of the corporate environment can influence whether, when, and how CEO characteristics influence corporate outcomes. Further, given that highly skilled CEOs can have some undesirable or unsuitable behavioral characteristics (such as high risk aversion), firms could avail themselves of those skills if they appropriately adjust compensation characteristics.

This paper explores how firms adjust compensation contracts by analyzing CEO risk aversion, and the impact thereof. CEO risk aversion is difficult to measure empirically, creating challenges when analyzing its impact on corporate outcomes and methods to mitigate it. We focus on a quasi-exogenous measure of managerial risk aversion, early life disaster exposure as prior literature shows that this exposure can significantly influence CEO risk aversion (Bernile et al., 2017).

We hypothesize that more risk averse CEOs, those exposed to extreme fatality disasters, will receive higher compensation delta and vega in order to encourage greater risk-taking and to better align their objectives with those of shareholders. The results are consistent with expectations: CEOs exposed to extreme fatality disasters have 5.24% higher compensation delta and 6.44% higher compensation vega, on average. This is consistent with the observation in Dittmann et al. (2017) that optimal compensation contracts should include appropriate risk taking incentives. In so doing, our paper adds additional texture to their model by highlighting the importance of individual behavioral characteristics.

We further explore factors that might moderate this relationship. We highlight that firms are most likely to adjust CEO compensation if there is a risk of managerial entrenchment. We argue that this is because entrenchment can increase latent agency conflicts; and, thus, could exacerbate underlying risk aversion. Therefore, firms especially pay more compensation delta and vega to entrenched CEOs who are more risk averse (extreme fatality exposure). We further highlight that firms adjust compensation when there is higher institutional ownership as institutional investors might guide firms' compensation practices.

We also find that these compensation practices can have real impacts for firms. Compensation practices significantly influence the impact of CEO risk aversion on corporate innovation. Extreme disaster exposed (more risk averse) CEOs that have above median vega compensation, have significantly higher quality and quantity of innovation. Patents are more numerous, more cited, and more economically valuable.

We further confirm that CEOs who are exposed to extreme disasters are more risk averse: their firms have lower leverage, lower volatility, and higher cash holdings. However, this effect is significantly lower if the firm pays higher compensation vega. This suggests that even if risk averse CEOs select into low risk firms, firms might tailor compensation contracts to avoid excess risk reduction. It also suggests that firms might tailor compensation practices to avail themselves of these 'risk averse' CEOs' skills while off-setting excess risk aversion.

We take steps to ensure that the results are robust to econometric concerns. We explore the impact of an exogenous shock to compensation policies: FAS 123R. This accounting rule significantly changed option-expensive rules and, thus, the desirability of paying CEOs with options. We show that FAS 123R had a disproportionately large impact on more risk averse CEOs (those exposed to extreme fatality disasters), reflecting their super-normally high levels of option compensation. This pattern highlights that our results are causal in nature and helps to alleviate identification concerns. We further ensure that the results are robust to myriad combinations of fixed effects, including firm, CEO-birth-state, year, and CEO-birth-year fixed effects. We also show that the results are robust to myriad control variable combinations and definitions. Additionally, we find that the results hold when we focus on unexpected exogenous CEO turnovers (i.e., those due to health shocks and deaths). Here, firms adjust compensation to match the incoming CEO's risk aversion (disaster exposure). This suggests a causal relationship between risk aversion (disaster exposure) and CEO compensation.

These results make a significant contribution to the literature. We contribute to the literature on CEOs' behavioral biases. We specifically dovetail with the literature on the real-world impact of CEOs' life experience. Whereas much prior literature has analyzed the *direct average* effect of biases on corporate outcomes, we demonstrate that it is essential to also consider factors that *moderate* this effect. Bernile et al. (2017) highlight that CEO's latent behavioral attributes (i.e., risk aversion from extreme disaster exposure) can influence corporate outcomes. We highlight that this effect can be nuanced. The impact of such disaster exposure depends on the circumstances in which it manifests. These circumstances can include compensation characteristics. Thus, the adverse impact of extreme disaster-exposed CEOs concentrates in the firms that fail to adjust compensation contracts. This highlights the importance of moderating effects when analyzing the impact of CEO attributes on corporate outcomes.

The results also contribute to the compensation literature and to compensation practice. We highlight that firms can offset CEO behavioral biases with properly structured compensation packages. Executive compensation should reflect the nuances of the individual. Thus, a one-size-fits-all approach to CEO compensation might be sub-optimal and ignore CEOs' latent behavioral drivers. In so doing, we emphasize the importance of considering CEO effects when designing and analyzing executive compensation.

7 References

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8 Tables

Table 1: Summary Statistics

The table reports summary statistics for the key executive and firm-level variables used in the analysis. The sample includes observations from 1992-2011 for the intersection of US S&P1500 firms (excluding financial and utility firms) covered by CRSP-Compustat and ExecuComp. All continuous variables are winsorized at 1% and 99%. See Appendix Table A1 for variable definitions.

Variables	N	Mean	SD	Median	90^{th}
Extreme Fatality	8070	0.10	0.30	0.00	0.00
Medium Fatality	8070	0.57	0.49	1.00	1.00
Low Fatality	8070	0.33	0.47	0.00	1.00
Log (1+Total Pay)	8038	8.16	1.09	8.23	9.64
Log(1+Delta)	7528	5.74	1.58	5.85	7.91
Log(1+Vega)	7736	4.07	1.80	4.33	6.30
Log (1+Stock $)	8068	2.71	3.60	0.00	8.29
Log (1+Equity $)	8038	6.28	3.12	7.36	9.21
Log (Assets)	8070	8.50	1.90	8.55	10.83
Market to Book Ratio	8070	1.85	1.43	1.37	3.22
Profitability	8070	0.05	0.13	0.04	0.14
R&D/Assets	8070	0.02	0.05	0.00	0.08
Tangibility	8070	0.30	0.25	0.24	0.68
Cash-to-Asset	8070	0.11	0.15	0.05	0.30
Dividend Paying (I)	8070	0.72	0.45	1.00	1.00
Sales Growth	8070	1.14	0.51	1.08	1.38
Stock Volatility	8070	38.89	22.07	33.05	64.53
CEO age	8070	56.78	6.87	57.00	65.00
Female (I)	8070	0.02	0.15	0.00	0.00

Panel B: CEOs' early life disaster experience by year (with non-missing data on relevant variables)

	Extreme Fatality Experience		Medium Fatality Experience		No Fatality Experience		
Year	Number	Percent	Number	Percent	Number	Percent	Total
1992	1	3.0%	26	78.8%	6	18.2%	33
1993	34	6.9%	331	66.9%	130	26.3%	495
1994	40	7.1%	372	65.7%	154	27.2%	566
1995	42	7.5%	344	61.5%	173	30.9%	559
1996	40	7.2%	332	60.1%	180	32.6%	552
1997	42	8.2%	277	54.2%	192	37.6%	511
1998	56	10.7%	253	48.3%	215	41.0%	524
1999	49	10.2%	229	47.5%	204	42.3%	482
2000	46	10.3%	212	47.5%	188	42.2%	446
2001	47	10.8%	226	52.0%	162	37.2%	435
2002	33	7.7%	237	55.6%	156	36.6%	426
2003	37	8.6%	254	59.1%	139	32.3%	430
2004	32	7.7%	254	61.4%	128	30.9%	414
2005	28	7.4%	242	63.7%	110	28.9%	380
2006	34	9.4%	219	60.7%	108	29.9%	361
2007	46	13.3%	198	57.2%	102	29.5%	346
2008	45	14.1%	183	57.2%	92	28.8%	320
2009	47	16.0%	164	56.0%	82	28.0%	293
2010	44	16.7%	147	55.9%	72	27.4%	263
2011	37	15.8%	135	57.7%	62	26.5%	234
Total	780	9.7%	4,635	57.4%	2,655	32.9%	8070

Table 2: Disaster exposure and compensation characteristics

This table contains OLS regressions in which we analyze the relationship between CEO risk aversion (disaster exposure) and compensation practices. The column header states the dependent variable. The regressions include fixed effects as denoted in the column footer and cluster standard errors by executive. The sample is a firm-year panel sample. All models include a constant (suppressed). Brackets contain t-statistics and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Models	(1)	(2)	(3)	(4)	(5)
Variables	Log (Total Pay)	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)
Extreme Fatality	-0.036	**0.290****	**0.249***	**0.301*****	**0.262****
	[-0.575]	**[2.501]**	**[1.931]**	**[2.619]**	**[2.216]**
Medium Fatality	-0.051	0.077	0.065	0.088	0.081
	[-1.216]	[0.872]	[0.773]	[1.022]	[1.034]
Log (Total Pay)				0.248***	0.420***
				[10.066]	[12.141]
Firm Size	0.308***	0.384***	0.474***	0.305***	0.336***
	[9.039]	[7.177]	[8.247]	[5.895]	[6.033]
Market to Book Ratio	0.089***	0.207***	0.024	0.182***	-0.017
	[6.251]	[6.844]	[1.127]	[6.027]	[-0.825]
Profitability	0.452***	0.911***	0.763***	0.797***	0.582***
	[4.039]	[5.918]	[6.318]	[5.719]	[5.153]
Tangibility	-0.381**	-0.904***	-0.382	-0.785***	-0.195
	[-2.151]	[-2.920]	[-1.087]	[-2.667]	[-0.586]
CEO Age	0.012	-0.013	0.031	-0.010	0.036
	[0.266]	[-0.173]	[0.354]	[-0.135]	[0.426]
CEO Age Squared	-0.001***	-0.000	-0.001	-0.000	-0.000
	[-2.778]	[-0.831]	[-0.920]	[-0.499]	[-0.424]
Cash/Assets	0.261	0.178	-0.275	0.148	-0.365
	[1.234]	[0.886]	[-1.071]	[0.786]	[-1.418]
Dividend Payer	0.048	-0.042	0.016	-0.053	-0.004
	[0.895]	[-0.499]	[0.166]	[-0.643]	[-0.043]
Sales Growth	0.000	0.088*	0.016	0.078*	0.002
	[0.006]	[1.857]	[0.753]	[1.852]	[0.116]
Female Indicator	-0.128	-0.489*	-0.567*	-0.449*	-0.502*
	[-1.447]	[-1.954]	[-1.781]	[-1.875]	[-1.657]
R&D/Assets	1.709**	-0.345	1.034	-0.645	0.430
	[2.095]	[-0.450]	[1.100]	[-0.848]	[0.495]
Firm FE	Y	Y	Y	Y	Y
Birth-State FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Birth-Year FE	Y	Y	Y	Y	Y
Observations	8,038	7,528	7,736	7,519	7,727
R-squared	0.773	0.845	0.800	0.851	0.814

Table 3: Disaster exposure and the value of stock and option grants

This table contains OLS regressions that analyze the relationship between CEO risk aversion (disaster exposure) and the dollar amount of stock or equity awarded in the compensation contract. The regressions include fixed effects as denoted in the column footer and cluster standard errors by executive. The sample is a firm-year panel sample. All models include a constant (suppressed). Brackets contain t-statistics and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Models	(1)	(2)	(3)	(4)
Variables	Log (1+Stock ($))	Log (1+ Equity ($))	Log (1+Stock ($))	Log (1+ Equity ($))
Extreme Fatality	**0.628****	**0.401***	**0.692*****	**0.514*****
	[2.282]	**[1.867]**	**[2.725]**	**[2.884]**
Medium Fatality	0.178	0.018	0.256	0.149
	[0.905]	[0.108]	[1.389]	[1.147]
Log(Total Pay)			1.435***	2.791***
			[14.011]	[28.249]
Firm Size	-0.077	0.328***	-0.470***	-0.450***
	[-0.527]	[2.675]	[-3.474]	[-4.160]
Market To Book Ratio	0.066	0.178***	-0.063	-0.075**
	[1.635]	[4.090]	[-1.497]	[-2.055]
Profitability	0.360	0.622*	-0.294	-0.718**
	[1.139]	[1.719]	[-0.915]	[-2.359]
Tangibility	-1.844**	-0.623	-1.290*	0.456
	[-2.358]	[-0.798]	[-1.746]	[0.666]
CEO Age	0.102	0.041	0.088	0.025
	[0.474]	[0.195]	[0.436]	[0.152]
CEO Age Squared	-0.002	-0.003**	-0.000	-0.000
	[-1.265]	[-2.124]	[-0.295]	[-0.383]
Cash/Assets	0.072	0.890	-0.209	0.367
	[0.109]	[1.486]	[-0.315]	[0.889]
Dividend Payer	0.367	0.195	0.320	0.083
	[1.478]	[0.872]	[1.379]	[0.559]
Sales Growth	0.102	0.071	0.042	-0.031
	[1.271]	[1.418]	[0.723]	[-0.698]
Female Indicator	-0.607	-0.845***	-0.503	-0.500
	[-1.134]	[-2.749]	[-0.928]	[-1.583]
R&D/Assets	2.541	1.447	0.361	-2.952
	[0.838]	[0.479]	[0.131]	[-1.319]
CEO Ownership	-3.044	-12.317***	0.337	-5.323***
	[-1.426]	[-4.851]	[0.168]	[-2.833]
Firm FE	Y	Y	Y	Y
Birth-State FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Birth-Year FE	Y	Y	Y	Y
Observations	7,847	7,822	7,822	7,822
R-squared	0.576	0.523	0.619	0.741

Table 4: Managerial entrenchment, CEO disaster exposure, and CEO compensation

This table contains OLS regressions that analyze the relationship between CEO risk aversion (disaster exposure) and compensation in samples of 'entrenched' (high G-index) and 'non-entrenched' (low G-index) firms. The regressions contain fixed effects as indicated in the column footer, and cluster standard errors by executive. The sample is a firm-year panel sample. All models include a constant (suppressed). The brackets contain t-statistics and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

	Low G index		High G-Index	
Models	(1)	(2)	(3)	(4)
Variables	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)
Extreme Fatality	0.197	-0.030	**0.863*****	**1.313*****
	[0.494]	[-0.109]	**[2.852]**	**[4.530]**
Medium Fatality	0.060	0.032	-0.234	-0.409***
	[0.189]	[0.165]	[-1.456]	[-3.080]
Baseline Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Birth-State FE	Y	Y	Y	Y
Birth-Year FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	2,199	2,279	1,333	1,375
R-squared	0.904	0.890	0.918	0.863

Table 5: The role of institutional ownership

This table analyzes whether institutional ownership moderates the impact of CEO risk aversion (disaster exposure) on compensation. As indicated in the column header, we use the sample median value of institutional ownership to split the sample into high (above median) or low (below median) subsamples. We then analyze the impact of CEO risk aversion (disaster experience) on compensation within these sub-samples. The column header states the dependent variable. Columns 5-8 also control for the level of institutional ownership whereas Columns 1-4 do not. The regressions include fixed effects as denoted in the column footer and cluster standard errors by executive. All models include a constant (suppressed). Brackets contain t-statistics and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	High Institutional Ownership		Low Institutional Ownership		High Institutional Ownership		Low Institutional Ownership	
Variables	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)
Extreme Fatality	**0.608*****	**0.349***	0.124	0.116	**0.604*****	**0.349***	0.129	0.117
	[3.801]	**[1.817]**	[0.831]	[0.602]	**[3.777]**	**[1.811]**	[0.864]	[0.611]
Medium Fatality	0.237**	0.072	0.148	0.163	0.246**	0.078	0.164	0.170
	[2.007]	[0.591]	[1.223]	[1.393]	[2.082]	[0.634]	[1.361]	[1.454]
Institutional Ownership (IO)%					0.726***	0.367	0.665***	0.294
					[2.876]	[1.327]	[3.042]	[1.289]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Birth-State FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Birth-Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	3,681	3,811	3,846	3,924	3,681	3,811	3,846	3,924
R-squared	0.896	0.860	0.867	0.820	0.897	0.860	0.869	0.820

Table 6: Innovation, disaster exposure, and compensation

This table contains OLS regressions that analyze patent counts, citations, and patent values as a function of disaster experience and interactions of disaster experience with incentive compensation (i.e., Compensation Vega and Compensation delta). Innovation measures are sourced and defined using data from Kogan et al. (2017) or KPSS 2017 dataset. The dependent variables are Patents (columns 1 and 4), Citations (columns 2 and 5), and Patent Values (columns 3 and 6). Patents is defined as the natural logarithm of one plus the number of patents filed in year t (or t+1) (Source: Kogan et al. 2017). Citations is defined as the natural logarithm of one plus the number of citations attributable to patents applied for at time t (or t+1) (Source: Kogan et al. 2017). Patent Values is defined as the natural logarithm of one plus the dollar value of patents applied for by a firm at time t (or t+1) (Source: Kogan et al. 2017). The dependent variables are measured at year t=0 in columns (1) through (3) and at t +1 in columns (4) through (6). The regressions include the full set of baseline control variables and additional controls for CEO tenure, CEO pay Slice, and Founder CEO indicator, Average Fatality Risk of County and Average Fatality Risk of County squared. Baseline fixed effects are also denoted in the table footer. Brackets contain t-statistics and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Models	(1)	(2)	(3)	(4)	(5)	(6)
	Innovation outcomes at time t=0			Innovation outcomes at time t+1		
Variables	Patents	Citations	Patent Values	Patents	Citations	Patent Values
High Vega Indicator * Extreme Fatality	**0.329****	**0.533****	**0.651*****	**0.406****	**0.489***	**0.600****
	[2.119]	**[2.133]**	**[2.691]**	**[2.287]**	**[1.673]**	**[1.964]**
high Vega Indicator * Medium Fatality	**0.191***	0.293	**0.423****	0.178	0.268	**0.319***
	[1.871]	[1.532]	**[2.390]**	[1.528]	[1.291]	**[1.649]**
High Vega Indicator	-0.115	-0.206	-0.227	-0.056	-0.087	-0.121
	[-1.246]	[-1.281]	[-1.519]	[-0.532]	[-0.493]	[-0.729]
Extreme Fatality	-0.173	-0.217	-0.262	-0.076	-0.052	-0.068
	[-1.017]	[-0.802]	[-0.984]	[-0.403]	[-0.171]	[-0.223]
Medium Fatality	-0.106	-0.146	-0.205	-0.145	-0.243	-0.222
	[-0.854]	[-0.731]	[-1.048]	[-1.099]	[-1.143]	[-1.045]
High Delta Indicator * Extreme Fatality	-0.038	-0.160	-0.115	-0.049	-0.065	0.010
	[-0.275]	[-0.699]	[-0.489]	[-0.299]	[-0.236]	[0.037]
high Delta Indicator * Medium Fatality	-0.003	-0.048	-0.102	0.065	-0.003	0.016
	[-0.032]	[-0.270]	[-0.603]	[0.531]	[-0.015]	[0.086]
High Delta Indicator	-0.090	-0.102	-0.037	-0.151	-0.234	-0.158
	[-1.044]	[-0.716]	[-0.270]	[-1.503]	[-1.423]	[-1.090]
Average Fatality Risk of County	-0.003	-0.018	-0.009	0.005	-0.009	-0.003
	[-0.297]	[-1.175]	[-0.591]	[0.520]	[-0.574]	[-0.214]
Average Fatality Risk of County Squared	-0.000	0.000	0.000	-0.000	0.000	-0.000

	[-0.066]	[0.574]	[0.185]	[-0.889]	[0.069]	[-0.327]
Firm Size	0.281***	0.415***	0.353***	0.239***	0.363***	0.210**
	[5.341]	[4.256]	[4.121]	[4.366]	[3.621]	[2.252]
Market to Book Ratio	0.049***	0.065**	0.120***	0.049***	0.078***	0.081***
	[3.487]	[2.286]	[4.566]	[3.583]	[3.009]	[3.271]
Profitability	0.066	0.190	0.178	0.098	0.256	0.151
	[0.547]	[0.862]	[0.831]	[0.766]	[1.070]	[0.659]
Tangibility	1.193***	2.054***	2.041***	1.279***	2.371***	2.300***
	[3.632]	[3.452]	[3.650]	[3.714]	[3.765]	[3.730]
Dividend Payer	0.051	0.031	0.016	0.162**	0.263*	0.192
	[0.702]	[0.203]	[0.116]	[2.009]	[1.667]	[1.328]
Sales Growth	0.035	0.087**	0.069**	-0.008	0.002	0.005
	[1.441]	[2.376]	[2.401]	[-0.396]	[0.033]	[0.251]
CEO Age	-0.077	-0.104	-0.122	-0.125	-0.156	-0.167
	[-0.869]	[-0.609]	[-0.821]	[-1.165]	[-0.816]	[-0.958]
CEO Age Squared	0.000	0.000	0.000	0.000	0.000	0.000
	[0.359]	[0.104]	[0.273]	[0.567]	[0.344]	[0.478]
Female Indicator	0.055	0.295	-0.186	0.290	0.672*	0.195
	[0.314]	[1.063]	[-0.521]	[1.413]	[1.893]	[0.428]
R&D/Assets	2.508**	4.755**	4.587***	2.756**	4.991**	5.492***
	[2.479]	[2.563]	[2.762]	[2.379]	[2.209]	[2.716]
CEO Tenure	0.008	0.006	0.010	0.010	0.015	0.019
	[1.064]	[0.431]	[0.770]	[1.127]	[0.932]	[1.165]
CEO Pay Slice	-0.113	-0.080	-0.003	-0.259*	-0.419*	-0.208
	[-0.903]	[-0.332]	[-0.012]	[-1.854]	[-1.654]	[-0.876]
Founder CEO	-0.323	-0.545	-0.481	-0.128	-0.529	-0.467
	[-1.529]	[-1.491]	[-1.324]	[-0.479]	[-1.082]	[-0.998]
Constant	2.566	4.130	5.043	5.048	6.263	7.873
	[0.574]	[0.526]	[0.691]	[0.923]	[0.715]	[0.917]
Firm FE	Y	Y	Y	Y	Y	Y
Birth-State FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Birth-Year FE	Y	Y	Y	Y	Y	Y
Observations	5,361	5,361	5,361	4,598	4,598	4,598
R-squared	0.886	0.861	0.873	0.892	0.868	0.879

Table 7: Disaster exposure, corporate policies, and firm risk: Role of compensation tailoring

This table contains OLS regressions that analyze the relationship between CEO risk aversion (disaster exposure) and corporate financial policies in Panels A (Book Leverage) and B (Cash-To-Assets), and firm risk (stock return volatility) in Panel C. Each panel in this table splits the sample into sub-samples based on whether the CEO has above (high) or below sample medians (low) compensation portfolio Vega, or compensation Delta (as denoted in the column header). The column footer states the fixed effects and standard errors are clustered by executive. All models include a constant (suppressed). Brackets contain t-statistics and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Panel A: Book Leverage	(1)	(2)	(3)	(4)	(5)
	Full Sample	High Vega Sample	High Delta Sample	Low Vega Sample	Low Delta Sample
Variables			Book Leverage		
Extreme Fatality	-0.042***	-0.012	-0.011	-0.026*	-0.068***
	[-3.874]	[-0.764]	[-0.826]	[-1.961]	[-3.991]
Medium Fatality	0.027***	0.033***	0.040***	0.008	-0.008
	[3.035]	[2.680]	[3.356]	[0.603]	[-0.717]
Observations	8085	3922	3838	3814	3690
R-squared	0.821	0.868	0.873	0.840	0.834
Firm, Year, Birth Year, and State of Birth FE	Y	Y	Y	Y	Y

Panel B: Cash-To-Assets	(1)	(2)	(3)	(4)	(5)
	Full Sample	High Vega Sample	High Delta Sample	Low Vega Sample	Low Delta Sample
Variables			Cash-To-Assets		
Extreme Fatality	0.023***	0.024***	0.028***	0.020**	0.032***
	[3.735]	[2.867]	[2.837]	[2.028]	[3.240]
Medium Fatality	-0.014***	-0.021***	-0.018**	-0.008	-0.003
	[-3.037]	[-3.339]	[-2.358]	[-1.167]	[-0.454]
Observations	8085	3922	3838	3814	3690
R-squared	0.843	0.862	0.861	0.872	0.864
Firm, Year, Birth Year, and State of Birth FE	Y	Y	Y	Y	Y

Panel C: Stock Volatility	(1)	(2)	(3)	(4)	(5)
	Full Sample	High Vega Sample	High Delta Sample	Low Vega Sample	Low Delta Sample
Variables			Stock Volatility		
Extreme Fatality	-3.129**	2.143	2.668*	-7.502**	-6.467**
	[-2.118]	[1.184]	[1.690]	[-2.350]	[-2.470]
Medium Fatality	4.021***	3.644***	4.888***	4.037**	4.845***
	[4.453]	[3.102]	[4.561]	[2.030]	[2.872]
Observations	8085	3922	3838	3814	3690
R-squared	0.728	0.758	0.776	0.796	0.778
Firm, Year, Birth Year, and State of Birth FE	Y	Y	Y	Y	Y

Table 8: CEO turnover and compensation

This table contains OLS regressions in which we analyze how firms compensate incoming CEOs after an exogenous CEO turnover. We define an exogenous turnover as one that is due to illness or death. We then determine whether the new CEO has (or has not) been exposed to early life disasters and the level of fatalities in those disasters. The column header contains the dependent variable. The regressions include industry and year fixed effects and cluster standard errors by executive. All models include a constant (suppressed). Brackets contain t-statistics. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Exogenous CEO Turnover type	Exogenous CEO turnovers where more risk averse Incumbent replaced by less risk averse CEOs				Exogenous CEO turnovers where less risk averse incumbent replaced by more risk averse CEOs			
Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Log (1+Delta)	Log (1+Vega)	Log (1+Stock ($))	Log (1+Equity ($))	Log (1+Delta)	Log (1+Vega)	Log (1+Stock ($))	Log (1+ Equity ($))
New CEO more risk-tolerant	-0.450	**-0.590***	**-2.306****	0.131				
	[-0.848]	**[-1.740]**	**[-2.085]**	[0.237]				
New CEO less risk-tolerant					-0.459*	0.512	**3.292*****	**1.364****
					[-1.739]	[1.417]	**[4.275]**	**[2.101]**
CEO Ownership			23.011	3.840			3.392	34.397*
			[1.584]	[0.243]			[0.228]	[1.937]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	147	152	155	154	186	190	203	203
R-squared	0.830	0.893	0.565	0.446	0.906	0.765	0.571	0.556

Table 9: Disaster Exposure, Compensation, and FAS123R

This table contains OLS regressions that analyze the relationship between FAS123R, CEO risk aversion (disaster exposure), and compensation. We analyze several permutations. Columns 1,2,5, and 6 include the FAS123R indicator but no year fixed effects. Columns 3,4, 7 and 8 include year fixed effects instead of the FAS123R indicator. Further, Columns 5-8 control for the CEO's total pay whereas columns 1-4 do not. The regressions include fixed effects as denote in the column footer, and cluster standard errors by executive. The sample is a firm-year panel sample. All models include a constant (suppressed). The brackets contain t-statistics, and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)
FAS123R*Extreme Fatality	**-0.641***** **[-3.474]**	**-0.510**** **[-2.564]**	**-0.605***** **[-3.429]**	**-0.479**** **[-2.453]**	**-0.606***** **[-3.413]**	**-0.451**** **[-2.451]**	**-0.577***** **[-3.365]**	**-0.431**** **[-2.359]**
FAS123R*Medium Fatality	-0.132 [-1.415]	-0.103 [-0.816]	-0.142 [-1.499]	-0.131 [-1.040]	-0.122 [-1.373]	-0.083 [-0.682]	-0.132 [-1.461]	-0.111 [-0.910]
FAS123R	-0.304*** [-4.296]	-0.839*** [-8.378]			-0.266*** [-3.941]	-0.776*** [-8.066]		
Extreme Fatality	**0.472***** **[3.665]**	**0.383***** **[2.870]**	**0.497***** **[3.943]**	**0.408***** **[3.105]**	**0.475***** **[3.775]**	**0.384***** **[3.185]**	**0.498***** **[4.011]**	**0.406***** **[3.391]**
Medium Fatality	0.106 [1.182]	0.086 [0.946]	0.131 [1.483]	0.112 [1.263]	0.116 [1.347]	0.098 [1.170]	0.139 [1.614]	0.121 [1.476]
Log (Total Pay)					0.264*** [11.064]	0.441*** [12.622]	0.246*** [10.165]	0.419*** [12.211]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Birth-State FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	N	N	Y	Y	N	N	Y	Y
Birth-Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	7,528	7,736	7.528	7,736	7,519	7,727	7,519	7,727
R-squared	0.834	0.789	0.846	0.800	0.841	0.805	0.852	0.815

Table 10: Controlling for additional CEO characteristics

This table contains OLS regressions that analyze the relationship between CEO risk aversion (disaster exposure) while controlling for additional CEO characteristics, which otherwise reduce the sample size. The column header contains the dependent variable. The column footer states the fixed effects and standard errors are clustered by executive. All models include a constant (suppressed). Brackets contain t-statistics and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)	Log (1+Delta)	Log (1+Vega)
Extreme Fatality	0.341***	0.402***	0.325***	0.381***	0.338***	0.387***	0.322***	0.376***
	[3.093]	[3.003]	[3.205]	[2.591]	[3.103]	[2.961]	[3.214]	[2.637]
Medium Fatality	0.031	0.154*	0.017	0.162	0.027	0.145	0.013	0.155
	[0.354]	[1.656]	[0.204]	[1.595]	[0.313]	[1.588]	[0.155]	[1.561]
Log (Total Pay)					0.189***	0.328***	0.184***	0.325***
					[6.145]	[7.534]	[5.945]	[7.183]
CEO Tenure	0.068***	0.006	0.054***	-0.004	0.068***	0.004	0.054***	-0.004
	[9.451]	[0.666]	[7.800]	[-0.471]	[9.408]	[0.543]	[7.855]	[-0.478]
CEO Pay Slice	0.702***	1.623***	0.664***	1.614***	0.029	0.463**	0.008	0.457**
	[4.921]	[9.259]	[4.486]	[8.947]	[0.166]	[2.581]	[0.047]	[2.452]
Founder CEO	0.673***	-0.838**			0.724***	-0.756**		
	[3.880]	[-2.313]			[4.118]	[-2.176]		
CEO Power Index			0.197***	-0.016			0.197***	-0.015
			[8.809]	[-0.569]			[8.874]	[-0.546]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Birth-State FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Birth-Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	5,457	5,611	5,455	5,455	5,457	5,611	5,455	5,455
R-squared	0.859	0.822	0.864	0.822	0.861	0.827	0.866	0.827

Appendix A1: Variable Definitions

Variables	Definitions
Extreme Fatality	An indicator variable equal to one for CEOs who are in the top decile for the number of disaster-related fatalities per capita experienced in their birth county, and zero otherwise
Medium Fatality	Medium Fatality Experience is an indicator variable equal to one for CEOs who experienced some disaster-related fatalities in their birth county but are not in the Extreme Fatality Experience group, and zero otherwise.
No Fatality	No Fatality Experience is an indicator variable equal to one for CEOs who experienced no disaster-related fatalities in their birth-county, and zero otherwise.
Log (1+Total Pay)	The natural logarithm of 1 plus the dollar value of the executive's total annual compensation (tdc1). Source: ExecuComp.
Log(1+Delta)	The natural logarithm of 1 plus Delta, where Delta is the change in the dollar value of the executive's wealth for a 1-percentage-point change in stock price (following Guay (1999), Core and Guay (2002), and Coles, Daniel, and Naveen (2006)).
Log(1+Vega)	The natural logarithm of 1 plus Vega, where Vega is the change in the dollar value of the executive's wealth for a 0.01 change in the annualized standard deviation of stock returns (following Guay (1999), Core and Guay (2002), and Coles et al. (2006)).
Log (1+Stock $)	The natural logarithm of 1 plus the value of restricted stock granted to the CEO (before 2006: rstkgrnt and starting 2006: stock_awards_fv)
Log (1+Equity $)	The natural logarithm of 1 plus (Options($) + Stock($)) where Options ($) is the value of stock options granted to the CEO (Execucomp – before 2006: option_awards_blk_value – starting 2006: option_awards_fv) and Stock ($) is value of restricted stock granted to the CEO (before 2006: rstkgrnt and starting 2006: stock_awards_fv)
Log(Assets)	The natural logarithm of Total Asset (at).
Market to Book	The market value of equity divided by the book value of equity at the fiscal year-end.
Profitability	Net income divided by book equity.
R&D/Assets	R&D Expenditure scaled by Assets (Compustat: xrd/at)
Tangibility	Fixed Asset/Book Assets
Cash-to-Asset	The ratio of cash and marketable securities divided by book assets.
Dividend Paying (I)	An indicator variable equal to one if the firm pays dividends during the year, and zero otherwise.
Sales Growth	Growth rate of sales
Stock Volatility	The annualized volatility (%) calculated from the standard deviation of daily stock returns during the fiscal year
CEO age	CEO Age is the age of the firm's CEO as of the fiscal year-end.
Female (I)	An indicator equal to one if the firm is led by a Female CEO, and zero otherwise
Book Leverage	Sum of long-term debt and current liabilities divided by book assets.
Patent	Patents is defined as the natural logarithm of one plus the number of patents filed in year t (or t+1) (Source: Kogan et al. 2017).

Citations	Citations is defined as the natural logarithm of one plus the number of citations attributable to patents applied for at time t (or t+1) (Source: Kogan et al. 2017).
Patent Values	Patent Values is defined as the natural logarithm of one plus the dollar value of patents applied for by a firm at time t (or t+1) (Source: Kogan et al. 2017).