Toxic Biases in CEO Selection: Evidence from Pollution Exposure and Within-Firm Promotions☆

P. Raghavendra Rau*
University of Cambridge

YiLin Wu**
National Taiwan University

Richard Lok-Si Ieong***
Baruch College

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Abstract

We examine whether CEO selection amplifies corporate risk-taking, using prenatal pollution exposure as a plausibly exogenous shock to risk preferences. Exposed managers are disproportionately promoted internally. Before promotion, firms with future exposed CEOs exhibit stretched working capital and expanded capacity; these positions unwind post-promotion. As CEOs, they adopt riskier external policies — higher leverage/volatility and more unrelated M&A — with lower CARs/ROA; the effects reverse after sudden CEO deaths. Identification uses two instruments (state birth-cohort shares; governor party at gestation) with weak-IV-robust inference. Results hold after conditioning on socioeconomic conditions at birth and current firm-area pollution. The patterns fit overoptimism, not overconfidence.

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* Rau: Cambridge Judge Business School, University of Cambridge, Trumpington Street, Cambridge, CB2 1AG, UK. Email: r.rau@jbs.cam.ac.uk. ** Wu (Corresponding author): Department of Economics and Center for Research in Econometric Theory and Applications (CRETA), College of Social Sciences, National Taiwan University, Taipei City, Taiwan, R.O.C. Email: yilinwu@ntu.edu.tw. *** Ieong: Zicklin School of Business, Baruch College, City University of New York, US. Email: loksi.ieong@baruch.cuny.edu.

1. Introduction

Chief Executive Officers (CEOs) significantly influence corporate decision-making, yet how firms select these leaders remains poorly understood. While extensive research examines the consequences of CEO characteristics — from military experience to early-life disasters[1], this literature largely treats CEO-firm matches as given. The implicit assumption is that firms either cannot observe relevant traits or randomly inherit whatever characteristics their chosen executives possess. Missing from this work is how promotion systems themselves might systematically filter for certain behavioral tendencies. If internal promotion tournaments reward risk-taking that occasionally generates standout results, then the very process of CEO selection could amplify risk preferences at the top of organizations. We provide the first empirical evidence that this selection-driven amplification occurs: firms disproportionately promote risk-tolerant managers based on their internal successes, inadvertently selecting for traits that later manifest in value-destroying external policies.

Specifically, we examine how selection in CEO promotion amplifies risk-taking. We propose a framework that distinguishes between internal, reversible/short-feedback policies (e.g., operations and working capital that can be adjusted quickly) and external, irreversible/market-priced policies (e.g., capital structure and M&A) that are exposed to investor scrutiny and harder to unwind. Our story echoes the promotion-tournament model of Goel and Thakor (2008). In their setting, managers bidding for the CEO job can increase their promotion odds by taking higher-variance actions that occasionally deliver standout outcomes. However, empirical support for this mechanism has been limited. The only study, an unpublished working paper by Li and Tong (2012), shows that, after a 'quiet' CEO retirement, overconfident insiders are disproportionately chosen as successors. We provide empirical evidence that managers with greater risk tolerance are disproportionately selected internally, and that their risk style subsequently appears in the external policy domain once they become CEOs. Our approach exploits prenatal exposure of CEOs to pollution from Superfund sites.

Studying this dynamic is important for two reasons. First, CEO choices shape firm performance, investor outcomes, and economic stability. If promotion systems reward executives

[1] Examples of these papers include exposures to severe disease outbreaks (Ru, Yang, and Zou, 2024) and natural disasters (Bernile, Bhagwat, and Rau, 2017), military experience (Law and Mills, 2017), past booms and busts (Schoar and Zuo, 2017), and the Great Depression (Malmendier, Tate, and Yan, 2011).

whose risky decisions happened to succeed in internal, reversible settings, firms may unknowingly elevate individuals whose observed success partly reflects luck rather than skill. This concern is especially relevant for internal candidates, who account for over 70% of CEO appointments (Cziraki and Jenter, 2022).

Second, prior work linking early-life experiences to executive behavior does not fully address the selection processes that interact with these traits. Families with differing risk preferences may self-select into treatment (treatment choice bias), have varying capacities to shield children from harm (treatment mitigation bias), or provide different levels of support (treatment support bias). Specifically, the *treatment choice* bias arises when families with certain risk preferences self-select into high-risk areas or relocate based on economic opportunities.[2] *Treatment mitigation* bias occurs when some families buffer children from the negative effects of treatment exposure through better healthcare, education, or living conditions, while others cannot.[3] Finally, *treatment support* bias reflects how access to strong educational or professional networks can mitigate early disadvantages (Drageset, 2021; Garcia and Rimé, 2019).[4] Failing to account for these factors risks conflating early-life exposure effects with unobserved family background. Without considering treatment choice for example, researchers may overstate the direct causal effect of early-life exposure, overlooking the role of family background and inherited traits in shaping risk-taking tendencies. Similarly, ignoring treatment mitigation and support effects risks conflating the impact of early-life exposure with socioeconomic privilege, falsely attributing differences in decision-making to early life exposure rather than access to resources.

We argue that prenatal exposure to pollution from Superfund sites is a plausibly exogenous source of variation in risk tolerance that solves the selection issues above. Before the 1980s, families were largely unaware of the health risks posed by hazardous waste. As shown in our data, most CEOs were born before environmental awareness in the US became widespread after the

[2] For example, Malmendier, Tate, and Yan (2011) find that individuals who experienced the Great Depression as children develop heightened financial risk aversion, but this effect may partly reflect differences in how families responded to economic shocks. Similarly, Bhagwat, Bernile, and Rau (2017) show that CEOs exposed to fatal natural disasters in childhood exhibit different levels of corporate risk-taking, though these effects may be shaped by whether their families deliberately chose to live in disaster-prone regions.

[3] For instance, Malmendier, Tate, and Yan's (2011) findings on Depression Baby CEOs would not apply to executives whose parents were wealthy enough to shield them from economic hardships.

[4] It is important to recognize that the three selection effects can have both physiological and psychological consequences. The pure biological effect represents the direct impact of the treatment, while selection effects arise from the individual's awareness of the treatment and the resulting behavior changes. Internet Appendix B in the paper summarizes findings from previous literature on early life experiences, detailing which effects drive each finding.

publication of Rachel Carson's "Silent Spring" (1962), and all but two were born before the Superfund program began in 1980. Crucially, exposure was often ground- or water-based rather than visibly airborne (Table IA1), making contamination effectively random with respect to parental preferences or socioeconomic status. Medical and behavioral science research links such in utero exposure to persistent traits like impulsivity and risk tolerance.[5] Because exposure occurs decades before appointment and is orthogonal to firm hiring preferences at the time, it provides a plausibly exogenous predictor of managerial risk preferences that neither firms nor individuals could optimize against during career advancement. This allows us to test whether firms systematically mistake luck-based internal success for skill and thus amplify risk preferences through promotion.

The mechanism we focus on is promotion based on observable outcomes, which can conflate effort and luck. Building on Goel and Thakor (2008), we argue that while internal CEOs may appear to rise through similar paths, the basis for success differs. During the pre-CEO period when future Superfund CEOs occupy senior executive positions, their firms exhibit distinctive patterns of internal risk-taking, such as stretched working capital and expanded capacity, which unwind when the executive assumes the CEO role. While firm-level data cannot isolate individual executive contributions, the timing of these patterns suggests boards may attribute firm-level outcomes to promotion candidates. Once in the CEO role, exposed executives' risk preferences become directly observable in external, irreversible choices, where downside costs are higher and feedback is market-priced.

Empirically, we document three sets of results which we summarize in Table 1 Panel A. First, exposed managers are more likely to be promoted internally rather than hired externally, consistent with tournaments that reward standout internal outcomes. Second, firms exhibit a distinctive pattern around the promotion of exposed insider CEOs: stretched working capital and expanded capacity during their senior executive tenures, followed by unwinding of these positions after

[5] The fetal origins hypothesis (Barker, 1990) suggests that adverse prenatal conditions have persistent effects that shape behavior well into adulthood. During early fetal development, the blood-brain barrier is immature, making the developing brain particularly vulnerable to toxicants (Zheng et al., 2003; Grandjean and Landrigan, 2006, 2014; Needham et al., 2011; Lanphear, 2015). Many Superfund site pollutants include endocrine-disrupting chemicals (EDCs), which impair inhibitory control, increase hyperactivity, and elevate the risk of attention-deficit disorders (Guxens et al., 2018; Ke et al., 2021). Research links these conditions to lower serotonin levels, which are associated with greater impulsivity and aggression (Yokota et al., 2016). These biological pathways provide a plausible mechanism connecting an exogenous treatment - prenatal pollution exposure - to risk-taking tendencies that persist into executive careers. See Internet Appendix C for a review of this literature.

promotion, delivering shorter cash-conversion cycles and higher asset turnover. Third, once in office, exposed CEOs adopt riskier external policies, including higher leverage, lower cash, and a greater incidence of unrelated acquisitions, and their firms exhibit higher stock-return volatility, lower credit ratings, and higher borrowing costs. These external bets are associated with lower acquisition announcement returns and weaker ROA and valuation on average, as well as higher CEO turnover and shorter tenures. At the same time, the distribution of outcomes widens, and exposed CEOs are overrepresented among firms ranked highly on Fortune's "America's Most Admired Companies," consistent with higher variance rather than uniformly poor ability.

To rule out competing explanations, we conduct a battery of robustness checks, summarized in Table 1 Panel B. First, industry composition is not the driver: exposed CEOs are not more likely to lead high-risk sectors. Second, a cognitive-impairment story would predict uniformly poor outcomes; instead, we document a domain asymmetry — internal improvements alongside external risk-taking with lower average payoffs. Third, results are estimated with rich fixed effects (firm, year, industry-year, CEO birth year, birth county, and headquarters state), ensuring comparisons among otherwise similar CEOs.

To address CEO–firm matching, we use two complementary designs. First, a two-instrument IV exploits historically predetermined variation in prenatal exposure. The first instrument is the county's share of state-wide births in the CEO's birth year. Because firms overwhelmingly promote local executives, a larger cohort in a Superfund-heavy state implies a deeper pool of exposed candidates (Yonker, 2017). The second instrument is the party of the state governor in office immediately before birth. In the pre-EPA era, regulatory laxity under some administrations increased ambient toxic exposure for cohorts gestated at those times. Neither instrument is plausibly connected to a firm's current risk preferences. Together they yield a strong first stage and permit over-identification tests of the exclusion restrictions. The IV estimates track OLS signs and magnitudes. Second, a difference-in-differences around sudden CEO deaths shows that risk-taking patterns reverse when exposed CEOs depart unexpectedly, consistent with a CEO-imprint rather than a board-policy story. Because we absorb fixed effects for the CEO's birth county and birth year, identification comes from within–birth-county, across-cohort variation in exposure rather than cross-county differences.

We strengthen causal interpretation with additional tests, also summarized in Table 1 Panel B. We condition on birth-county socioeconomic conditions (poverty, employment, income) and show that exposure is not limited to poor counties, as many sites are in wealthier regions.[6] We compare CEOs exposed to sites with vs. without developmental toxicants and find that effects concentrate in the developmental-toxicant group. We examine postnatal exposure and find markedly weaker associations than for prenatal exposure, consistent with in-utero mechanisms. We control for current pollution near firm headquarters and whether the firm is a polluter and our results remain. To isolate cultural influences, we exclude homegrown CEOs, those born, educated, and working in the same area and our results are unchanged. We run matched-sample analyses and falsification tests using pseudo-random CEO birthplaces. When exposure is randomly assigned, the effects disappear.

This study contributes to the literature in three ways. First, it shows that promotion systems can amplify behavioral traits shaped by early-life conditions, even when firms are unaware of those traits. Second, it introduces a method to study how biologically rooted risk preferences interact with organizational selection. Third, it provides a novel identification strategy to separate CEO behavioral effects from firm selection effects, a central problem in the literature on CEO impact. In addition, we reconcile the puzzle of simultaneous internal out-performance and external under-performance by documenting a previously unseen internal risk-loading phase before promotion. This result strengthens the selection-on-risk narrative and rules out a simple cognitive-impairment explanation.

More broadly, our findings explain why performance-based promotion can over-promote risk-takers whose internal success partly reflects luck, not skill. By elevating candidates whose traits are misaligned with the external demands of the CEO role, firms create a structural source of firm-level risk that is both hidden and difficult to correct.

2. Literature review: Promotion tournaments, hidden risk, and testable implications

Internal CEO searches are, at heart, promotion tournaments. Goel and Thakor (2008) show that, when the board simply anoints the manager with the highest first-period project payoff, every contestant has an incentive to pick a riskier project than he otherwise would, because higher variance raises the chance of producing the single best outcome. Formally, if one manager chooses a project whose risk exceeds that of all peers, his probability of promotion rises above the baseline $1/n$ implied by symmetry. The tilt is magnified when a contestant is overconfident, that is, he

[6] As an example, the most polluted county in America is Silicon Valley, with 23 Superfund sites (see Nieves, E. 2018, "The Superfund Sites of Silicon Valley", New York Times, March 26, 2018.

underestimates the true variance of his own project. Importantly, the rule is shareholder-optimal ex ante: conditional on outcomes, the "star" still appears to have the highest ability.

Using 1993–2007 U.S. succession events, Li and Tong (2012) document that when the outgoing CEO retires (so the board has not yet learned about hidden risk), overconfident insiders are significantly more likely to be promoted than rational peers. Those CEOs subsequently over-invest and destroy value, triggering higher dismissal rates. The evidence corroborates the theory's twin claims that (i) internal tournaments select risk-seekers and (ii) the very trait that wins promotion later impairs firm performance.

Our setting provides a new laboratory for the same mechanism. As Internet Appendix C shows, prenatal exposure to Superfund-site toxins is associated with heightened risk tolerance later in life. If those traits push exposed managers toward higher-variance internal projects, the Goel–Thakor logic implies that pollution-exposed managers should win promotion contests disproportionately and enter the corner office mainly via internal hires. Once in charge, they should steer the firm toward risk-heavier external policies — higher leverage, more volatile investment, and aggressive M&A. A final prediction exploits the exogenous vacancies created by sudden CEO deaths (heart attacks, accidents, plane crashes). Because these events force the board to select a successor without the taint of prior under-performance, we can cleanly test whether firms that unexpectedly lose a Superfund CEO experience a marked decline in risk post-demise.

We note that a fundamental challenge in testing tournament-based promotion theories empirically is isolating individual executive contributions to firm outcomes during the pre-CEO period. With firm-level archival data, researchers cannot definitively attribute operational decisions to specific executives, particularly when multiple senior managers may influence firm policies. Prior studies either examine settings with clearer individual attribution (e.g., divisional data, mutual fund managers) or remain silent on this challenge. We contribute by documenting systematic firm-level patterns that coincide with executive tenure: risk-loading during senior executive positions followed by reversal upon CEO promotion. While individual causation cannot be established definitively, the timing of these patterns relative to promotion events provides suggestive evidence consistent with tournament dynamics.

Taken together, the tournament theory, its empirical confirmation, and the biological channel deliver three testable implications that organise the rest of the paper: Superfund managers (i) are more likely to be promoted from within, (ii) pursue riskier corporate policies once promoted, and

(iii) leave an observable risk footprint that dissipates when an unexpected death severs the manager-firm match.

3. Sample construction, variable definitions, and descriptive statistics

3.1. Superfund sites

We start with a list of 1,803 Superfund sites collected from the EPA's websites as of December 31, 2018.[7] Details of the Superfund program and how we collected the data is described in Internet Appendix C. Crucially, we determine each site's pollutant accumulation period (the period during which contaminants were accumulated) based on the site's background information and archived documents. This allows us to identify whether CEOs were exposed *in utero* to the pollutants from these Superfund sites. Table IA1 in the Internet Appendix provides summary statistics on the Superfund sites through 2018. The table indicates that air-based toxicants are rare (4.88%) at Superfund sites, while toxicants in the ground and water are much more common, reported at 82.03% and 87.97% of sites, respectively, suggesting that pollution is rarely obviously visible at these sites. Internet Appendix C also details the medical literature that discusses how pollution exposure affects risk-taking.

Our study uses county-level data to examine the effect of prenatal exposure to Superfund sites.[8] This county-level approach follows Kirpich and Leary (2017), Amin, Nelson, and McDougall (2018), Davis, McDermott, McCarter, and Ortaglia (2019), and Hubal et al. (2022). To demonstrate the negative impact on infant health, we collect data on infant mortality and low birthweight rates from the U.S. County-Level Natality and Mortality Data, 1915-2007 (Bailey et al., 2016). Panel A of Table IA2 shows the percentage of Superfund infants (infants born in a county with at least one Superfund site during the pollutant accumulation periods) compared to all

[7] Our list of 1,803 Superfund sites includes 53 proposed sites that were never added to the NPL, 1,338 currently listed sites, and 412 sites that have been deleted from the NPL. Our study uses all three types of Superfund sites, regardless of their current cleanup status. This is because our research focuses on whether CEOs were exposed to hazardous pollutants from these sites during their prenatal period. The latest list of Superfund sites is available here: https://www.epa.gov/superfund/superfund-national-priorities-list-npl.

[8] One alternative to refine our measurement of CEO birth locations could be to use U.S. Census data from 1950, 1940, 1930, and earlier to identify the exact residential addresses of CEOs at birth. While this approach may enhance precision, it has its own limitations. Census records are collected at 10-year intervals, so for CEOs born between Census years, their birth addresses would have to be inferred based on the assumption that their families did not move before or after their birth. If this assumption does not hold, it could introduce additional measurement errors. Furthermore, even when Census records provide specific addresses, they do not necessarily confirm prenatal exposure to pollution unless there is independent verification of residential stability and proximity to potential pollution sources during the prenatal period. Consequently, while Census data can complement our current approach, it does not fully resolve the challenges associated with accurately measuring exposure.

infants and the proportion for CEOs. Superfund CEOs make up a smaller proportion of all CEOs relative to the proportion of Superfund infants. This could be because Superfund infants are less likely to become CEOs, or CEO families with higher socioeconomic status are less likely to have Superfund infants. We control for the latter by including fixed effects for CEOs' year-of-birth and county-of-birth, as well as the demographic characteristics of the birth county in all models. Panel B (C) compares infant mortality rates (low birthweight rates) between counties with Superfund sites during the pollutant accumulation periods and (1) all counties, (2) counties with Superfund sites during periods before or after the pollutant accumulation periods, and (3) counties without Superfund sites. The key takeaway is that the most negative impact on infant health occurred during the pollutant-generating periods at the Superfund sites. However, we advise caution in interpreting the results from Table IA2, as Schulz (2010) shows that prenatal exposure with long-lasting adult health consequences does not necessarily result in altered birthweight.

3.2. CEO characteristics

We begin with the S&P 1500 firms listed on Execucomp from 1992 to 2018, initially identifying 7,890 unique CEOs. Our CEO birthplace data is sourced from Bernile, Bhagwat, and Rau (2017), and Lei, Petmezas, Rau, and Yang (2025). For CEOs without this data, we manually collect their birthplace and birth year from various sources.[9] This effort yields birthplace information for 3,511 CEOs. Of these, 501 are non-American-born CEOs, 9 have only partial birthplace information, and 3,001 American-born CEOs have complete birthplace records at the county level. By matching the locations of Superfund sites and their pollutant accumulation periods with the birthplaces and birth years of these American-born CEOs, we identify 734 unique Superfund CEOs and 2,267 non-Superfund CEOs. The ratio of Superfund CEOs to our initial CEO sample is approximately 9%, and it rises to 20.9% when considering only those with birthplace information and to 24.5% among American-born CEOs. We focus on American-born CEOs with complete birthplace records since we cannot verify the pollution exposure of non-American-born CEOs at birth.

[9] Our research draws from a wide range of sources, including Bloomberg People Profiles, Forbes, Conference Board CEO biographies, Legacy.com obituaries, Marquis Who's Who, Standard and Poor's Register of Corporations, Directors and Executives, the U.S. Executive Compensation database on Lexis-Nexis, NNDB.com, Business Week Corporate Elite issues, The Wall Street Journal, Wikipedia, other media coverage, and Google searches. For deceased CEOs, in addition to legacy, we also utilize findagrave.com, courierpress.com, and dignitymemorial.com.

Our key explanatory variable, "*CEO #Superfund exposure*," quantifies the number of sites (later designated as Superfund sites) that was actively polluting the CEO's birth county during their birth year.[10] Figure 1 shows the distribution of CEO birth years and their Superfund exposures. Most CEOs in the sample were born long before pollution was widely recognized as an issue, predating the publication of Rachel Carson's "Silent Spring" in 1962, which argued that industrial use of chemicals such as DDT is harmful to human health. All but two CEOs were born before President Carter proposed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to Congress.

To address concerns that other CEO characteristics may influence our findings, we control for several CEO attributes such as age, tenure, duality, founder, outsider, employment contract, ownership, and equity-based compensation (delta and vega). Data on CEO characteristics are sourced from Execucomp, BoardEx, Equilar Consultants, Risk Metrics, and Compustat, with missing data supplemented from SEC filings when available. Detailed descriptions of the variables used in this study can be found in the Appendix and Internet Appendix A.

3.3. Firm characteristics

To illustrate the characteristics of our sample, we present two sets of comparisons in Table 2 and Table IA3. Table 2 compares our sample of Superfund CEOs with non-Superfund CEOs, consisting of 734 unique Superfund CEOs and 2,267 non-Superfund CEOs. Strikingly, Superfund CEOs are typically hired by larger firms compared to their non-Superfund counterparts. Univariate evidence indicates that firms led by Superfund CEOs perform worse in ROA. They tend to adopt riskier external investment policies, evidenced by lower capital expenditures and higher R&D. They also tend to adopt riskier external capital raising policies. This is indicated by lower credit ratings, a higher probability of default, and higher equity risk, reflected in greater total and firm-specific stock return risk. Additionally, these firms are less likely to pay dividends. The bottom of the table reveals that, on average, Superfund CEOs were born in counties with lower poverty rates, higher employment rates, and higher earnings per capita, suggesting that lower local socioeconomic status does not drive our results for Superfund CEOs. A two-sample Kolmogorov-Smirnov test shows no significant differences between the Fama–French (1997) 48 industry

[10] For instance, General Motors CEO Mary T. Barra was born in 1961 in Oakland County, Michigan, which has five Superfund sites, three of which were polluting before 1961. Therefore, Mary T. Barra is classified as a "Superfund CEO," with a "*CEO #Superfund exposure*" value of 3.

distributions for our Superfund and non-Superfund CEO samples (results not tabulated),[11] indicating that the results are not due to Superfund CEOs managing firms in riskier industries than non-Superfund CEOs.

Table IA3 compares our sample with firms in Compustat and Execucomp. As expected, since our sample is drawn from Execucomp, our sample firms resemble Execucomp firms more closely than Compustat firms. Additionally, our sample consists of S&P 1500 firms, which are among the largest in Compustat. Table IA3 indicates that, on average, our sample firms are more similar to those in Execucomp than in Compustat. The last column shows that our sample firms are still significantly larger than the typical Execucomp firms. One reason for this could be that CEOs of larger firms attract more media attention, making their birthplace records more readily available.

4. CEO promotion likelihood

A central question in this study is whether firms systematically select CEOs based on past internal risk-taking success rather than true managerial skill. If firms were choosing CEOs purely based on broad leadership ability, we would expect no systematic difference between Superfund CEOs and non-Superfund CEOs in terms of internal versus external hiring. However, if firms are unknowingly selecting risk-takers based on past internal success, then Superfund CEOs should be significantly more likely to be promoted internally rather than hired externally. This would suggest that firms are mistaking risk-taking outcomes for managerial ability, filtering for executives whose aggressive decision-making happened to succeed in lower-stakes, internal environments (Goel and Thakor, 2008).

Past research suggests that internal and external hiring processes reward different skill sets. Externally hired CEOs often possess strong general management skills that make them attractive to multiple firms, including experience with institutional investors, media, and analysts (Frydman, 2019; Murphy and Zábojník, 2007). Their selection is more transparent, as external candidates must demonstrate a track record of success across firms. In contrast, internally promoted CEOs are chosen based on their firm-specific knowledge and perceived success in operational roles.

[11] In our CEO sample, the top ten industries for Superfund CEOs, as per Fama–French (1997) 48 industry classification, are business services (13.1%), retail (11.5%), electronic equipment (6.8%), communication (6.4%), petroleum and natural gas (6.0%), pharmaceutical products (5.1%), computers (4.8%), transportation (4.8%), automobiles and trucks (4.3%), and chemicals (3.9%). In contrast, the top ten industries for non-Superfund CEOs are business services (10.6%), retail (8.4%), petroleum and natural gas (5.8%), electronic equipment (5.3%), communication (5.0%), computers (4.8%), chemicals (4.2%), transportation (4.0%), pharmaceutical products (3.9%), and machinery (3.8%).

However, internal promotions often fail to account for whether these executives' risk-taking decisions will translate effectively to the CEO role.

If firms misinterpret past internal success as a proxy for CEO potential, we should observe a significant difference in the likelihood of internal promotion between Superfund and non-Superfund CEOs. To test this, we examine whether Superfund CEOs are more likely to be promoted internally rather than hired externally. Table 3 Column 1 presents probit regression results using an outside CEO indicator (equal to 1 if the CEO was externally hired and 0 if internally promoted) as the dependent variable, controlling for firm, industry, and CEO characteristics, including departing CEO and firm characteristics similar to those in Dahya and McConnell (2005) and Marshall, McCann, and McColgan (2014). The results show that, consistent with Goel and Thakor (2008), Superfund CEOs are significantly more likely to be promoted from within the firm rather than hired externally, confirming that firms disproportionately select these executives based on their past internal success rather than evaluating them in a broader competitive market.

We further examine whether these selection biases are more pronounced in certain corporate governance settings, specifically in family firms, where CEO selection processes may be influenced by legacy, trust, and firm-specific knowledge rather than objective managerial skill. Table 3 Column 2 presents probit regression results using a family firm indicator (equal to 1 if the firm is controlled by a founding family). The results show that Superfund CEOs are significantly more likely to be promoted within family firms than non-Superfund CEOs, reinforcing the idea that firms with weaker governance structures may be particularly prone to selecting these executives based on past internal performance.

Columns 3-5 analyze the interaction between the Superfund exposure variable and the family firm indicator to predict the likelihood of hiring an outside CEO within family firms. In all three specifications, Superfund CEOs remain significantly less likely to be externally hired CEOs. However, the interaction term is significantly positive only when members of the founding family hold non-executive positions, meaning that they are on the board or are blockholders but are not involved in managing the company (Column 4). Conversely, the interaction term is insignificant when members of the founding family hold top management positions (Column 5). This indicates that family firms are less likely to promote executives with Superfund exposure from within the firm only when family members hold non-executive positions but not when family members hold executive roles.

To further reinforce our interpretation that Superfund CEOs are more likely to engage in risk-taking behaviors, we explicitly examine whether they are more likely to hold private pilot licenses, an established proxy for CEO personal risk-taking (Cain and McKeon, 2016; Baghdadi, Podolski, and Veeraraghavan, 2022). Following Baghdadi et al. (2022), we identify CEOs with private pilot licenses using the Federal Aviation Administration (FAA) airmen certification database.[12] Table IA4 presents results from probit regressions showing that Superfund CEOs are significantly more likely to have pilot licenses compared to their non-Superfund counterparts.[13] This additional evidence highlights that prenatal exposure to Superfund pollutants not only affects corporate decision-making but also translates into observable personal risk-taking behaviors among these executives. Collectively, these findings strengthen the interpretation that firms systematically, though unknowingly, promote internally successful candidates whose perceived managerial talent may partly reflect innate risk-taking traits rather than genuine skill.

5. The impact of risk-taking on corporate policies

The previous section established that firms are significantly more likely to promote Superfund CEOs internally rather than hire them externally, suggesting that selection biases in promotion processes filter for executives based on past internal risk-taking success rather than broad managerial ability. This raises an important question: how do these selected CEOs behave once they assume the top leadership role?

To answer this, we analyze whether Superfund CEOs systematically exhibit riskier decision-making once promoted and whether their risk-taking translates into firm performance differences. If firms were merely selecting the best available candidates, we would expect Superfund CEOs to perform comparably to their non-Superfund counterparts across both internal and external corporate policies. However, if selection biases lead firms to overpromote individuals with risk-prone tendencies, we should observe distinct patterns in firm policies under their leadership.

[12] We would like to thank Edward Podolski for providing us the CEO pilot license data.
[13] We include year fixed effects to control for common time trends, but not firm fixed effects, as CEO pilot-license status typically exhibits minimal within-firm variation over time, resulting in loss of statistical significance. We also note that the timing of pilot-license acquisition (before or after becoming CEO) is unknown; however, our use of pilot licenses as proxies for personal risk-taking remains unaffected by this timing.

We begin by examining externally focused financial policies, such as capital structure choices, acquisitions, and investor relations, where risk-taking has immediate and often irreversible consequences. We then assess internally focused policies related to operational efficiency and resource management, where risk-taking is more reversible and can be adjusted in the short term. Finally, we evaluate how the labor market responds to Superfund CEOs' overall performance, specifically their tenure, turnover likelihood, and career trajectories. This analysis provides further insight into whether firms eventually recognize the consequences of their selection biases and adjust accordingly.

Therefore, the dependent variables in our baseline models are the risk-taking policies related to external capital raising, internal efficiency, financial performance, and CEOs' career outcomes, respectively, for firm *i* in year *t*. We regress these variables on whether firm *i* is managed by a Superfund (or non-Superfund) CEO *j* and a vector of control variables *k* measured in year *t*-1. To account for unobservable firm heterogeneity in the dependent variables and possible time trends, all baseline models include firm, state of the firm's corporate headquarters (HQ), and year fixed effects. Additionally, to account for changes in the types of newborns in the county over time and potential CEO age and cohort effects, the baseline models also include CEO birth year and birth county fixed effects.[14] All standard errors are clustered by CEO-firm and year.

5.1. CEOs' prenatal exposure to Superfund sites and external risk-taking policies

5.1.1. The firms' capital structure policy

We begin our analysis by testing whether Superfund CEOs make more aggressive external financial decisions, measured by the cash-to-asset ratio, leverage ratio, and the natural log of one plus the amount of cash returned to shareholders through share repurchases. We focus on share repurchases instead of dividends because the former are generally discretionary while the latter are sticky. Table 4 presents the results. In all specifications, we include lagged CEO and firm

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[14] We do not include firm-CEO fixed effects in our main specifications because they absorb all time-invariant CEO characteristics, including prenatal Superfund exposure, which is central to our analysis. Since prenatal exposure is fixed at birth, firm-CEO fixed effects eliminate nearly all relevant cross-sectional variation, making it difficult to estimate its impact. Similarly, replacing firm fixed effects with CEO fixed effects, or combining both CEO and firm fixed effects, substantially weakens or reverses our results, likely due to over-control. These specifications restrict variation to within-CEO or within-firm changes over time, which is not well-suited to identifying the long-term effects of an early-life exposure. Our chosen specifications (firm fixed effects along with year, CEO birth county, CEO birth year, headquarters state fixed effects, and in some cases, industry) effectively control for unobserved heterogeneity while preserving the necessary variation to estimate the effect of prenatal exposure on CEO decision-making.

characteristics similar to those in Bates, Kahle, and Stulz (2009), Custódio and Metzger (2014), and Bernile, Bhagwat, and Rau (2017). Consistent with our hypotheses, Table 4 shows that *Ln*(1+ *CEO #Superfund exposure*) is positively associated with leverage and negatively associated with the firm's cash holdings and the amount of repurchases. Economically, *ceteris paribus*, firms managed by a CEO born in a county with one polluting Superfund site have a 1.32% (= −0.0191×(Ln(2)-Ln(1))) lower cash-to-assets ratio and a 3.13% (=0.0451×(Ln(2)−Ln(1))) higher leverage ratio compared to firms managed by non-Superfund CEOs. These effects are comparable to those documented by Bernile, Bhagwat, and Rau (2017) that firms managed by CEOs with medium disaster fatality experience have 1% lower cash holdings and a 3% higher leverage ratio (Internet Appendix B) and to Cain and McKeon (2016) for CEOs with private pilot licenses. Our average sample firm has a leverage of 21.2%, implying that Superfund CEOs are associated with a 14.8% (=3.13%÷21.2%) higher firm leverage, on average. Cain and McKeon (2016) report that pilot CEOs have an 11.4% higher firm leverage at the median. The results for the control variables are also consistent with those from the referenced prior studies.

Is the debt accrued by the Superfund CEOs beneficial for the firm? We compute the kink defined by Graham (2000) and Malmendier, Tate, and Yan (2011) to address this question. The kink is the ratio of the hypothetical level of interest at which the expected marginal tax-shield benefits of debt begin to decline (numerator) to the actual amount of interest paid (denominator). If the kink exceeds one, the firm could increase its interest expense and still receive full benefits from these additional tax deductions, indicating a conservative use of debt. If the kink is less than one, the firm earns reduced tax benefits on the actual interest expenses, suggesting that the firm has excessive debt relative to the available tax benefits.

Table IA5 presents the results using the kink as the dependent variable, including lagged CEO and firm characteristics similar to those in prior studies. Since the kink is left-censored at 0 and right-censored at 8, Table IA5 reports coefficients from a Tobit model in column 1. However, a general drawback of the Tobit model with fixed effects is the well-known incidental parameters bias in the coefficient estimates (Greene, 2004). Therefore, column 2 reports coefficients from an OLS model. In both models, the coefficients on *Ln*(1+ *CEO #Superfund exposure*) are significantly negative at the 1% level, indicating that firms managed by Superfund CEOs tend to issue excessive debt. Economically, ceteris paribus, firms managed by a CEO born in a county with one polluting Superfund site have a kink reduction of 0.82 (=−1.1758×(Ln(2) − Ln(1))), which represents a 16%

decrease from the sample mean kink of 5.002. This effect of Superfund CEOs on kink is similar in magnitude but opposite to the Depression Baby CEO effect reported by Malmendier, Tate, and Yan (2011). The impact is likely to be greater if the CEO was exposed to multiple polluting Superfund sites *in utero*.

5.1.2. The credit risk and cost of borrowing

From the external stakeholders' perspective, if the debt issued by Superfund CEOs is excessive or exhausts their firms' debt capacities, it should negatively impact the firms' credit risk and borrowing costs. Table IA6 details how firm credit ratings and default risk are influenced by Superfund CEOs.

We obtain credit ratings from the Compustat Standard & Poor's (S&P) Rating database, where a rating of 0 corresponds to D and 24 corresponds to AAA. Since the S&P Rating database was discontinued after February 2017, we supplement the missing data and post-February 2017 data using the Mergent Fixed Income Securities Database (FISD), which includes bond credit ratings from S&P, Moody's, Fitch, and Duff & Phelps. We convert the ratings from these other agencies to match the S&P rating scale.

Column 1 of Table IA6 presents estimates from an Ordered Probit model, showing that firms managed by Superfund CEOs have significantly lower credit ratings, consistent with our earlier findings. Column 2 examines the likelihood of receiving a junk rating (i.e., S&P domestic long-term issuer credit ratings or converted ratings from other agencies are below BBB−), finding no significant effect of Superfund CEOs on this probability. In the last two columns, we show that firms managed by Superfund CEOs have significantly higher bankruptcy scores, according to Zmijewski (1984), and higher estimated default probabilities based on the KMV-Merton (1974) model (Bharath and Shumway, 2008).

Next, Table IA7 reports estimates of whether firms with Superfund CEOs are associated with a higher cost of borrowing, using three measures: (1) interest expenses scaled by total debt, (2) bank loan all-in spread, defined as the spread over LIBOR for new bank loans, and (3) bond issue spread, defined as the yield-to-maturity for newly issued bonds minus the yield for U.S. Treasuries of equivalent maturity. We gather bank loan data from the DealScan database and bond issue data from the Mergent Fixed Income Securities Database (FISD). Following Ivashina (2009) and Drucker and Puri (2009), columns (2) and (3) control for various loan/bond contract characteristics, with each observation corresponding to a specific loan or bond issue. The bank loan all-in spread regression also includes lead lender fixed effects.[15] Additionally, columns (2) and (3) control explicitly for firm leverage and credit ratings. Therefore, the estimated impact of Superfund exposure on the cost of borrowing is incremental to the effects on firm leverage and credit rating. This is particularly significant given our earlier findings of a strong relationship between leverage ratio, credit risk, and CEOs' prenatal Superfund exposure.

Using interest expense/debt as the dependent variable, column (1) shows no significant effect of Superfund CEOs. This may be because interest expenses for total debt can arise from debt issued long before the current CEOs took their position. Therefore, we next focus on new bank loans or newly issued bonds in the current fiscal year, which allows a direct link between the cost of borrowing and the CEO in charge at the time of issuance. Columns (2) and (3) show that firms led by Superfund CEOs have higher bank loan all-in spreads and bond issue spreads, respectively. Economically, *ceteris paribus*, firms managed by a CEO born in a county with one polluting Superfund site pay an additional 11.65 basis points for bank loans and 64.43 basis points for bond issues compared to firms managed by non-Superfund CEOs. These Superfund CEO effects are similar to, but somewhat weaker than, those observed for CEOs with medium disaster fatality experience documented by Bernile, Bhagwat, and Rau (2017) (Internet Appendix B). Overall, the evidence from these tables supports medical research linking prenatal exposure to Superfund pollution to aggression.

5.1.3. Equity risk

From the shareholder's perspective, we examine whether aggressive managerial decisions lead to higher equity risk, measured by the annualized total stock return volatilities ($\sigma_{Stock\ return}$), the annualized firm-specific (idiosyncratic) stock return volatilities ($\sigma_{Specific\ return}$), and three proxies for the stock's vulnerability to firm-specific extreme adverse price movements. Column (1) of Table 5 shows that, all else being equal, firms managed by a CEO born in a county with one polluting Superfund site have a 5.4% increase in $\sigma_{Stock\ return}$ compared to firms managed by non-Superfund CEOs, from a sample mean of 0.3902. For comparison, Cain and McKeon (2016) report that pilot CEOs are associated with increases in $\sigma_{Stock\ return}$ ranging from 2.20% to 3.5%. Column (2) shows an insignificant relation for $\sigma_{Specific\ return}$, calculated using an expanded index model

[15] For loan deals with multiple facilities, we use loan characteristics of the largest tranche with the earliest active date. We use the variable LeadArrangerCredit in the DealScan database to identify if a lender is also a lead arranger. We include all loans with at least one lead arranger in our sample. For loan deals with multiple lead arrangers, we have one observation corresponding to each lead arranger.

regression with contemporaneous, two leads, and two lags for the market and industry indexes (Hutton, Marcus, and Tehranian, 2009; Kim, Li, and Zhang, 2011; Xu, Xuan, and Zheng, 2021).

Next, we test the robustness of our findings using alternative measures of idiosyncratic risk, focusing on the stock's vulnerability to firm-specific extreme adverse price movements. We use three proxies: (1) negative skewness in firm-specific returns, (2) the ratio of firm-specific volatilities in down weeks to those in up weeks, and (3) the frequency of firm-specific crashes (defined as firm-specific weekly returns falling 3.09 standard deviations below the annual mean). These specifications include control variables similar to those used in Hutton, Marcus, and Tehranian (2009), Kim, Li, and Zhang (2011), and Xu, Xuan, and Zheng (2021). Columns (3) to (5) show that the presence of a Superfund CEO appears to increase firms' stock vulnerability to extreme adverse stock price movements.

5.1.4. Acquisition activity

Existing studies suggest that CEO hubris, characterized by an overly optimistic belief in takeover gains, drives unrelated and/or unprofitable acquisitions (Roll, 1986). Additionally, the personality traits literature indicates that hubris is linked to higher levels of impulsivity and aggression (Carver, Sinclair, and Johnson, 2010). Corporate acquisitions are inherently riskier than internal growth due to the substantial commitment of resources, which can lead to significant financial losses. Therefore, in our next set of tests, we investigate whether Superfund CEOs are associated with unprofitable and/or unrelated acquisitions.

We obtain merger and acquisition (M&A) announcements involving U.S. public acquiring firms between 1992 and 2018 from the Securities Data Corporation's (SDC) U.S. Mergers and Acquisitions database. After excluding buybacks, share repurchases, self-tenders, and spinoffs, we are left with 13,719 M&A announcements for 6,630 acquirer-year observations. Each observation in Table 6 corresponds to an individual M&A announcement. To assess whether Superfund CEOs are associated with unprofitable M&A, we calculate the acquirer's cumulative abnormal returns (CAR) from day −1 to day +1 relative to the M&A announcement (day 0). This calculation is based on market model regressions of daily stock returns on the CRSP value-weighted market index, using an estimation period from day −131 to day −31. We also calculate CARs using the Carhart (1997) four-factor model and apply standard event study methods. For acquirers managed by Superfund CEOs, the average market model CAR(-1, +1) is 0.08% with a t-value of 0.95, while for acquirers managed by non-Superfund CEOs, it is 0.24% with a t-value of 4.81.

Table 6 Columns (1) and (2) show that acquirers with Superfund CEOs have lower CAR(-1, +1), even after controlling for acquirers, acquirer CEOs, and M&A deal characteristics. To assess whether Superfund CEOs are associated with unrelated M&A, column (3) uses a probit model and shows that firms managed by Superfund CEOs are more likely to announce unrelated acquisitions, as identified by the Fama-French (1997) 48 industry classification. As described earlier, a general drawback of the nonlinear (such as probit) model with fixed effects is the well-known incidental parameters bias in the coefficient estimates (Greene, 2004). Therefore, Table 6 also includes results from an OLS regression with fixed effects (column 4). Our findings on acquisition activity are economically comparable to those in previous studies (e.g., Bernile, Bhagwat, and Rau, 2017) (Internet Appendix B).

5.2. CEOs' prenatal exposure to Superfund sites and internal firm policies

Table 7 demonstrates that firms managed by Superfund CEOs consistently outperform those led by non-Superfund CEOs in key measures of internal efficiency. Specifically, these firms exhibit lower cash conversion cycles, measured as the time taken to convert investments in inventory and receivables into cash through sales, indicating better management of working capital through faster inventory turnover and more efficient receivables and payables processes. Additionally, they achieve higher asset turnover, defined as the ratio of net sales to average total assets, reflecting more effective utilization of assets to generate revenue. Employee productivity, measured as total revenue per employee, is also significantly higher. Importantly, these post-promotion efficiency gains do not mean Superfund CEOs were merely more competent all along; they appear to reflect a systematic pattern around their promotion. As Section 5.8 documents, firms exhibit a 'loading' of working capital and capacity during these executives' senior tenures, followed by 'harvesting' once they assume the CEO role, with CCC declining and asset turnover rising. This load-then-harvest pattern is indeed concentrated in the years immediately surrounding the promotion (see section 5.8).

Finally, we restrict the sample solely to internally promoted CEOs (results not tabulated for brevity). The pattern is similar – external risk measures are typically significantly higher for Superfund insiders. Similarly, on internal efficiency measures, the cash conversion cycle is significantly lower, and the asset turnover is higher for Superfund insiders. Although classic tournament theory predicts that all internally promoted CEOs should be high-variance risk-takers (Goel and Thakor, 2008), our within-insider split shows that pollution-exposed insiders push external policies far more aggressively than their non-Superfund insider counterparts, indicating that early-life exposure adds an independent layer of risk appetite. To examine whether Superfund exposure creates risk-taking tendencies for insiders and outsiders equally, we also compare a sample of insider Superfund CEOs to outsider Superfund CEOs. The results show that both insider and outsider Superfund CEOs increase risk-taking in similar ways, suggesting that Superfund exposure matters, not the insider/outsider status of the CEO.

5.3. Market-based and accounting-based firm performance metrics

The literature shows that prenatal exposure to pollution has long-lasting effects on adult performance (e.g., Raja, Subhashree, and Kantayya, 2022; Oppenheimer et al., 2022). To investigate whether CEOs' prenatal exposure to Superfund sites negatively affects firm performance compared to industry peers, we avoid using industry-adjusted performance measures due to the concerns about inconsistent estimates raised by Gormley and Matsa (2014). Instead, we use unadjusted ROA, Tobin's Q, and stock returns as dependent variables and include interactions of industry with year fixed effects. In all specifications in Table 8, we control for potential CEO mobility restrictions using a state-level noncompetition enforceability index (Garmaise, 2011), local labor market opportunities for CEOs (Jochem, Ladika, and Sautner, 2018), and product market competition using product market similarity based on TNIC (text-based network industry classifications) (Hoberg and Phillips, 2016). Across all three firm performance measures, we find that Superfund CEOs indeed hurt firm performance.

Table 8 shows that, on average, the external policies implemented by Superfund CEOs fail to deliver positive results. However, their risk-taking should lead to notable successes if the risks pay off. To explore this further, we examine the likelihood of Superfund CEOs leading prestigious companies ranked in the top 50 of Fortune's "America's Most Admired Companies (MAC)" list. As shown in Table IA8, Superfund CEOs are more likely to lead firms featured in the MAC list and achieve higher rankings, suggesting that while their external risk-taking often underperforms, it can sometimes result in high-profile achievements.

Mitchell and Lehn (1990) argue that bad bidders often become attractive takeover targets themselves. In the same vein, we investigate whether the poor performance of firms managed by Superfund CEOs results in takeovers or general delisting events. To address this, we run Cox proportional hazards models, defining a failure event as when the firm receives a takeover, is taken over, or is delisted from the stock exchange due to liquidation, bankruptcy, or other financial reasons during the CEO's tenure. Duration is the time to the failure event, measured as the number of years from becoming CEO to the event or right-censoring without an event during the sample period. Table IA9 reports the results. CEO Superfund exposure is significantly positively related to the hazard ratio of receiving a takeover (column 1), being taken over (column 2), or being delisted from the exchange due to financial reasons (column 3). This result holds whether or not we include year, industry, and firm headquarters state fixed effects.[16]

So far, we have documented various effects on firms managed by Superfund CEOs. The next natural question is whether a common factor drives these effects. For instance, if a firm consistently makes poor acquisitions, this could increase its cost of debt and equity volatility and decrease performance. To test this, we repeat all previous analyses, excluding firm-years with mergers or acquisitions. The effect of Superfund CEOs persists and is even stronger in most regressions. Similarly, it is plausible that poor investment decisions could negatively affect NPV. We eliminate all firm-year observations in the highest annual decile of growth in net PP&E (net property, plant, and equipment, scaled by total assets). Again, the Superfund CEO effect remains significant (results not shown for brevity).

5.4. CEO career outcomes

Given that CEOs' prenatal exposure to Superfund sites negatively affects their performance on average, we expect Superfund CEOs to have shorter tenures and a higher risk of forced turnover. Columns (1) and (2) of Table 9 confirm this expectation. These results hold even after controlling for local labor market opportunities for CEOs, restrictions on CEO mobility, industry performance (Jenter and Kanaan, 2015), industry volatility (Peters and Wagner, 2014), and CEO equity-based compensation (delta and vega).

Next, we test the robustness of our findings on forced CEO turnover. If generic CEO turnover events, such as retirements at traditional retirement ages, are not driven by poor firm performance, we would expect no difference in the likelihood of these events between Superfund and non-Superfund CEOs. Additionally, severance pay for departing CEOs is typically determined by pre-established employment contracts rather than by the firm's performance at departure (Rau and Xu, 2013). Columns (3) and (4) show that the coefficient estimates for Superfund CEOs are

[16] Since the number of failure events is relatively small, we cannot run Cox proportional hazards models with year, industry, firm headquarters state, CEO birth year, and CEO birth county fixed effects.

indistinguishable from zero, supporting the idea that Superfund CEOs are not more likely to be dismissed without cause.

Taken together, we demonstrate that Superfund CEOs take more risks without corresponding payoffs, negatively affecting their careers on average. Additionally, we compare our findings with recent studies on CEOs' early-life experiences and personal risk-taking, showing that our results are similar in both economic and statistical significance (see Internet Appendix B).

5.5. Do firms know of the risk-taking proclivities of Superfund CEOs?

It is possible that firms may recognize the heightened risk-taking tendencies of Superfund CEOs and take steps to mitigate these behaviors through adjustments to their compensation design. Specifically, Superfund CEOs are likely to be granted lower delta, which measures the sensitivity of their equity-based pay to stock price changes, and lower vega, which reflects the sensitivity of option values to stock return volatility. These reductions aim to discourage excessive risk-taking by limiting incentives tied to equity risk. Unlike typical CEOs, Superfund CEOs do not need additional motivation to pursue risk-increasing positive NPV projects, making these adjustments an effective way to curb their propensity for high-risk decisions. Additionally, firms may reduce the overall value of option grants as a share of total compensation. These measures indicate that boards are aware of the CEOs' behavioral patterns and make deliberate efforts to temper these risk-taking tendencies while maintaining alignment with shareholder interests.

Columns (1) and (2) of Table 10 show that Superfund CEOs are associated with lower delta and vega, consistent with the conjecture that firms recognize their propensity for risk-taking and accordingly reduce incentives for such behavior. However, column (3) shows that the proportion of option value as a percentage of total compensation is not statistically significant. Interestingly, despite these adjustments in delta and vega, the risk-taking behavior of Superfund CEOs persists, suggesting that standard incentive alignment may not effectively address the underlying mechanism driving their decisions. We return to this puzzle in section 6.1, where we explore alternative behavioral explanations.

5.6. CEO-firm risk-matching concerns: Instrumental variable (IV) estimation

A central identification challenge in our study is to disentangle true selection on CEO traits from CEO-firm matching. Firms might knowingly recruit executives whose innate risk appetites resemble their own, or they might unwittingly promote managers who prospered from earlier luck. Either scenario would blur the causal link between a CEO's prenatal environment and the policies she later sets. To neutralize this confounding channel, we exploit two sources of historical variation that jointly predict a manager's in-utero exposure to toxic sites yet are likely to stand far outside the firm's hiring calculus. Importantly, these IVs are not intended to prove that pollution causes risk-taking — this relationship has been well-documented in prior research. Instead, we use IVs that predicts prenatal pollution exposure of the CEO while remaining exogenous to firm hiring decisions. This ensures that our results reflect a selection bias in CEO promotion rather than an endogenous firm preference for risk-taking executives.

First, we follow Yonker (2017) in recognizing that U.S. CEO labor markets remain starkly local — firms hire local-origin CEOs roughly five times more often than distance-neutral sorting would imply. If a state happened to host many Superfund sites, a larger birth cohort in a given county naturally yields a deeper local talent pool that contains a disproportionate share of executives gestated near hazardous waste. Our first instrument for *Ln*(1+*CEO #Superfund exposure*) is the ratio of total births in the county to total births in the state in the CEO's birth year. This instrument is unlikely to violate the exclusion restriction, since after conditioning on firm, calendar-year, birth-year, birth-county and headquarter-state fixed effects, as well as the full vector of control variables, it is difficult to imagine any pathway through which the sheer size of a fifty-year-old birth cohort could influence current corporate risk policy except through the CEO's own prenatal exposure.

Second, we exploit state partisan control at the moment of gestation. In the pre-EPA era, governors wielded primary authority over industrial siting, permitting, and enforcement. Fowler and Kettler (2021) show that Republican administrations were systematically more tolerant of toxic releases than Democratic ones throughout their times in office, even after accounting for a state's industry mix and demographics. Thus, the state governor's affiliation in the CEO birth state and year captures whether there were more likely to have actively polluting Superfund sites. We therefore use the party affiliation of the governor in office immediately before the CEO was born as a second instrument: cohorts gestated under Republican administrations were, on average, exposed to looser environmental oversight. With state and year fixed effects, gubernatorial party supplies state-by-birth-year shifts in ambient prenatal pollution; in the micro 2SLS we also include birth-county and birth-year fixed effects, so identification comes from cohort-to-cohort changes within the same birth county, not cross-county differences.

Orthogonality checks show no systematic relation between the instruments and local socioeconomic conditions. In county×cohort panels with birth-county and birth-state×birth-year fixed effects, the cohort-share instrument is not predicted by county-by-cohort SES (poverty, employment, log earnings; joint $p \approx 0.13$–0.15; SEs clustered by county). Similarly, in state×cohort panels with birth-state and birth-year fixed effects, gubernatorial party at gestation is not statistically significant at the 5% level in births-weighted state×cohort SES (joint $p=0.07$; clustered by state). We report first-stage strength (Kleibergen–Paap rk Wald F; Sanderson–Windmeijer F) and weak-IV-robust inference (Anderson–Rubin; Stock–Wright S), alongside Hansen's J, in Tables 11 and IA.11.

Tables 11 and IA10 report the two-stage least-squares estimates obtained with the county-birth-share and gubernatorial-party instruments. In the first stage (Table IA10), both instruments load with the expected sign and are jointly strong: the Sanderson–Windmeijer multivariate F and the Montiel-Olea & Pflueger effective F exceed the benchmark value of 10 in 18 of the 19 specifications (median F = 52.32). The lone exception is the interest expense/debt regression (effective F = 8.6); accordingly, its weak-IV-robust Anderson–Rubin statistic is insignificant. Hansen J p-values are typically above 0.10, indicating no evidence that either instrument violates the exclusion restriction.

The second-stage results (Table 11) reinforce the baseline OLS patterns and, in most cases, are larger in magnitude. The cash ratio is significantly lower, while book leverage and bond issue spreads are significantly higher, as are measures of equity risk such as systematic risk, negative skewness and the down-to-up volatility. Corporate actions also align with the previous results - announcement CARs decline, unrelated acquisition activity climbs, and ROA, Tobin's Q and stock returns all fall, all consistent with value-reducing risk taking. CEO career outcomes also echo these patterns - in-utero exposure has no effect on tenure length but significantly raises the probability of forced turnover. All of these inferences remain intact when we replace the weak conventional *t*-statistics with Anderson–Rubin confidence sets.

Table IA11 repeats the exercise with the single county-birth-share instrument; first-stage *F*s remain high (mean = 132.58), and the second-stage coefficients and significance closely track those in Table 11. Taken together, the evidence indicates that CEOs who were prenatally exposed to heavier toxic burdens pursue systematically riskier corporate policies, and that this pattern reflects selection from geographically segmented labor pools rather than endogenous matching between risk-loving firms and risk-loving executives.

5.7. CEO-firm risk-matching concerns: Difference-in-differences (DID) analysis on CEOs' sudden deaths

Instead of imprinting their own styles, CEOs could simply be hired to execute board-chosen policies. Goel and Thakor's (2008) promotion-tournament model cautions that this conjecture is unlikely when the incoming CEO is an overconfident risk-taker: by selecting the riskiest internal project, such a manager raises the chance of delivering the single best outcome and is more likely to win the tournament. Li and Tong (2012) empirically show that after a CEO's quiet retirement, boards do, in fact, elevate these managers, and using t-tests on the CEO retirement events, also show that only after a painful forced dismissal, do the boards learn to stop promoting them.

Our difference-in-differences (DID) design around sudden CEO deaths in this section operationalises the same idea with a cleaner, exogenous shock to leadership. If the aggressive policies we attribute to Superfund CEOs reflect personal risk preferences highlighted by Goel–Thakor, their abrupt removal should trigger a measurable reversal. Conversely, if the board were the true architect, as a reverse-causality story would suggest, successor CEOs would stay the course, and corporate policies would remain unchanged.

Following Fracassi (2017), we collect CEOs' sudden death events from major newspaper databases (ProQuest newspapers, Factiva, and Google News Archive) and articles published on the internet.[17] We record the deceased CEO's prenatal Superfund exposure as *Ln*(1+*deceased CEO #Superfund exposure*). We compare firm-year observations for the three years before (pre-treatment period) and three years after (post-treatment period) the CEO's death. The variable *Post CEO demise* (0,1) is set to one for the three years after the CEOs' deaths and zero otherwise. The main coefficient of interest is the interaction term (*Post CEO demise* (0,1) × *Ln*(1+*deceased CEO #Superfund exposure*)).

Table 12 reports the results of the DID analysis.[18] In almost every case, the signs of the coefficients for the interaction term reverse from the previous baseline results (except for

[17] The cause of death of the CEO is indicated as a heart attack, stroke, plane crash, car, boating, mountain accident, cancer within a year of diagnosis, and other similar unexpected death events.

[18] The test for CEOs' forced turnover is not feasible because the model did not converge. We use industry-adjusted ROA, Tobin's Q, and stock returns as the dependent variables due to insufficient observations to include interactions of industry with year fixed effects.

acquisitions and CEO tenure) and remain significant. The DID analysis shows that following the Superfund CEOs' sudden deaths, compared to non-Superfund CEOs' sudden deaths, successors systematically unwind the risk-heavy policies instituted by Superfund predecessors. The pattern is consistent with Li and Tong's finding that boards revise corporate policy only after the risk-taking CEO is gone, but here the trigger is a random death rather than a forced dismissal. [19]

Overall, the sudden-death evidence reinforces the Goel-Thakor mechanism: firms promote internally managers who under-estimate risk, and once these CEOs exit unexpectedly, the firm's risk profile snaps back toward the norm, leaving little room for a board-driven explanation.

5.8. Pre-CEO internal-risk evidence and promotion tournaments

Section 5.2 documents that firms experience significant improvements in internal efficiency, specifically, shorter cash-conversion cycles (CCC) and higher asset turnover, during the tenure of Superfund-exposed CEOs. To clarify the origins of these efficiency gains, we examine firm-level internal risk-taking patterns during periods when future Superfund CEOs occupied senior positions. We collect detailed career information from Execucomp and BoardEx, including the dates when executives joined the firm, ascended to CEO, and occupied senior-executive roles such as CFO, COO, or divisional head. For missing role information, we manually supplement our data from SEC filings and publicly available sources like LinkedIn.

Restricting the sample to only insider CEOs, who were promoted from within the firm, we employ a difference-in-differences (DID) approach to examine whether firms exhibit elevated internal risk-taking during periods when future Superfund CEOs occupy senior-executive positions, using the following specification:

$$Y_{it} = \alpha + \beta\,\mathrm{SuperfundInternal}_i + \theta\,\mathrm{PreTenure}_t + \gamma(\mathrm{SuperfundInternal}_i \times \mathrm{PreTenure}_t) + X_{it}\delta + \lambda_t + \mu_i + \epsilon_{it}$$

where Y_{it} represents internal risk metrics such as CCC and asset turnover, *Superfund Internal*$_i$ identifies firms promoting pollution-exposed insiders, and *PreTenure*$_t$ equals one during the years these executives served in their most recent senior-executive roles before becoming CEO.

Table IA12 presents our key findings. In Panel A, during the senior-executive tenure of future Superfund CEOs, their firms have significantly longer CCC relative to matched controls

[19] The results are mostly similar, albeit slightly weaker, if we examine the change from the two years before to two years after the CEO's demise. We cannot examine the change from one year before to one year after the CEO's demise since the number of observations is less than the number of explanatory variables including the fixed effects.

(t = 1.94) [20] and simultaneously lower asset turnover by around two percentage points (t = –1.94). At the same time, these firms deliver higher capex-efficiency (revenue-per-dollar-of-capex, coeff. ≈ 0.05, t ≈ 2), signaling that the extra working-capital burden is financing projects that are already generating sales. While we cannot definitively attribute these firm-level patterns to individual executive decisions, a limitation inherent to archival data, the timing is striking: risk-loading coincides with senior executive tenure, followed by harvesting immediately upon CEO promotion. Under classic promotion-tournament logic, variance is rewarded more than average efficiency; hence firm-level outcomes during an executive's watch, even with a lumpier balance sheet, may influence promotion decisions.

To verify that this load-then-harvest pattern operates through inventory build-ups and capital spending, Panel B adds explicit controls for the change in inventory and capital expenditure scaled by total assets (ΔInventory/Assets and ΔCapEx/Assets). Introducing these controls reduces the magnitude and significance of the *PreTenure* × *Superfund* interaction on asset turnover, indicating that the observed pre-promotion patterns are likely driven by capital outlays and inventory accumulation during the period before the executive ascends to the corner office.

Figure IA.F2 in the Internet Appendix illustrates the "load-then-harvest" timing with an event-study centred on the promotion year. We set k = –1 (the last full fiscal year before promotion) as the reference period and label k = 0 as the fiscal year in which the promotion occurs. Because a fiscal year often straddles the appointment date, the incoming CEO controls only a fraction of that year; the first full operating year is therefore k = 1, and the most informative post-promotion datapoint is k = 2. Consistent with this timing, the plot shows a stable pre-trend, followed by a spike in the IHS-transformed CCC and a dip in asset-turnover at k = –2 to –3, offering evidence of risk loading, while the coefficients at k = 0 remain muted. Formal F-tests confirm that all pre-promotion coefficients are jointly indistinguishable from zero, supporting the parallel-trends assumption of our DID design.

After promotion, the internal-risk metrics reverse exactly when full-year control is achieved: CCC falls and asset-turnover peaks at k = 2. This pattern dovetails with the post-promotion efficiency gains documented in Section 5.2 and suggests that those gains arise from unwinding

[20] Because CCC is logged with an inverse-hyperbolic-sine transform, the coefficient cannot be read directly in days: at a sample-median CCC of roughly 50 days, a 0.15 rise in asinh(CCC) translates to about a 7-8-day lengthening—but the exact level shift depends on each firm's baseline.

pre-promotion inventory and capex positions. The precise timing — risk-loading during senior executive tenure followed by immediate reversal upon promotion appears consistent with boards elevating executives associated with high-variance firm outcomes, inadvertently selecting managers whose risk preferences later manifest in external policies.

Overall, the evidence points to systematic patterns around the promotion of risk-tolerant executives: firms exhibit working capital and capacity expansion during these executives' senior tenure, followed by harvesting once they assume the CEO role. While individual attribution remains elusive with firm-level data, the timing relative to promotion events provides suggestive evidence of tournament dynamics. This asymmetric pattern of apparent internal success followed by external value destruction is hard to square with a simple cognitive-impairment story. Instead, the results point to risk appetite and its domain-specific payoffs as the primary driver.

6. Additional empirical analyses

One concern is that our pre-promotion evidence reflects firm-level phenomena rather than individual executive actions. While we cannot rule this out entirely with firm-level data, several patterns suggest individual influence: (1) the risk-loading specifically coincides with the executive's senior tenure, not random firm cycles; (2) the immediate reversal upon promotion suggests the new CEO has different preferences than the firm's prior trajectory; (3) the pattern only appears for internally promoted CEOs, not external hires who were not present during the risk-loading phase. Moreover, the sudden-death analysis in Section 5.7 provides additional support: if the risk-taking were purely a firm-level phenomenon independent of the executive, we would not observe systematic reversals when Superfund CEOs depart unexpectedly.

A related concern is that we do not observe the full pool of promotion candidates. However, under tournament theory (Goel and Thakor, 2008), this incompleteness may not fundamentally undermine our conclusions. In promotion tournaments, only the winner's type is revealed through selection. Unsuccessful candidates who took conservative approaches remain unobserved, while those who took risks but failed are likely selected out earlier. Our key insight is that boards observing firm-level outcomes during an executive's tenure cannot distinguish between skill and luck when variance is high. The fact that exposed executives are disproportionately promoted internally suggests they are overrepresented among the 'winners' whose risky strategies happened to succeed.

Moreover, if all senior executives were equally taking risks (making the exposed executives unremarkable), we would not observe: (1) the systematic relationship between prenatal exposure and internal promotion, (2) the distinctive load-then-harvest pattern around promotions of exposed executives specifically, or (3) the reversal of risk-taking policies after sudden deaths of exposed CEOs. These patterns suggest that exposed executives do behave differently from the unobserved pool, even if we cannot directly measure individual risk-taking across all candidates.

In this section, we address other plausible explanations. We first examine if the Superfund CEOs' corporate policies are a manifestation of their overconfidence. Second, we focus solely on the exposure to the developmental toxicants released by Superfund sites, which we conjecture is the primary channel harming fetal neurodevelopment, as the fetal brain is highly vulnerable to chemical toxicity (e.g., Black et al., 2019). Third, we examine if the CEOs' postnatal exposure to Superfund sites up to adolescence and CEOs' current exposure to pollution at work have incremental impacts beyond their prenatal exposure. Fourth, we perform a battery of robustness tests. Finally, we perform two matched-pair sample analyses and two falsification tests to consolidate our main results.[21]

6.1. Are Superfund CEOs overconfident CEOs?

Goel and Thakor's (2008) promotion-tournament model, and the empirical evidence in Li and Tong (2012), attribute the selection of risk-taking CEOs to managerial overconfidence, a systematic underestimation of outcome variance. An overconfident contestant chooses the riskiest internal project because he mistakenly views it as less volatile, which raises his chance of delivering the single best outcome and therefore of being promoted. Empirically, Li and Tong confirm that such managers are indeed more likely to become CEO if the board has not yet learned about the bias.

Our Superfund results could, in principle, arise from the same cognitive bias: prenatal toxin exposure might make future managers overconfident, prompting them to under-price risk and adopt aggressive policies. To disentangle this explanation from the overoptimism / heightened risk-preference channel we emphasise in Sections 4–5, we follow Malmendier and Tate (2005) and estimate the Holder-67 measure of overconfidence. Holder-67 equals one if a CEO refuses

[21] The results, reported in the tables in the Internet Appendix, present kink regression results using an OLS (instead of a Tobit) specification and unrelated acquisitions (0,1) regression results using an OLS (instead of a probit) specification.

to exercise in-the-money options whose stock price exceeds the strike by at least 67 % at least twice during the sample period.

Columns 1–3 of Table IA13 show the opposite of what the overconfidence story predicts: prenatal Superfund exposure is negatively related to Holder-67 (coef. = -0.13 to -5.48, depending on specification) and the relationship is statistically significant. Put differently, Superfund CEOs are *less* likely to display the canonical option-holding pattern that identifies variance underestimation.

The evidence therefore is inconsistent with classic overconfidence as the primary driver of our findings. A more plausible fit is overoptimism — a systematic overestimation of mean returns — or a direct increase in risk tolerance induced by early-life neuro-developmental effects. [22] Medical studies link prenatal toxin exposure to ADHD-like symptoms that include inflated assessments of potential rewards (Shoham et al., 2016; 2021), precisely the bias that would generate higher variance and lower average performance, which is what we observe.

This distinction between overconfidence and overoptimism can also explain the previously noted puzzle in section 5.5 - namely, why firm efforts to reduce risk-taking through lower delta and lower vega incentives appear ineffective. Specifically, incentive adjustments like delta and vega are primarily designed to manage variance-related biases (overconfidence), rather than mean-related biases (overoptimism). Because our results align more closely with overoptimism, a systematic overestimation of expected returns, these incentive-based adjustments do not effectively target the fundamental cognitive bias influencing Superfund CEOs' decision-making. Future work could explore screening or mentoring interventions that target the systematic return-overestimation we document, rather than the variance misperception highlighted by Goel and Thakor (2008), and the overconfidence literature.

6.2. *Are the results driven by developmental toxicants released from Superfund sites?*

The fetal origins hypothesis argues that *in-utero* exposure to developmental toxicants has long-term consequences on neurodevelopment. However, prenatal exposure to toxicants *not* classified as developmental toxicants can also lead to chronic diseases in adulthood, such as

[22] Directly testing overoptimism (systematically biased expectations about average returns) is empirically more challenging because it requires direct measurement of CEOs' subjective expectations or forecasts about future outcomes, data that is rarely available in archival studies. Given our available data, we are unable to conduct an explicit test of overoptimism analogous to Holder 67 for overconfidence.

cancers (e.g., Young and Cai, 2020). Therefore, prenatal exposure to these non-developmental toxicants could also be influencing our results.

Each Superfund site contains numerous contaminants, that are detailed in the health and environment section of the site's homepage. This section lists all Superfund chemicals released from the site, including the names of contaminants, their contaminated media, chemical abstracts service registry numbers (CASRN), and Agency for Toxic Substances and Disease Registry (ATSDR) toxicological profiles. We identify developmental toxicants based on their critical effects on human body systems as assessed in the EPA's Integrated Risk Information System (IRIS) and developmental toxicity studies in laboratory animals.[23] To determine whether a Superfund site releases developmental toxicants, we match each site's contaminants using their 10-digit CASRN with their developmental toxicity risk assessment.[24] As described in section 3.1 and Internet Appendix C, we identify each Superfund site's pollutant accumulation period from archived documents. However, these documents do not specify each toxicant's accumulation period. Therefore, we assume that the complete list of Superfund chemicals was accumulated and released simultaneously.

In Table IA14, we run regressions at the CASRN chemical level. Our primary explanatory variable is an indicator variable, *Developmental toxic chemical* (0,1), which equals one if the contaminants are developmental toxicants. We construct a CASRN-firm-year sample and repeat our analyses from Tables 4 to 9 and IA5 to IA7 replacing "*Ln*(1+*CEO #Superfund exposure*)" with "*Developmental toxic chemical* (0,1)" and adding CASRN fixed effects. In almost all regressions, except for leverage and share repurchases, the coefficients on *Developmental toxic chemical* (0,1) are significant and align with our baseline results. Conversely, when we include only Superfund sites with toxicants not classified as developmental toxicants, the results weaken considerably (results not shown for brevity). Overall, these findings confirm that prenatal exposure to developmental toxicants appears to be the primary factor driving our results.

[23] The list of chemicals in the IRIS database and its assessed critical effect on human body systems are available at https://iris.epa.gov/AtoZ/?list_type=alpha. The IRIS summary icon contains each chemical's IRIS chemical toxicity assessment summary.

[24] The EPA published guidelines for studying developmental toxicity in 1991 (USEPA (1991)). However, as the fields of toxicology and risk assessment continued to develop, early versions of the guidance document were later revised. Moreover, several chemicals were found to cause developmental toxicity in experimental animal studies. In most of these cases, the toxic effects of the chemical on human development have not been studied; hence, there is no clear evidence of hazards in humans. Among 573 chemicals listed in the IRIS database, the IRIS toxicological review or supporting document is unavailable for 468 (82%=468/573) listed chemicals. Therefore, in addition to the IRIS, we identify developmental toxicants based on developmental toxicity studies in laboratory animals.

6.3. Postnatal exposures to Superfund sites

6.3.1. Postnatal exposures to Superfund sites up to adolescence

A natural question is whether the results are primarily driven by CEOs' prenatal Superfund exposure or by a combination of prenatal and postnatal exposure if the CEOs lived in the same neighborhoods from birth to adolescence. The literature on the fetal origins hypothesis and the vulnerability of the developing brain to toxicants suggests that postnatal effects might be minor. To investigate the impact of CEOs' postnatal exposure to Superfund sites up to adolescence, we collect CEOs' high school and higher education records to identify non-moving CEOs who were born and grew up in the same county.[25] For the sample of non-moving Superfund CEOs, we first calculate the length of the pollutant accumulation periods for each Superfund site in the CEO's county *after* the CEO's birth year. We then measure the natural log of the likely length of CEO postnatal exposure to Superfund sites up to adolescence, *Ln*(*Length of CEO postnatal exposure*), defined as the minimum of either the maximum length of the pollutant accumulation periods for all nearby Superfund sites after the CEO's birth year or 15 years (age of entry into senior high school).

Using only the non-moving Superfund CEOs sample, we repeat all regression models from Tables 4 to 9 and IA5 to IA7 with "*Ln*(*Length of CEO postnatal exposure*)." The results, shown in Table IA15, are statistically weaker. In an unreported test, we focus on CEOs *without* prenatal Superfund exposure who moved to and grew up in a county with Superfund sites. These unreported results also show that postnatal exposure has weaker effects. Our findings align with those of Persico, Figlio, and Roth (2020), who document that *postnatal* exposure to Superfund sites has little impact on children's academic performance and cognitive abilities.

[25] CEOs' high school records are collected from birthplace data sources listed previously, LinkedIn, yearbooks, high school alumni association websites, and official high school websites, following the approach of Duchin, Simutin, and Sosyura (2021). To avoid misidentification with individuals of the same name, we cross-check using CEOs' work experiences, ages, or birthplaces. Among the 3,001 American-born CEOs with complete county-level birthplace records, we obtain high school county FIPS codes for 1,397 CEOs and identify 733 CEOs who were born and attended high school in the same county. We then collect higher education records from BoardEx, supplementing this data with additional sources as above, if needed. For those missing high school records, we assume that they were born and grew up in the same county if they attended a university in the same state. This assumption allows us to identify university state FIPS codes for 1,511 CEOs, of whom 679 were born and attended university in the same state. In total, the data show that 1,412 (47%) CEOs were likely born and raised in the same region. In addition, of our 501 non-American-born CEOs, 167 moved to the U.S. for their high school and higher education.

6.3.2. CEOs' current exposure to pollutants at work

Firm risk-taking activities could also result from the firm being a current polluter. Risk-taking firms might, for example, take shortcuts in controlling the pollution they emit. Another possibility is that Superfund CEOs' desensitization towards pollution might negatively influence their ESG policies, making them more likely to pollute and increase potential environmental liabilities, potentially leading to worse firm performance. Therefore, we next control for the current polluting activities. As mentioned in Internet Appendix C, the EPA identifies potentially responsible parties (PRPs) who may be liable as generators of contaminants at a Superfund site.[26] We collect the identities of PRPs from the Noticed Parties at Sites in SEMS (FOIA 11) from the EPA's Superfund Data and Reports. Additionally, we gather the complete list of firms with significant toxic chemical emissions that are required to self-report their emissions to the Toxics Release Inventory (TRI) program on Form R.[27] Using the identities of PRPs and the parent companies of TRI facilities, we determine if a firm is a current polluter. We denote these firms with the indicator variable, *Firm current polluter?* (0,1).

Alternatively, current exposure to pollution at the workplace could lower the performance of both the CEO and the workers. Studies have shown that even short-term exposure to hazardous waste sites can reduce performance in highly skilled, cognitively demanding jobs.[28] To address concerns that our results are mainly driven by Superfund CEOs' workplace exposure to pollutants, we identify Superfund sites within a three-mile radius of firms' headquarters (HQ) and facilities (Greenstone and Gallagher, 2008; Persico, Figlio, and Roth, 2020). Since Compustat only reports the firm's current principal executive office address and not its historical HQ locations, we utilize Bill McDonald's historical headquarters data[29] and the header sections of 10-K/Q filings on SEC EDGAR to collect the longitude and latitude coordinates of firms' historical HQs. We also gather

[26] Typically, the EPA uses "general notice letters" and "special notice letters" to communicate with PRPs regarding their identification as PRPs and potential cleanup liabilities. For more details about the EPA's use of notice letters, please refer to the EPA's website at: https://www.epa.gov/enforcement/superfund-notice-liability-letters.

[27] After the passage of the Emergency Planning and Community Right-to-Know Act (EPCRA) in 1986, industrial facilities employing 10 or more full-time equivalent employees are required to self-report their emissions of specific hazardous pollutants to the TRI program using various forms. Among them, firms with significant emissions use the detailed reporting form (Form R).

[28] Even short-term exposure to hazardous waste sites and ambient air pollution reduces performance in highly skilled, cognitively demanding jobs (see Archsmith, Heyes, and Saberian, 2018; Heyes, Rivers, and Schaufele, 2019; Zhang, Chen, and Zhang, 2018; Chang, Graff Zivin, Gross, and Neidell, 2019; Ebenstein, Lavy, and Roth, 2016; Huang, Xu, and Yu, 2020).

[29] Available at https://sraf.nd.edu/data/augmented-10-x-header-data/.

key facility-level information, including facility name, address, geospatial information, and parent company details from the EPA.[30, 31] We then construct indicator variables, *HQ current pollution exposure* (0,1) and *Facility current pollution exposure* (0,1), to identify Superfund sites within a three-mile radius of a firm's HQ and its facilities, respectively. Our results in Table IA16 show that *Ln*(1+*CEO #Superfund exposure*) remains statistically significant after controlling for CEOs' current workplace pollution exposure and their firms' polluting behavior.

One issue with Table IA16 is that, as shown in Table IA1, Superfund site pollution is mostly ground- or water-based. The literature also highlights the causal link between exposure to ambient air pollution and increased aggression, impulsivity, and reduced cognition or mental acuity (e.g., Archsmith, Heyes, and Saberian, 2018; Herrnstadt et al., 2021). Bishop et al. (2023) show that later-in-life cumulative exposure to air pollution could increase the probability of Alzheimer's disease or related dementias. To address concerns that exposure to air pollution could drive our results, we replace *HQ current pollution exposure* (0,1) and *Facility current pollution exposure* (0,1) with *Ln*(1+# *Days HQ current AQI* > 100) and *Ln*(1+# *Days Facility current AQI* > 100), respectively. We obtain the annual county-level air quality index (AQI) from the EPA website.[32] The higher the AQI value, the greater the level of air pollution, with values above 100 indicating unhealthy air quality. Results (untabulated) show that adding these variables to the baseline regressions in Tables 4-9 and IA5 to IA7 does not alter the significance of Ln(1+CEO #Superfund exposure).

6.4. Other robustness tests

In this section, we report other robustness tests. Since the results are broadly similar to our main results in Tables 4 to 9 and IA5 to IA7, they are not tabulated. First, to rule out the possibility that the firm policies under the Superfund CEOs are merely a continuation of the departing CEOs, we exclude the first year after the new CEOs assume their position. This adjustment results in little change in the sign or significance of our findings.

[30] We obtain the file NATIONAL_FACILITY_FILE.CSV of key facility-level information and NATIONAL_ORGANIZATION_FILE.CSV of facilities' parent company information from https://www.epa.gov/frs/epa-state-combined-csv-download-files.

[31] Following Autor, Dorn, Hanson, Pisano, and Shu (2020), we use a search-engine-based algorithm (i.e., Bing Web Search API under Microsoft Azure) to match parent company names appearing on EPA to Compustat firms based on at least three shared web search URLs for those observations where the parent name strings on EPA and Compustat firm records do not match exactly.

[32] The county-level air quality index (AQI) data are available at https://www.epa.gov/outdoor-air-quality-data/about-air-data-reports.

Second, one might argue that our results are driven by imbalanced data. Thirteen percent (400) of our CEOs and 14% of our CEO-firm-year observations come from three counties: New York County, Kings County in New York, and Cook County in Illinois. Eliminating these CEOs does not qualitatively change our results. Additionally, some counties, such as San Bernardino County in California, are much larger than others. In such large counties, measured by total area or income disparity, there could be significant disparities within the county, making county-level fixed effects potentially inadequate. Our results remain consistent after excluding the top three counties by total area or income disparities.

Third, we replace *Ln*(1+*CEO #Superfund exposure*) with the natural log of one plus the average Hazard Ranking System (HRS) scores, assigning a score of zero for firm-CEO observations without prenatal Superfund exposure. The HRS score offers a continuous measure of Superfund exposure risks. However, while the HRS score is critical in NPL listing decisions, it has faced significant criticism due to subjective judgments about the relative risks from migration, direct contact, and fire/explosion pathways, leading to revisions following the Superfund Amendments and Reauthorization Act of 1986 (Jennings, Mehta, and Mohan, 1994).[33] Additionally, a higher HRS score at one site does not necessarily have a more negative impact on the CEO than two sites with lower scores. Thus, we use the HRS scores only as a robustness test, and our results remain qualitatively similar.

Fourth, our results might be influenced by a cultural factor. Homegrown CEOs (born, raised, and managing firms in the same area) may have different cultural influences than other CEOs. For instance, due to personal attachments to their hometowns, homegrown CEOs may choose to work in their hometowns, disregarding potential Superfund pollution effects. This attachment could also influence their managerial styles (e.g., Lei, Petmezas, Rau, and Yang, 2025). We define a homegrown CEO as one whose birth county is also the county of the firm's headquarters. Eliminating these homegrown CEOs does not qualitatively change our results. Alternatively, we classify CEOs as local if they were born, attended high school in the same county (or college in the same state), and then served as CEOs in firms headquartered in the same county. Again, eliminating these local CEOs does not change our baseline regression results. Furthermore, adding

[33] The revised HRS retains the water migration and air migration pathways, drops the direct contact and fire/explosion pathways, and adds a fourth pathway, soil exposure.

the homegrown CEO dummy to our main regressions in Tables 4 to 9 and IA5 to IA7 does not alter the significance of the main Superfund exposure variable.

6.5. Matching sample analysis

Although we have addressed omitted variables correlated with prenatal Superfund exposure by including various controls and fixed effects, our analysis may still be susceptible to potential omitted variable biases. To validate our results, we construct two matching samples. The first matching sample pairs observations with Superfund CEOs to those with non-Superfund CEOs. Matched pairs satisfy the following criteria: (1) the matched CEOs were born in the same year (if feasible) or in the same decade, and (2) they are in the same FF48 industry. For those meeting these criteria, we select the control non-Superfund CEO from the nearest neighboring county to the Superfund CEO. This process creates CEO-firm-year pairs within the same industry, closely matched by CEOs' birthplaces and birth years. Table IA17 uses this nearest CEO birthplace matching sample and shows that most of our findings remain unchanged. Thus, our results are not driven by potential omitted variables at the CEO birth county-year level.

Our second nearest firm headquarters matching sample is composed of matched CEO-firm-year pairs that meet the following criteria: (1) the matched firms' CEOs were born in the same year (if feasible), or in the same decade, and (2) they are in the same FF48 industry. For those meeting these criteria, we select the control firm managed by a non-Superfund CEO with headquarters in the nearest neighboring county to the treated firm managed by a Superfund CEO. This process creates CEO-firm-year pairs within the same industry, closely matched by CEOs' birth years and their firms' headquarters locations. Table IA18 uses this nearest firm HQ matching sample and shows that our baseline findings remain largely unchanged in this matching sample. Thus, our conclusions do not appear to be affected by potential omitted variables at the firm headquarters-year level.

6.6. Placebo tests with falsely assigned birthplaces

In our final robustness test, we perform falsification tests by replacing the sample CEOs' birth counties (and county-level control variables) with pseudo-birth counties, creating two empirical bootstrap resampling distributions. In Table IA19, column (1), the pseudo-birth county is randomly chosen from all U.S. counties (not limited to the counties containing CEOs' actual birthplaces). This is done for each firm-CEO in the sample, forming a single pseudo sample on which we run each regression from the main tables. This process is repeated 1,000 times, creating an empirical pseudo-random CEO birthplace bootstrap resampling distribution. In Table IA19, column (2), for each firm-CEO in the sample, the pseudo-county is randomly chosen from the ten nearest counties to the CEO's actual birth county. After the replacement, we again run each regression from the main tables. This process is repeated 100 times, forming an empirical pseudo-nearest CEO birthplace bootstrap resampling distribution. In both columns, we use *Ln*(1+ *Pseudo-random CEO #Superfund exposure*) to capture the effect of the CEO's randomly assigned prenatal Superfund exposure for the bootstrap resampling distributions. Each column includes the same control variables and fixed effects as the corresponding previous tables. We report the fraction of the total number of bootstrap regressions that show significant (p-value ≤ 0.05) coefficients on *Ln*(1+ *Pseudo-random CEO #Superfund exposure*) as our main tables.

Table IA19 shows that our CEO pseudo prenatal Superfund exposure variable is insignificant in most specifications. In column (1), out of 24 specifications, significant results from random assignment occur more than 5% of the time in only nine cases. In column (2), significant results occur more than 5% of the time by chance in only four cases. There are only three cases (credit rating, CEO forced turnover, and CEO tenure) where the results from both randomization techniques coincide. This indicates that our original findings are not driven by random chance.

7. Conclusions

This paper shows that selection in CEO promotion amplifies risk-taking by using prenatal exposure to hazardous waste as a plausibly exogenous shock to risk preferences. We document a clear domain split: firms with exposed executives in senior positions exhibit apparent operational success, but once these executives become CEO, they pursue riskier external policies that are harder to reverse and immediately priced by markets.

Three sets of results tie the story together. First, exposed managers are disproportionately promoted internally, consistent with promotion tournaments that reward standout internal outcomes. Second, we document distinctive patterns around insider CEO promotions: firms exhibit stretched working capital and expanded capacity during the senior tenure of future exposed CEOs, followed by unwinding of these positions post-promotion, yielding shorter cash-conversion cycles and higher asset turnover. While firm-level data cannot definitively attribute these patterns to individual executives, the timing relative to promotion events is suggestive. Third, once in office, exposed CEOs adopt observably riskier external policies (higher leverage, lower cash, and more unrelated M&A), and their firms exhibit higher stock-return volatility, lower credit ratings, and higher borrowing costs. These external bets are associated with lower CARs around acquisitions and weaker ROA/valuation on average, higher turnover, and shorter tenures. Consistent with wider performance dispersion, we find exposed CEO overrepresentation among Fortune "Most Admired" firms, which is inconsistent with uniformly poor ability.

Causality rests on multiple, complementary designs. Baseline estimates include firm, year, industry-year, CEO birth-year, birth-county, and HQ-state fixed effects. A two-instrument IV based on state birth-cohort shares and governor party at gestation produces a strong first stage and weak-IV-robust inferences, while second-stage estimates track OLS signs. A difference-in-differences around sudden CEO deaths shows reversals in external policies and risk after exposed CEOs depart, supporting a CEO-imprint rather than board-policy explanation. Matched-sample analyses and pseudo-random birthplace placebos further reduce concerns that CEO–firm matching or chance drives the results. Our results hold after conditioning on birth-county socioeconomic conditions (poverty, employment, income), and exposure is not limited to poor counties. Effects concentrate at sites releasing developmental toxicants and are markedly weaker for postnatal exposure, consistent with in-utero mechanisms rather than neighborhood or culture. Findings are robust to controls for current pollution near HQ/facilities and to excluding homegrown CEOs who never left their birth regions. Industry composition does not explain the patterns.

Critically, the exogenous nature of prenatal pollution exposure enables us to circumvent firm-executive matching problems common in studies of managerial risk-taking. Prior literature faces difficulties disentangling whether risk-taking behaviors result from CEOs' innate preferences or from deliberate firm-CEO matching. By leveraging prenatal toxin exposure, an event occurring long before career decisions are made, we isolate the causal impact of executive risk preferences from potential selection effects, thereby providing cleaner identification of the mechanisms at play.

Our evidence closely aligns with Goel and Thakor's (2008) promotion-tournament theory, which predicts that managers choosing the riskiest internal projects disproportionately win internal CEO races. Our results highlight a novel channel distinct from the classical overconfidence mechanism central to prior literature. While Goel and Thakor emphasize variance underestimation (overconfidence), our post-promotion results fits overoptimism, a systematic overestimation of payoffs, rather than overconfidence (variance underestimation). The exposed CEOs do not display classic Holder-67 overconfidence in option-exercise behavior, yet they do load on external risk with lower average payoffs. This distinction helps explain why standard incentive tweaks aimed at variance (e.g., vega) often fail to curb risk-taking when the underlying bias is in means.

For boards and investors, our results carry practical implications. Promotion filters can amplify biologically rooted risk preferences. Screening should place less weight on firm-level performance metrics that may reflect collective efforts or temporary fluctuations and more on risk-adjusted, clearly attributable outcomes. Governance around irreversible CEO-level choices, such as M&A committees, pre-mortems, hurdle-rate discipline, and downside-tail triggers, can better align promotion-selected risk styles with firm objectives. Future research with divisional or segment-level data could more precisely identify the micro-link between individual executive decisions and unit-level outcomes.

Overall, our evidence shows how early-life shocks interact with organizational selection to create a structural source of firm-level risk which is predictable, persistent, and largely hidden until it reaches the CEO seat.

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Appendix

Variable Name	Definition
Pollution exposure variables	
Superfund CEO	An indicator variable that takes the value of one if the CEO's birth county generated the U.S. worst hazardous contaminants during her birth year and zero otherwise. These sites are later designated as Superfund sites.
CEO #Superfund exposure	The number of sites later designated as Superfund sites in the CEO's birth county during her birth year.
Corporate cash, leverage, and payout policy variables	
Cash/Assets	The ratio of cash and short-term investments to the book value of total assets.
Leverage	The ratio of the book value of total long-term debt over total assets.
Ln(1+Share repurchase)	The natural logarithm of one plus dollar amounts of share repurchase.
Corporate equity risk variables	
$\sigma_{\text{Stock return}}$	The annualized standard deviation of a firm's stock return.
$\sigma_{\text{Specific return}}$	The annualized square root of the residual variance from an expanded index model regressing a firm's weekly returns on the contemporaneous, two leads, and two lags of CRSP weekly value-weighted market index returns and the relevant Fama-French (1997) weekly value-weighted industry index returns. We allow nonsynchronous trading by including two leads and two lags for the market and industry indexes (Hutton, Marcus, and Tehranian, 2009).
Negative skewness	Negative one multiplied by the skewness (the third standardized moment) of firm-specific weekly returns (defined in $\sigma_{\text{Specific return}}$) for each firm-year (Xu et al, 2021).
$\sigma_{\text{Down-to-up}}$	Natural logarithm of the ratio of the standard deviation of firm-specific weekly returns in down weeks to the standard deviation of firm-specific weekly returns in up weeks (Xu et al, 2021). Down (up) weeks are weeks with firm-specific weekly returns below (above) the annual mean.
Crash risk	The frequency that a firm-year experiencing crash weeks during the fiscal year. Crash weeks are the frequencies with which the firm-specific weekly returns fall 3.09 standard deviations (probability 0.001 events for a normal distribution) below the annual mean (Kim, Li, and Zhang, 2011).
Corporate M&A announcement abnormal returns and the propensity of unrelated acquisitions variables	
CAR(-1,1) Market model	The acquirer's cumulative abnormal return (CAR) during trading days [–1, +1] around the M&A announcement (day 0) is based on the market model regressions of daily stock returns on the CRSP value-weighted market index. The estimation period for the market model is from day −131 through day −31 before the M&A announcement (day 0). We obtain merger and acquisition (M&A) announcements that involve U.S. public acquiring firms in the Securities Data Corporation's (SDC) U.S. Mergers and Acquisitions database.
CAR(-1,1) FF4 model	The acquirer's CAR during trading days [–1, +1] around the M&A announcement (day 0) is based on the Carhart (1997) four-factor model regressions of daily stock returns on the CRSP value-weighted market index, size, book-to-market, and momentum factor. The estimation period for the Carhart (1997) four-factor model is from day −131 through day −31 before the M&A announcement (day 0).
Unrelated acquisition (0,1)	An indicator variable that equals one if the target is not in the same Fama–French (1997) 48 industry as the acquirer and zero otherwise. We obtain merger and acquisition (M&A) announcements that involve U.S. public acquiring firms in the Securities Data Corporation's (SDC) U.S. Mergers and Acquisitions database.
Firm internal efficiency variables	
Cash conversion cycle (CCC Sales)	365×(Avg. Inventories/COGS)+365×(Avg. Total Receivables/Sales)−365×(Avg. Accounts Payable/COGS). As CCC contains zero and negative values and to handle potential extreme values, we apply an inverse hyperbolic sine transformation (IHS) to CCC Sales, i.e., IHS (CCC Sales) = ln(CCC+$\sqrt{CCC^2+1}$).

Cash conversion cycle (CCC Revenue)	365×(Avg. Inventories/COGS)+365×(Avg. Total Receivables/Total Revenue) −365×(Avg. Accounts Payable/COGS). We apply an inverse hyperbolic sine transformation to CCC Revenue.
Asset turnover	Net sales/Average total assets.
Capex efficiency (Revenue)	Total revenue (REVT)/Capital Expenditures (CAPX). As REVT/CAPX contains zero and negative values and to handle potential extreme values, we apply an inverse hyperbolic sine transformation to REVT/CAPX.
Employee productivity	Total revenue (REVT)/Employees (EMP). As REVT/EMP contains zero and negative values and to handle potential extreme values, we apply an inverse hyperbolic sine transformation to REVT/EMP.
Layoff severity	The number of employees laid off is divided by the total employees pre-layoff, computed as -(EMP_t - EMP_{t-1}/EMP_{t-1}). As layoff severity contains zero and negative values and to handle potential extreme values, we apply an inverse hyperbolic sine transformation to -(EMP_t - EMP_{t-1}/EMP_{t-1}).
Firm performance variables	
ROA	The ratio of operating income before depreciation scaled by total assets.
Tobin's Q	The ratio of market-to-book value of assets.
Stock return	Annual buy-and-hold stock return, including dividends.
CEO turnover and outside CEO appointment variables	
Ln (1+CEO tenure)	The natural logarithm of 1 plus the number of years the current CEO has held her position.
Forced CEO turnover (0,1)	An indicator variable for CEO involuntary departure events in which a news article indicates a forced departure. The forced CEO turnover indicator equals one in year *t* if the incumbent CEO is in office for the larger part of fiscal year *t* but is no longer in office for fiscal year *t*+1.
Generic CEO turnover (0,1)	An indicator variable for all CEO turnover events excluding turnover in which the CEO leaves the firm to immediately accept a position elsewhere or where the CEO leaves the firm for health reasons. The generic CEO turnover indicator equals one in year *t* if the incumbent CEO is in office for the larger part of fiscal year *t* but is no longer in office in fiscal year *t*+1.
Severance payment if CEO turnover (0,1)	An indicator variable for all CEO turnover events in which the CEO received severance payments upon departure. We collect severance payment information from explicit CEO severance pay contracts or explicit CEO employment contract terms, including golden handshakes or golden parachutes.
CEO incentive compensation variables	
Ln(1+CEO Delta)	The natural logarithm of 1 plus the change in the risk-neutral (Black-Scholes) value of a CEO's total portfolio of all current and prior grants of shares and options for a 1% change in the price of the underlying stock.
Ln(1+CEO Vega)	The natural logarithm of 1 plus the change in the Black-Scholes value of a CEO's total portfolio of outstanding options for a 1% change in the standard deviation of the return.
Proportion of options	The value of option grants as a percentage of total compensation.
County-level control variables	
County poverty status	The percentage of the county population with income that falls below the appropriate official poverty threshold. The data source is the IPUMS USA database variable POVERTY, which was created using detailed income and family structure information about each individual and calculating the family income as a percentage of the appropriate official poverty threshold.
County employment status	The percentage of the county population that is employed. The data source is the IPUMS USA database variable EMPSTAT.
County earnings per capita	The average personal total pre-tax wage and salary income for each county. The data source is the IPUMS USA database variable INCWAGE.

Ratio of county births	The total number of births by the county of the mother's legal residence, scaled by the total number of births by state of the mother's legal residence in the CEO's birth year.
State governors' party affiliation	The state governor's partisan affiliation is coded as 1 for Democratic governors, 0 for Republican governors, and others are excluded. U.S. state governors' party affiliations based on the most recent gubernatorial election prior to the CEO's birth year. The data on U.S. governors are from Kaplan (2021).
CEO characteristics control variables	
Ln(CEO age)	The natural logarithm of the age of the CEO.
CEO age≥ 60 (0,1)	An indicator that equals 1 if the CEO's age (measured in years) is at least 60.
CEO duality (0,1)	An indicator equals 1 if the CEO also holds the title of chairman of the board & 0 otherwise. CEO duality data are obtained from RiskMetrics and SEC filings.
Founder CEO (0,1)	An indicator equals 1 if the current CEO founded the firm and 0 otherwise. The CEO's founder status is obtained from Equilar Consultants and SEC filings.
Outside CEO (0,1)	An indicator variable that equals one if the individual joined the firm and became CEO in no more than two years and zero otherwise (Gopalan, Milbourn, and Song, 2010).
CEO ownership	The percentage of the firm's total common stock owned by the CEO.
CEO Salarycomp	The ratio of CEO salary to total compensation.
Firm and industry characteristics control variables	
Assets volatility	The standard deviation of stock return times the market value of equity divided by the market value of assets.
Ln(Assets)	The natural logarithm of the firm's book value of total assets.
Capex	The ratio of capital expenditures to the book value of total assets.
R&D	The ratio of research and development expense to the book value of total assets. We code the missing values of research and development expense as zero.
Dividend (0,1)	An indicator variable that equals one if the firms pay cash dividends and zero otherwise.
Cash flow/Assets	The ratio of cash flow from operations (operating income before depreciation minus interest minus taxes minus cash dividends) to the book value of total assets.
NWC/Assets	The ratio of net working capital (current assets minus cash minus current liabilities plus debt in current liabilities) to the book value of total assets.
Acquisition/Assets	The ratio of cash outflows associated with acquisitions (Compustat data item AQC) to the book value of total assets.
PP&E/Assets	The ratio of net property, plant, and equipment to the book value of total assets.
Growth in sales	Sales less lagged sales over the lagged sales.
Inst. ownership	Total institutional ownership based on the data from the Thomson-Reuters Institutional Holdings (13F) database.
Outside directors	The number of independent directors divided by the total number of directors on the firm's board.
NOL carryforward (0,1)	An indicator variable that equals one if the firms have a net operating loss (NOL) carryforward (Compustat data item TLCF>0) and zero otherwise.
Ln(Sales)	The natural logarithm of sales.
Current ratio	The ratio of current assets to current liabilities.
R&D/Sales	The ratio of research and development expense to sales. Missing values of R&D expense are coded as 0.
AD/Sales	The ratio of advertising expense to sales. Missing values of advertising expense are coded as 0.
Opacity	Following Hutton, Marcus, and Tehranian (2009), we employ a measure of opacity based on measures of accruals quality: the three-year moving sum of the absolute value of annual discretionary accruals proposed by Dechow and Dichev (2002).
Ln(B/M)	The natural logarithm of the ratio of the book-to-market value of equity.
TNIC total similarity	Total product similarity scores, which are the sum of firm pairwise similarity scores based on text-based network industry classifications (TNIC) (Hoberg & Phillips, 2016).

PP&E/Sales	The ratio of net property, plant, and equipment over sales.
Intangibles	The ratio of the sum of research and development expense and advertising expense over sales. We code the missing values of research and development expense as zero.
Dividend yield	The ratio of common stock dividends and preferred stock dividends (Compustat data items DVC+DVP) scaled by the market value of common stock and the par value of preferred stock (Compustat data items PRCC_F × CSHO+ PSTK).
Ln(Local peers)	The natural log of the number of Compustat firms from the same industry (based on Fama-French (1997) 48-industry classification) and within a 150-mile-radius circle around the focal company headquarters. Firms' historical HQ information was collected from the Augmented 10-X Header Data from Software Repository for Accounting and Finance at the University of Notre Dame.
Non-compete index	The state-level index that measures how difficult it is to enforce a non-compete clause in an employment contract. Larger index numbers indicate that the strength of enforcement of a non-compete clause is stronger. The data source for the non-compete index is Garmaise (2011) Table A1.
Ind. return percentile	The industry median annual buy-and-hold stock returns measured on a percentile basis within the annual cohort of all Compustat firms from the same industry (based on Fama-French (1997) 48-industry classification) as the focal company.
Firm abnormal return percentile	The focal firm's industry-adjusted annual buy-and-hold stock returns measured on a percentile basis.
Ind. return risk	Industry stock return volatility computed from daily value-weighted returns on the same industry (based on Fama-French (1997) 48-industry classification) as the focal company. The daily return data on the 48-industry portfolio are obtained from the Kenneth R. French data library.
Firm abnormal return volatility	The focal firm's industry-adjusted stock return volatility over the fiscal year.
Ln(Mktcap)	The natural log of market value of equity.
Ln(Firm age)	The natural log of the number of years since the year of listing.
Family firm (0,1)	An indicator that equals 1 for firm-years where members of the founding family hold positions in top management, are on the board, or are blockholders of the company.
Family firm$_{\text{non-exec}}$ (0,1)	An indicator variable equals 1 for firm-years where members of the founding family are on the board or are blockholders of the company.
Family firm$_{\text{Exec}}$ (0,1)	An indicator variable that equals 1 for firm-years where members of the founding family continue to be top management of the companies.
Corporate M&A deal characteristics variables	
All stock (0,1)	An indicator that equals 1 if the M&A transaction is completely paid in stock and 0 otherwise.
% acquired	Fraction of the target firm exchanged in the M&A transaction.
Hostile (0,1)	An indicator variable that equals 1 if the target board officially rejects the offer yet the acquirer persists with the acquisition, and 0 otherwise.
Competing bidders	The number of third-party launching offers for the same target while the original bid was pending, and 0 otherwise.
Tender offer (0,1)	An indicator variable that equals 1 when a tender offer is launched for the target and 0 otherwise.
Termination fees (0,1)	An indicator variable that equals 1 if the target or acquirer has made a termination fee agreement whereby failure to consummate the M&A transaction results in a payment made by one party to the other and 0 otherwise.
Public status (target) (0,1)	An indicator variable that equals 1 if the target is listed on a stock exchange and 0 otherwise.
Toehold (0,1)	An indicator variable that equals 1 if the acquirer owns more than 0.5% ownership in the target before the M&A announcement.
CAR(-131,-31) (acquirer)	Run-up (or run-down) measured by the acquirer's CAR during trading days [–131, -31] prior to the M&A announcement (day 0) based on the market model.

Figure 1. The distribution of CEO birth years and their Superfund exposures

This figure shows the distribution of CEO birth years and their Superfund exposures. The blue dots represent a birth year-Superfund exposure pair. The larger the dot reflects the greater number of CEOs were born in that year with that specific Superfund exposure. We mark three critical years: The green line in 1962 is the beginning of the U.S. environmental movements (i.e., the publication of "Silent Spring"); the brown line in 1970 is the year when the U.S. Environmental Protection Agency (EPA) was formed; the red line in 1979 is the year when President Carter proposed the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, aka Superfund Act).

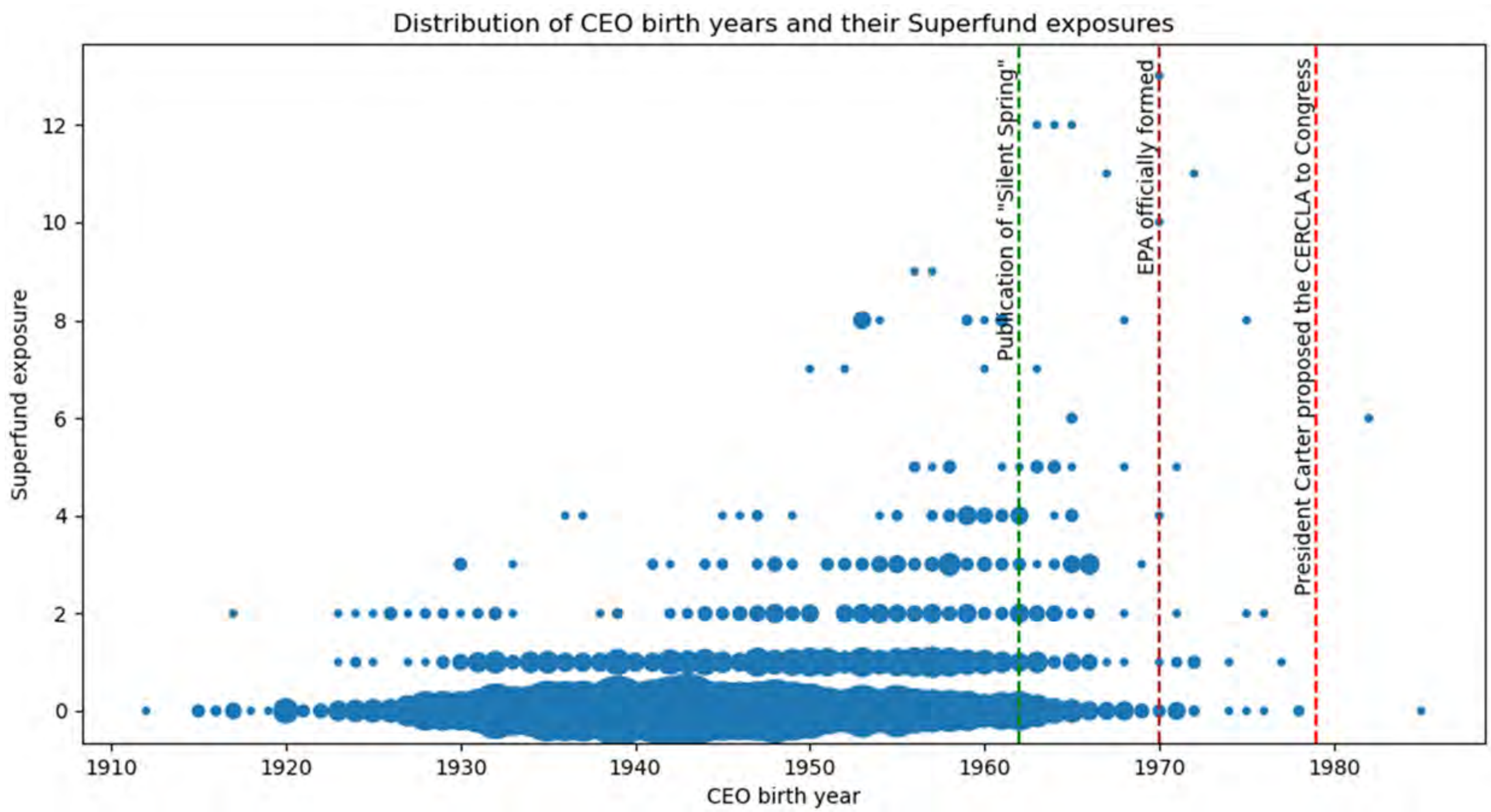

Table 1. Summary of main empirical results

Panel A summarizes the three sets of empirical results documented in the paper. Results are estimated with firm, year, industry-year, CEO birth-year, birth-county, and HQ-state fixed effects. The table/figure column refers to tables and figures in the main paper unless "IA only" is specified. Panel B summarizes research-design elements used to address identification threats and falsification tests. Abbreviations: KP F = Kleibergen–Paap rk Wald F; AR = Anderson–Rubin test; S–W = Stock–Wright S; J = Hansen over-identification test. Means for the tests are reported first and medians in parentheses.

Panel A. Main empirical results

Result set	Outcomes examined	Findings	Tables/Figures
1. Selection in CEO promotion	Internal vs. external appointments	Exposed managers are disproportionately promoted internally rather than hired externally, consistent with tournament models of Goel and Thakor (2008) rewarding standout internal outcomes.	Table 3: Internal vs external hiring
2. Firm patterns during future CEO's senior executive tenure	Working capital (CCC), asset turnover, capacity expansion	During senior executive tenure of future exposed insider-CEOs, firms exhibit stretched CCC and expanded capacity; following CEO promotion, these positions reverse, with shorter CCC and higher asset turnover (a "load-then-harvest" pattern).	Figure IA.F2: Pre-CEO event study; Table 7: Internal operating efficiency
3. CEO firm-wide policy choices and market-priced outcomes	Capital structure (leverage, cash), M&A (unrelated acquisitions, announcement CARs), risk (volatility, ratings, borrowing costs), performance (ROA, Tobin's Q, tenure)	As CEOs, exposed managers adopt riskier external policies: higher leverage, lower cash, more unrelated M&A. Firms exhibit higher return volatility, lower ratings, and higher borrowing costs. These policies are associated with lower acquisition CARs, weaker ROA and valuation on average, higher turnover, and shorter tenures. At the same time, the distribution widens, and exposed CEOs are overrepresented among Fortune "Most Admired Companies," consistent with higher variance rather than uniformly poor ability.	Tables: Capital structure (Table 4), Debt risk (IA5, IA6, IA7), Equity risk (Table 5), M&A (Table 6), Performance (Table 8), Career outcomes (Table 9), Compensation (Table 10), MAC list (IA8), Other consequences (IA9)

Panel B. Identification threats and falsification tests

Design / Check	Identification threat	Setup	Main findings	Table/Figure
Industry distribution of CEOs	Exposed CEOs gravitate to riskier industries	Distribution of exposed and unexposed CEOs across industries	Distributions are similar	In text
Two-instrument IV (state birth-cohort shares; governor party at gestation)	CEO–firm matching; omitted SES/institutions at birth	2SLS with firm, year, industry-year, birth-county, HQ-state FE; weak-IV-robust (AR/S-W)	Effects similar to OLS KP F=9.21 (4.91), AR p=0.17 (0), S-W p=0.17 (0), J p= 0.41 (0.31)	Tables 11, IA10, IA11: IV summary
Sudden-death difference-in-differences	Board policy vs CEO imprint; endogenous matching	Pre/post around unexpected CEO deaths (±3 years)	Reversal in leverage, cash, volatility, M&A CARs, ROA after exposed CEOs depart	Table 12: Sudden-death DiD
Birth-county Socio-Economic Status controls at birth	Sorting by poverty/ education/ income at birthplace	Add poverty/ employment/ income (birth-year × county) covariates	Effects persist; exposure not limited to poor counties	All tables
Developmental-toxicant concentration	Biological mechanism (in utero neurodevelopment)	CASRN-based flag for developmental toxicants at sites	Effects concentrate in developmental-toxicant subsample	Table IA14: Developmental toxicants
Prenatal vs postnatal exposure	Neighborhood/culture channels *after* birth	Compare gestation exposure with childhood exposure (non-movers)	Gestation effects stronger; postnatal weaker/mixed	Table IA15: Prenatal vs postnatal
Current pollution near firm & polluter status	Contemporaneous firm-area pollution confound	Add HQ/facility exposure controls and firm polluter indicator	Results robust to current exposure/polluter controls	Table IA16: Current pollution robustness
Pseudo-random birthplace placebo	Chance correlation / specification search	Randomly reassign CEO birthplaces; re-estimate	False positives ≈ nominal; effects disappear under randomization	Table IA19: Placebo bootstrap
Pre-CEO internal-risk event study	Mechanism (tournament): candidate behavior pre-promotion	Event-time around promotion for future exposed insider-CEOs	Pre: stretch CCC/build capacity; Post: unwind (shorter CCC, higher asset turnover)	Table IA12, Figure IA.F2: Pre-CEO event study
Matched-sample re-estimates	Differences in observables between treated/control firms	Nearest-birthplace (or nearest-HQ) matching; re-run baselines	Signs/magnitudes persist in matched samples	Table IA17, IA18: Matched-sample OLS
Personal risk-taking	Mechanism corroboration (risk-seeking in personal domain)	Indicator for CEOs holding FAA private pilot licenses	Exposed CEOs significantly more likely to hold a pilot license	Table IA4: Pilot license probability
Overconfidence test (Holder-67)	Alternative mechanism (variance underestimation)	Option exercise patterns relative to Malmendier-Tate Holder-67 predictions	No evidence of classic overconfidence; consistent with overoptimism instead	Table IA13: Overconfidence test

Table 2. Comparison between firms run by Superfund CEOs and non-Superfund CEOs

This table reports summary statistics for comparisons between firms managed by the Superfund CEOs and other CEOs. The Superfund CEOs subsample includes all firm-year observations for firms having a Superfund CEO that year. The rest of the firm-year observations with valid CEO birth years and birthplaces in the U.S. are in the non-Superfund CEOs subsample. Tests of differences in means (medians) are two-sample t-tests (Kruskal-Wallis H-tests). ∗∗∗, ∗∗, and ∗ denote significant differences at the 1%, 5%, and 10% levels, respectively.

	Superfund CEOs (Observations=4,852)				Non-Superfund CEOs (Observations=14,721)				t-test Superfund vs. Non-Super.	(Kruskal-Wallis H test) Superfund vs. Non-Super.
	N	Mean	Median	Std. Dev.	N	Mean	Median	Std. Dev.		
# of Unique CEOs	734				2,267					
Size										
Ln(Assets)	4,831	8.3960	8.3938	1.9528	14,657	8.0388	7.9522	1.8970	11.10***	(129.23***)
Ln(Sales)	4,823	7.9233	7.9994	1.7877	14,630	7.6261	7.6123	1.6917	10.14***	(110.19***)
Performance										
ROA	4,843	0.0371	0.0372	0.0659	14,674	0.0429	0.0408	0.0622	-5.38***	(26.33***)
Tobin's Q	4,558	1.7480	1.4101	0.9089	13,820	1.7622	1.3953	0.9479	-0.90	(0.14)
Stock return	4,378	0.2247	0.1258	0.8328	13,082	0.2304	0.1258	0.7356	-0.40	(0.11)
Growth opportunities										
PP&E/Assets	4,751	0.2606	0.1840	0.2399	14,421	0.2989	0.2401	0.2465	-9.47***	(101.07***)
Capex	4,649	0.0506	0.0350	0.0556	13,894	0.0570	0.0429	0.0598	-6.73***	(98.57***)
R&D	4,831	0.0275	0.0000	0.0630	14,657	0.0227	0.0000	0.0950	3.99***	(20.44***)
Debt risk										
Leverage	4,827	0.2144	0.1762	0.1999	14,626	0.2111	0.1823	0.2020	0.95	(0.13)
Cash/Assets	4,843	0.1346	0.0726	0.1587	14,675	0.1176	0.0560	0.1503	6.55***	(75.38***)
Credit rating	3,351	16.0185	16.000	3.5836	9,676	16.2485	16.000	3.4765	-3.23***	(6.49**)
Default probability	3,813	0.1127	0.0000	0.2434	11,395	0.1039	0.0000	0.2340	1.95*	(4.37**)
Interest expense/Debt	4,340	0.1927	0.0616	3.2866	13,235	0.1994	0.0684	5.0006	-0.10	(164.34***)
Equity risk										
Dividend (0,1)	4,830	0.6433	1.0000	0.4791	14,652	0.6955	1.0000	0.4602	-6.64***	(29.77***)
Ln(1+Share repurchase)	4,495	2.9589	2.6391	2.8479	13,295	2.4611	1.6095	2.6598	10.30***	(95.86***)
$\sigma_{\text{Stock return}}$	4,201	0.4018	0.3485	0.2121	12,648	0.3863	0.3497	0.1470	4.39***	(3.03*)
$\sigma_{\text{Specific return}}$	3,942	0.3114	0.2557	0.2087	11,735	0.3023	0.2677	0.1312	2.57***	(23.46***)
Other risk										
Acquisition (0,1)	4,852	0.3510	0.0000	0.4773	14,721	0.3347	0.0000	0.4719	2.07**	(2.91*)
County-level variables										
County poverty status	4,843	14.4837	12.3976	8.3924	14,691	21.8896	17.1784	13.6853	-44.83***	(1561.80***)
County employment status	4,459	40.1133	40.0141	5.3299	13,900	39.0507	38.6680	12.1561	8.15***	(308.86***)
Ln(County earnings per capita)	4,843	7.7478	7.8011	0.6985	14,619	7.3048	7.5938	1.0061	33.97***	(1059.48***)

Table 3. Effects of CEOs' prenatal Superfund exposures on the origin of CEOs

This table presents coefficients from probit regression of the effect of prenatal Superfund exposures on the likelihood of outside CEO (a dummy variable set equal to one if the individuals joined the firm and became CEO in no more than two years and zero otherwise) and family firm appointments. Family firm (0,1) is defined as one in firm-years where members of the founding family continue to hold positions in top management, are on the board, or are blockholders of the company, and zero otherwise. Family firm$_{non\text{-}exec}$ (0,1) is defined as one in firm-years where members of the founding family continue to be on the board or are blockholders of the company and zero otherwise. Family firm$_{Exec}$ (0,1) is defined as one in firm-years where members of the founding family continue to be top management of the companies, and zero otherwise. County-level variables are measured in the CEO's birth year and birth county. Variables are defined in the Appendix. Constant terms are not reported. Z-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Outside CEO (0,1)**	**Family firm (0,1)**	**Outside CEO (0,1)**	**Outside CEO (0,1)**	**Outside CEO (0,1)**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Ln(1+CEO #Superfund exposure$_t$)	-0.4188**	1.0367***	-0.7164***	-0.6390***	-0.4289**
	(-2.48)	(3.56)	(-3.89)	(-3.69)	(-2.32)
Family firm (0,1)			-1.0799***		
			(-7.05)		
Ln(1+CEO #Superfund exposure$_t$) × Family firm			1.2535***		
			(5.57)		
Family firm$_{non\text{-}exec}$ (0,1)				-0.0618	
				(-0.41)	
Ln(1+CEO #Superfund exposure$_t$) × Family firm$_{non\text{-}exec}$				1.3233***	
				(5.60)	
Family firm$_{Exec}$ (0,1)					-2.3256***
					(-8.62)
Ln(1+CEO #Superfund exposure$_t$) × Family firm$_{Exec}$					0.5468
					(1.32)
Departing forced CEO turnover (0,1)	0.6390***	0.0357	0.7316***	0.6537***	0.7511***
	(6.64)	(0.32)	(7.16)	(6.59)	(7.24)
Ln(Local peers)$_{t-1}$	0.1925**	-0.0882	0.2197***	0.2401***	0.3035***
	(2.53)	(-1.11)	(2.91)	(2.96)	(3.84)
Non-compete index	-0.2047	-0.8604**	-0.2369	-0.2833	-0.2206
	(-1.03)	(-2.26)	(-1.12)	(-1.27)	(-1.06)
Ind. return percentile$_{t-1}$	0.0003	0.0001	0.0004	0.0002	0.0006
	(0.21)	(0.11)	(0.28)	(0.16)	(0.47)
Firm abnormal return percentile$_{t-1}$	-0.0007	0.0024	-0.0001	-0.0002	-0.0005
	(-0.49)	(1.63)	(-0.08)	(-0.15)	(-0.35)
Ind. return risk$_{t-1}$	6.4275**	6.4060*	5.3778**	6.2980**	6.3811**
	(2.36)	(1.92)	(1.99)	(2.34)	(2.19)
Firm abnormal return volatility$_{t-1}$	5.1498***	0.5765	4.5419***	4.5504***	4.8811***
	(5.07)	(0.51)	(4.36)	(4.34)	(4.62)
Ln(Assets)$_{t-1}$	-0.3100***	-0.1492***	-0.3605***	-0.3325***	-0.3119***
	(-8.02)	(-3.23)	(-9.32)	(-8.59)	(-7.83)
Tobin's Q$_{t-1}$	-0.0340***	0.0270***	-0.0317***	-0.0391***	-0.0290***
	(-4.95)	(3.59)	(-4.71)	(-5.91)	(-4.07)
Departing CEO age	-1.6888***	3.9162***	-1.1840**	-1.4423***	-0.9836*
	(-3.45)	(5.04)	(-2.40)	(-2.96)	(-1.90)
Ln(1+ Departing CEO tenure)	-0.3840***	-0.0308	-0.3412***	-0.3221***	-0.4217***
	(-4.76)	(-0.25)	(-4.17)	(-3.88)	(-4.92)
Departing Founder CEO (0,1)	-0.1810	3.5356***	-0.0035	-0.3779**	-0.1018
	(-1.11)	(13.66)	(-0.02)	(-2.32)	(-0.59)
Departing CEO duality (0,1)	0.1668	-2.2279***	-0.0019	0.2194*	-0.0152
	(1.36)	(-9.13)	(-0.01)	(1.76)	(-0.12)

Departing CEO employment contract (0,1)	0.2311**	0.4041***	0.2417**	0.1403	0.2811**
	(2.19)	(2.61)	(2.26)	(1.31)	(2.48)
Inst. ownership$_{t-1}$ (%)	0.3146	-2.1893***	0.1486	0.3649	0.3556
	(1.10)	(-5.94)	(0.51)	(1.24)	(1.15)
Outside directors$_{t-1}$ (%)	1.3615***	-4.4971***	1.0026***	1.6443***	0.8689***
	(4.71)	(-10.15)_	(3.43)	(5.61)	(2.85)
County poverty status	-0.0884***	0.0567***	-0.0830***	-0.0922***	-0.0966***
	(-5.91)	(2.62)	(-5.38)	(-5.86)	(-6.32)
County employment status	-0.0026	0.0263***	0.0002	-0.0020	-0.0022
	(-0.65)	(3.89)	(0.05)	(-0.49)	(-0.43)
Ln(County earnings per capita)	-0.9880***	1.6309***	-0.8713***	-1.0241***	-1.0991***
	(-3.17)	(4.14)	(-2.79)	(-3.22)	(-3.50)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.4714	0.6535	0.4879	0.4846	0.5047
Observations	2,980	3,269	2,980	2,980	2,980

Table 4. Effects of CEOs' prenatal Superfund exposure on capital structure

This table reports coefficients from OLS regressions of *Cash/Assets*, *Leverage*, and *Ln*(1+*Share repurchase*) for fiscal year *t* on our CEOs' prenatal Superfund exposure measure and control variables (of lagged firms, lagged CEOs, and counties characteristics) with fixed effects. County-level variables are measured in the CEO's birth year and birth county. Variables are defined in the Appendix. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**
	(1)	**(2)**	**(3)**
Ln(1+ CEO #Superfund exposure$_t$)	-0.0191*	0.0451***	-0.7948**
	(-1.66)	(2.92)	(-2.41)
Assets volatility$_{t-1}$	0.1149***	-0.1386***	
	(7.07)	(-8.15)	
Tobin's Q$_{t-1}$	-0.0027***	-0.0005	
	(-3.42)	(-0.53)	
Ln(Assets)$_{t-1}$	-0.0288***	-0.0050	0.4647***
	(-7.66)	(-1.23)	(6.90)
Capex$_{t-1}$	-0.1463***	0.0282	
	(-5.21)	(0.74)	
R&D$_{t-1}$	0.0869	-0.2185***	
	(1.00)	(-2.69)	
Dividend (0,1)$_t$	-0.0012	-0.0098*	
	(-0.30)	(-1.76)	
Cash flow/Assets$_{t-1}$	-0.0735***		
	(-3.09)		
NWC/Assets$_{t-1}$	-0.1274***		
	(-5.10)		
Acquisition/Assets$_{t-1}$	-0.1033***		
	(-6.90)		
Leverage$_t$	-0.0762***		-1.4735***
	(-5.17)		(-5.40)
ROA$_{t-1}$		-0.1184***	1.4795***
		(-6.44)	(3.31)
PP&E/Assets$_{t-1}$		0.0017	
		(0.07)	
Growth in sales$_{t-1}$		-0.0068*	-0.1384*
		(-1.92)	(-1.77)
Cash/Assets$_t$			-0.0227
			(-0.08)
Ln(CEO age)$_{t-1}$	-0.0687	0.1561	-2.7869
	(-0.51)	(0.82)	(-1.01)
Ln(1+CEO tenure)$_{t-1}$	-0.0052	0.0001	0.0465
	(-1.46)	(0.02)	(0.50)
CEO duality (0,1)$_{t-1}$	-0.0013	0.0169***	0.1238
	(-0.29)	(3.32)	(1.16)
Founder CEO (0,1)$_{t-1}$	0.0027	-0.0271	-0.6357*
	(0.24)	(-1.46)	(-1.92)
CEO ownership$_{t-1}$ (%)	-0.0000	0.0005	-0.0076
	(-0.16)	(1.63)	(-1.38)
Inst. ownership$_{t-1}$ (%)	0.0044	-0.0397***	-0.1777
	(0.40)	(-3.02)	(-0.80)
County poverty status	-0.0004	0.0001	0.0670*
	(-0.38)	(0.09)	(1.78)
County employment status	-0.0006*	0.0018***	-0.0144
	(-1.84)	(3.47)	(-1.39)
Ln(County earnings per capita)	-0.0201	0.0428**	0.2938
	(-1.47)	(2.40)	(0.64)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes
Adj R^2	0.8553	0.7917	0.6950
Observations	8,298	8,955	9,136

Table 5. Effects of CEOs' prenatal Superfund exposure on equity risk

This table reports coefficients from OLS regressions of $\sigma_{Stock\ return}$, $\sigma_{Specific\ return}$, *Negative skewness*, $\sigma_{Down\text{-}to\text{-}up}$, and *Crash risk* for fiscal year *t* on our CEOs' prenatal Superfund exposure measure and control variables (of lagged firms, lagged CEOs, and counties characteristics) with fixed effects. Variables are defined in the Appendix. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	$\sigma_{Stock\ return}$	$\sigma_{Specific\ return}$	**Negative skewness**	$\sigma_{Down\text{-}to\text{-}up}$	**Crash risk**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Ln(1+CEO #Superfund exposure$_t$)	0.0302**	0.0250	0.3497*	0.0835**	0.1755*
	(2.41)	(1.59)	(1.93)	(2.25)	(1.91)
Opacity$_{t-1}$			0.0051*	0.0012**	0.0016
			(1.95)	(2.21)	(1.25)
Stock return$_{t-1}$	0.0052***	-0.0004	0.0016	0.0083**	-0.0232**
	(3.27)	(-0.18)	(0.09)	(2.18)	(-2.35)
Ln(Assets)$_{t-1}$	-0.0217***	-0.0267***	0.1280***	0.0277***	0.0471**
	(-6.85)	(-7.11)	(3.81)	(3.84)	(2.46)
Ln(B/M)$_{t-1}$	0.0118***	0.0112***	-0.1868***	-0.0404***	-0.0794***
	(4.81)	(3.83)	(-6.84)	(-6.98)	(-5.12)
Leverage$_{t-1}$	0.0233**	0.0180	-0.0539	-0.0411	0.0118
	(2.01)	(1.25)	(-0.41)	(-1.46)	(0.16)
PP&E/Assets$_{t-1}$	-0.0063	-0.0003	-0.1293	-0.0754*	0.0282
	(-0.36)	(-0.02)	(-0.69)	(-1.83)	(0.24)
Cash/Assets$_{t-1}$	-0.0101	-0.0226	0.0587	-0.0341	0.0289
	(-0.71)	(-1.43)	(0.39)	(-1.10)	(0.34)
Dividend (0,1)$_{t-1}$	-0.0032	0.0068	0.0532	-0.0003	0.0364
	(-0.78)	(1.41)	(1.12)	(-0.03)	(1.40)
ROA$_{t-1}$	-0.0638***	-0.0201*	0.2813***	0.0759***	0.0660
	(-4.32)	(-1.75)	(3.48)	(3.89)	(1.44)
Growth in sales$_{t-1}$	0.0010	0.0019	-0.0278	-0.0029	-0.0294
	(0.55)	(1.28)	(-0.91)	(-0.42)	(-1.29)
Ln(CEO age)$_{t-1}$	0.0029	-0.3918**	-2.4956	-0.3131	-1.0368
	(0.02)	(-2.47)	(-1.55)	(-0.91)	(-1.16)
Ln(1+CEO tenure)$_{t-1}$	0.0072*	0.0080*	0.0741*	0.0141*	0.0381
	(1.92)	(1.96)	(1.83)	(1.69)	(1.61)
CEO duality (0,1)$_{t-1}$	0.0034	0.0051	0.0370	0.0073	0.0048
	(0.72)	(0.99)	(0.81)	(0.74)	(0.17)
Founder CEO (0,1)$_{t-1}$	0.0375***	0.0185	0.0607	0.0279	-0.0158
	(3.02)	(1.07)	(0.34)	(0.77)	(-0.16)
CEO ownership$_{t-1}$ (%)	0.0005**	0.0003	0.0010	-0.0001	0.0007
	(1.96)	(0.97)	(0.32)	(-0.22)	(0.41)
Inst. ownership$_{t-1}$ (%)	-0.0457***	-0.0070	0.1801*	0.0508**	0.0973
	(-4.67)	(-0.61)	(1.69)	(2.28)	(1.56)
Ln(1+CEO Vega)$_{t-1}$	-0.0016	0.0011	-0.0069	-0.0001	0.0125*
	(-1.63)	(0.91)	(-0.54)	(-0.04)	(1.81)
Ln(1+CEO Delta)$_{t-1}$	0.0007	0.0018	0.0258**	0.0071***	0.0118
	(0.61)	(1.26)	(2.09)	(2.77)	(1.57)
County poverty status	-0.0016	-0.0010	-0.0318***	-0.0046*	-0.0097
	(-1.52)	(-0.76)	(-2.57)	(-1.71)	(-1.42)
County employment status	0.0022***	0.0021***	0.0082*	0.0018**	0.0027
	(7.60)	(4.88)	(1.81)	(2.04)	(1.21)
Ln(County earnings per capita)	0.0424***	0.0120	0.0350	0.0374	0.0171
	(3.08)	(0.64)	(0.19)	(1.00)	(0.19)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.8591	0.7483	0.2435	0.2442	0.2288
Observations	8,458	7,795	8,036	8,036	8,037

Table 6. Effects of acquirer CEOs' prenatal Superfund exposure on M&A announcement abnormal returns and the propensity of unrelated acquisitions

Columns (1) and (2) of this table report, respectively, coefficients from OLS regressions of acquirers' *CAR*(-1,1) *Market model* announcement returns and acquirers' *CAR*(-1,1) *FF4 model* announcement returns for fiscal year *t* on the acquirers CEOs' prenatal Superfund exposure measure and control variables (of acquirers, acquirer CEOs, M&A deal characteristics, and counties characteristics) with fixed effects. In columns (3) and (4), we use probit and linear probability models, respectively, to regress unrelated acquisitions (0,1) for fiscal year *t* on the same explanatory variables with fixed effects as columns (1) and (2). Each observation corresponds to each M&A announcement. Variables are defined in the Appendix. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-acquirer and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**CAR(-1,1) Market model**	**CAR(-1,1) FF4 model**	**Unrelated acquisition (0,1) (Probit)**	**Unrelated acquisition (0,1) (Linear probability)**
	(1)	**(2)**	**(3)**	**(4)**
Ln(1+ CEO #Superfund exposure$_t$)	-0.0081***	-0.0063**	0.2816***	0.0751***
(acquirer)	(-2.64)	(-2.06)	(2.76)	(2.86)
All stock (0,1)	-0.0035	-0.0025	0.0033	0.0083
	(-1.07)	(-0.76)	(0.04)	(0.35)
% acquired	-0.0002***	-0.0002***	0.0014	0.0004
	(-3.45)	(-3.70)	(1.09)	(1.13)
Hostile (0,1)	-0.0160	-0.0177	0.7528**	0.2090*
	(-1.21)	(-1.40)	(2.01)	(1.93)
Competing bidders	-0.0039	-0.0030	-0.7188***	-0.1431***
	(-0.50)	(-0.42)	(-3.64)	(-3.43)
Tender offer (0,1)	0.0216***	0.0202***	-0.3027**	-0.0663**
	(5.41)	(5.11)	(-2.47)	(-2.18)
Termination fees (0,1)	-0.0058	-0.0048	0.0612	0.0129
	(-1.53)	(-1.28)	(0.55)	(0.47)
Public status (target) (0,1)	-0.0112***	-0.0110***	-0.2091**	-0.0483*
	(-3.11)	(-3.18)	(-1.98)	(-1.86)
Toehold (0,1)	-0.0026	-0.0019	0.0170	0.0086
	(-0.60)	(-0.45)	(0.14)	(0.28)
Ln(Assets)$_{t-1}$ (acquirer)	-0.0029***	-0.0026***	0.1254***	0.0352***
	(-3.79)	(-3.38)	(5.29)	(5.69)
Ln(B/M)$_{t-1}$(acquirer)	0.0015	0.0020	0.0099	-0.0037
	(0.37)	(0.45)	(0.09)	(-0.15)
Leverage$_{t-1}$(acquirer)	0.0188***	0.0198***	-0.1751	-0.0364
	(2.85)	(2.92)	(-0.83)	(-0.68)
Cash/Assets$_{t-1}$(acquirer)	-0.0097	-0.0087	-0.3500	-0.0509
	(-1.18)	(-1.05)	(-1.44)	(-0.86)
CAR(-131,-31) (acquirer)	-0.013***	-0.0121***	-0.0351	-0.0100
	(-4.73)	(-4.13)	(-0.48)	(-0.55)
Ln(CEO age)$_{t-1}$ (acquirer)	-0.1123	-0.1117	-0.1626	0.2989
	(-1.45)	(-1.34)	(-0.07)	(0.54)
Ln(1+CEO tenure)$_{t-1}$ (acquirer)	-0.0025*	-0.0019	0.0481	0.0052
	(-1.67)	(-1.31)	(1.03)	(0.42)
CEO duality (0,1)$_{t-1}$ (acquirer)	0.0016	0.0009	0.1179*	0.0328*
	(0.72)	(0.39)	(1.69)	(1.80)
Founder CEO (0,1)$_{t-1}$ (acquirer)	-0.0045	-0.0052	0.0269	-0.0058
	(-1.00)	(-1.16)	(0.25)	(-0.21)
County poverty status	0.0003	0.0004	-0.0096	-0.0027
	(0.82)	(1.05)	(-0.89)	(-0.97)
County employment status	-0.0000	0.0001	-0.0099*	-0.0013
	(-0.01)	(0.34)	(-1.81)	(-1.27)
Ln(County earnings per capita)	0.0079*	0.0081**	-0.0317	-0.0069
	(1.96)	(2.03)	(-0.21)	(-0.18)
Acquirer industry, Year, Birth Year, Birth County, and Acquirer HQ State FE	Yes	Yes	Yes	Yes
Clustered by CEO-Acquirer and year	Yes	Yes	Yes	Yes
Adj R^2	0.1670	0.1645	0.3345	0.4258
Observations	6,798	6,798	6,065	6,798

Table 7. Effects of CEO prenatal Superfund exposure on industry-adjusted firm internal efficiency during CEO tenure

This table presents coefficients from OLS regressions of firm internal efficiency measures (*Cash conversion cycle* (*CCC*), *Asset turnover*, *Capital Expenditure efficiency*, *Employee productivity, and Layoff severity*) for fiscal year *t* as the dependent variables and includes interactions of industry- with year-fixed effects (industry × year fixed effect), following Gormley and Matsa (2014). In addition, it controls for the CEO's birth year, county of birth, and firm's headquarters state fixed effects. Variables are defined in the Appendix. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**CCC (Sales)**	**CCC (Revenue)**	**Asset turnover**	**Capex efficiency (REVT/CAPX)**	**Employee productivity (REVT/EMP)**	**Layoff severity**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Ln(1+CEO #Superfund exposure)	-0.4060^{***}	-0.5102^{***}	0.0475^{**}	-0.0444	0.0683^{**}	0.0548
	(-3.17)	(-4.40)	(2.10)	(-1.56)	(2.52)	(0.50)
Ln(Local peers)$_{t-1}$	0.0951	-0.1436^{**}	-0.0736^{***}	-0.0104	0.0418^{***}	-0.1150^{**}
	(1.50)	(-2.37)	(-7.38)	(-0.66)	(3.59)	(-2.21)
Non-compete index	-0.1648	-0.1919	-0.0270	-0.0277	-0.0294	-0.1993
	(-1.03)	(-1.32)	(-1.04)	(-0.76)	(-1.12)	(-1.22)
Ln(Assets)$_{t-1}$	-0.0233	-0.0863^{**}	NA	-0.0196^{**}	0.0892^{***}	0.3065^{***}
	(-0.63)	(-2.42)		(-2.29)	(11.97)	(10.19)
$\sigma_{\text{Stock return},t-1}$	-0.2187	-0.5282	0.1326	0.3981^{**}	0.2860	4.0128^{***}
	(-0.33)	(-0.88)	(1.09)	(2.30)	(1.40)	(6.35)
Ln(B/M)$_{t-1}$	0.3649^{***}	0.3366^{***}	-0.1498^{***}	0.1060^{***}	-0.0256^{**}	0.5685^{***}
	(6.11)	(6.25)	(-14.46)	(7.52)	(-1.99)	(10.75)
TNIC total similarity$_{t-1}$	-0.0518^{***}	-0.0389^{***}	-0.0036^{***}	-0.0023	0.0027^{***}	-0.0040
	(-7.56)	(-4.15)	(-5.71)	(-1.53)	(3.14)	(-0.97)
PP&E/Sales$_{t-1}$	-0.9303^{***}	-0.9012^{***}	NA	-0.4832^{***}	-0.0169	-0.1273
	(-3.48)	(-3.25)		(-3.65)	(-1.10)	(-1.33)
Leverage$_{t-1}$	1.8265^{***}	0.5491^{*}	-0.3371^{***}	0.1955^{*}	0.2808^{***}	1.4948^{***}
	(5.15)	(1.78)	(-8.08)	(1.86)	(3.31)	(5.84)
Intangibles$_{t-1}$	-0.3935^{***}	-0.3773^{***}	NA	0.0580^{***}	0.0936^{***}	-0.0143
	(-9.88)	(-9.45)		(5.00)	(8.67)	(-0.43)
Dividend yield$_{t-1}$	0.0186	0.2580	-0.0147	0.1400	-0.2662	2.6592^{**}
	(0.04)	(0.68)	(-0.15)	(0.76)	(-1.59)	(2.27)
Ln(CEO age)$_{t-1}$	0.8919	3.4013	-0.3110	-0.0233	-0.6933	0.6328
	(0.29)	(1.15)	(-0.57)	(-0.03)	(-0.92)	(0.23)
Ln(1+CEO tenure)$_{t-1}$	-0.0980	-0.0363	0.0294^{***}	-0.0236	0.0174	-0.0708
	(-1.37)	(-0.53)	(2.56)	(-1.51)	(1.32)	(-1.16)
CEO duality (0,1)$_{t-1}$	-0.0561	-0.0592	-0.0646^{***}	0.0175	-0.0443^{**}	0.1014
	(-0.62)	(-0.68)	(-4.23)	(0.87)	(-2.09)	(1.30)
Founder CEO (0,1)$_{t-1}$	-0.4349^{***}	-0.5317^{***}	-0.0081	-0.0551^{*}	0.1158^{***}	-0.4858^{***}
	(-2.83)	(-3.78)	(-0.33)	(-1.78)	(4.63)	(-4.31)
CEO ownership$_{t-1}$ (%)	0.0316^{***}	0.0237^{***}	0.0076^{***}	0.0042^{**}	-0.0070^{***}	0.0174^{***}
	(4.89)	(4.12)	(5.48)	(2.04)	(-4.46)	(2.96)
Inst. ownership$_{t-1}$ (%)	0.7152^{***}	0.4456^{**}	0.0761^{*}	-0.1480^{***}	0.0013	-0.9761^{***}
	(3.08)	(2.04)	(1.92)	(-2.58)	(0.02)	(-4.49)
Ln(1+Delta)$_{t-1}$	0.0147	0.0379	-0.0368^{***}	-0.0319^{***}	-0.0052^{***}	-0.2034^{***}
	(0.41)	(1.13)	(-7.99)	(-3.96)	(4.20)	(-7.02)
County poverty status	0.0553^{***}	0.0196^{*}	0.0034	0.0160^{***}	-0.0052^{**}	0.0177^{*}
	(3.82)	(1.76)	(1.48)	(5.99)	(-2.07)	(1.73)
County employment status	0.0057	-0.0113^{*}	0.0031^{***}	-0.0004	0.0016	-0.0040
	(0.89)	(-1.90)	(4.78)	(-0.37)	(1.22)	(-0.88)
Ln(County earnings per capita)	0.3187^{**}	0.1118	0.0975^{***}	0.1127^{***}	-0.0384	0.0990
	(2.03)	(0.80)	(3.52)	(3.50)	(-1.23)	(0.74)
Industry×Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.7847	0.7129	0.7636	0.7439	0.7324	0.3656
Observations	10,096	8,989	10,850	9,950	10,478	10,470

Table 8. Effects of CEOs' prenatal Superfund exposure on industry-adjusted firm performance

This table presents coefficients from OLS regressions of firm performance (*ROA*, *Tobin's Q*, and *Stock return*) for fiscal year *t* as the dependent variable and includes interactions of industry- with year-fixed effects (industry × year fixed effect), following Gormley and Matsa (2014). In addition, it controls for the CEO's birth year, county of birth, and firm's headquarters state fixed effects. Variables are defined in the Appendix. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**ROA**	**Tobin's Q**	**Stock return**
	(1)	**(2)**	**(3)**
Ln(1+CEO #Superfund exposure$_t$)	-0.0177***	-0.0993***	-0.0528**
	(-3.38)	(-2.90)	(-2.17)
Ln(Local peers)$_{t-1}$	-0.0007	0.0880***	-0.0024
	(-0.27)	(5.25)	(-0.19)
Non-compete index	0.0077**	0.0509*	0.0553**
	(2.13)	(1.90)	(2.29)
Ln(Assets)$_{t-1}$	0.0058***	-0.0625***	-0.0181*
	(3.57)	(-5.85)	(-1.80)
Ln(B/M)$_{t-1}$	-0.0502***	-0.8690***	0.1184***
	(-9.17)	(-28.01)	(5.67)
TNIC total similarity$_{t-1}$	-0.0002**	0.0010	0.0004
	(-1.97)	(0.94)	(0.36)
PP&E/Sales$_{t-1}$	-0.0079	0.0772***	-0.0116
	(-1.32)	(3.25)	(-0.78)
Leverage$_{t-1}$	-0.0964***	-1.3666***	0.1828**
	(-7.47)	(-17.13)	(2.19)
Intangibles$_{t-1}$	-0.0119***	0.0471***	0.0167
	(-3.46)	(2.86)	(1.57)
Dividend yield$_{t-1}$	0.0284	-0.0243	-0.2487
	(0.95)	(-0.12)	(-1.34)
Ln(CEO age)$_{t-1}$	0.2232	0.3929	0.3162
	(0.83)	(0.40)	(0.45)
Ln(1+CEO tenure)$_{t-1}$	0.0045	-0.0058	-0.0100
	(1.07)	(-0.30)	(-0.52)
CEO duality (0,1)$_{t-1}$	-0.0112**	-0.0673***	0.0202
	(-2.51)	(-2.75)	(0.93)
Founder CEO (0,1)$_{t-1}$	-0.0053	0.1375***	0.0528*
	(-0.89)	(3.28)	(1.75)
CEO ownership$_{t-1}$ (%)	0.0006	-0.0044*	0.0008
	(1.38)	(-1.91)	(0.49)
Inst. ownership$_{t-1}$ (%)	0.0693***	-0.0163	-0.2260***
	(3.75)	(-0.24)	(-3.66)
Ln(1+CEO Vega)$_{t-1}$	0.0003	-0.0175**	-0.0038
	(0.17)	(-2.42)	(-0.62)
Ln(1+CEO Delta)$_{t-1}$	0.0028	0.0829***	-0.0118
	(0.92)	(7.00)	(-1.30)
County poverty status	-0.0005	-0.0071**	-0.0011
	(-1.54)	(-2.15)	(-0.33)
County employment status	0.0005	-0.0003	-0.0007
	(1.25)	(-0.17)	(-0.38)
Ln(County earnings per capita)	-0.0017	-0.0381	0.0001
	(-0.39)	(-0.94)	(0.00)
Industry×Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes
Adj R^2	0.3535	0.7283	0.3507
Observations	10,433	10,344	10,421

Table 9. Effects of CEOs' prenatal Superfund exposure on their career outcomes

This table presents coefficients from OLS and probit regressions predicting the natural logarithm of one plus the length of CEO tenure and CEO turnover, respectively. Specifically, we regress the natural logarithm of one plus the length of CEO tenure (model 1), CEO forced turnover, generic turnover, and severance payment if turnover (models 2 to 4) on our CEOs' prenatal Superfund exposure measure and control variables (of lagged firms, lagged industries, lagged CEOs, and counties characteristics) with fixed effects. Variables are defined in the Appendix. Constant terms are not reported. Z-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Ln(1+CEO tenure)**	**Forced CEO turnover (0,1)**	**Generic CEO turnover (0,1)**	**Severance payment if CEO turnover (0,1)**
	(1)	**(2)**	**(3)**	**(4)**
Ln(1+CEO #Superfund exposure$_t$)	-0.0517**	0.2727***	0.0236	-0.0402
	(-2.43)	(3.21)	(0.30)	(-0.36)
Ln(Local peers)$_{t-1}$	-0.0266***	0.0762**	0.0148	0.0305
	(-2.71)	(2.03)	(0.41)	(0.59)
Non-compete index	0.0338	-0.0414	-0.2064**	0.0178
	(1.43)	(-0.42)	(-2.31)	(0.13)
Ind. return percentile$_{t-1}$	-0.0001	0.0007	-0.0004	-0.0003
	(-0.78)	(0.96)	(-0.64)	(-0.31)
Ind. return risk$_{t-1}$	0.1113	0.1564	-0.1711	1.5798
	(0.27)	(0.08)	(-0.10)	(0.71)
Ln(Assets)$_{t-1}$	-0.1080***	0.0708***	0.0240	0.0130
	(-19.39)	(3.40)	(1.12)	(0.44)
Tobin's Q$_{t-1}$	-0.0051***	0.0011	-0.0053	-0.0105**
	(-5.55)	(0.30)	(-1.48)	(-2.11)
CEO age$\geq$ 60 (0,1)$_{t-1}$	2.0523***	-0.1241*	0.3544***	0.1463*
	(3.65)	(-1.75)	(5.80)	(1.73)
Ln(1+CEO tenure)$_{t-1}$		-0.0373	0.2381***	0.2979***
		(-0.86)	(5.69)	(4.95)
Outside CEO (0,1)$_{t-1}$	0.0087	-0.0478	0.0360	-0.0067
	(0.53)	(-0.84)	(0.63)	(-0.09)
Founder CEO (0,1)$_{t-1}$	0.4289***	0.0688	-0.1686**	-0.3436***
	(18.23)	(0.87)	(-1.97)	(-2.81)
CEO duality (0,1)$_{t-1}$	0.2360***	-0.1744***	0.0390	0.0865
	(15.83)	(-2.92)	(0.68)	(1.05)
CEO ownership$_{t-1}$ (%)	0.0054***	0.0118***	-0.0199***	-0.0102
	(4.55)	(3.24)	(-3.49)	(-1.55)
CEO employment contract (0,1)$_{t-1}$	-0.1275***	-0.0457	-0.1245**	3.2167***
	(-9.24)	(-0.85)	(-2.39)	(9.67)
Inst. ownership$_{t-1}$ (%)	-0.0331	-0.1545	-0.0309	-0.2138
	(-0.85)	(-1.01)	(-0.21)	(-1.12)
Ln(1+CEO Vega)$_{t-1}$	0.0217***	0.0139	0.0099	-0.0006
	(5.45)	(0.92)	(0.67)	(-0.03)
Ln(1+CEO Delta)$_{t-1}$	0.0913***	-0.0728***	-0.0520***	-0.0598**
	(16.77)	(-3.86)	(-2.74)	(-2.18)
County poverty status	0.0003	-0.0097	0.0095	0.0224*
	(0.14)	(-1.04)	(1.15)	(1.71)
County employment status	0.0045***	0.0009	-0.0018	-0.0043
	(4.19)	(0.26)	(-0.38)	(-0.52)
Ln(County earnings per capita)	0.1194***	-0.0628	-0.1933*	-0.1023
	(4.18)	(-0.55)	(-1.80)	(-0.75)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.6110	0.3404	0.1545	0.2875
Observations	10,962	7,637	9,929	8,589

Table 10. Effects of CEOs' prenatal Superfund exposures on their incentive compensation contracts

This table reports coefficients from OLS regressions of CEO *delta*, *vega*, and the *proportion of options* (value of option grants as a percentage of total compensation) for fiscal year *t* on our CEOs' prenatal Superfund exposure measure and control variables (of lagged firms, lagged CEOs, and counties characteristics) with fixed effects. Variables are defined in the Appendix. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and by year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Ln(1+CEO Delta)**	**Ln(1+CEO Vega)**	**Proportion of options**
	(1)	**(2)**	**(3)**
Ln(1+CEO #Superfund exposure$_t$)	-0.2337*	-0.3707***	-0.0185
	(-1.95)	(-3.29)	(-1.06)
Ln(Sales)$_t$	0.2882***	0.2953***	-0.0063
	(9.60)	(9.24)	(-1.15)
Leverage$_t$	0.0405	0.0091	-0.0540**
	(0.29)	(0.07)	(-2.07)
Tobin's Q$_t$	0.2189***	-0.0568***	0.0110***
	(12.88)	(-3.48)	(3.38)
Growth in sales$_t$	-0.0080	-0.0017	-0.0018
	(-0.57)	(-0.15)	(-0.73)
CEO Salarycomp$_t$	-1.5922***	-1.0760***	-0.6623***
	(-19.20)	(-14.19)	(-45.10)
Ln(CEO age)$_t$	5.9412***	0.5546	-0.5215**
	(3.50)	(0.34)	(-2.13)
Ln(1+CEO tenure)$_t$	0.5305***	0.2961***	-0.0187***
	(16.21)	(9.66)	(-3.73)
PP&E/Assets$_t$	-0.8411***	-0.4503**	0.0333
	(-4.94)	(-2.51)	(0.99)
Cash/Assets$_t$	-0.1163	0.0252	0.0182
	(-0.76)	(0.17)	(0.63)
Dividend (0,1)$_t$	0.0637	0.0860*	-0.0149*
	(1.44)	(1.86)	(-1.73)
NOL carryforward (0,1)$_t$	0.0003	0.0215	-0.0061
	(0.01)	(0.61)	(-1.01)
ROA$_t$	-0.1547	0.4289***	-0.0565*
	(-1.21)	(3.05)	(-1.77)
Bankruptcy score$_t$	-0.1527***	0.0208	0.0233***
	(-7.15)	(1.18)	(6.06)
Stock return$_t$	-0.0245	-0.0535**	-0.0067
	(-0.76)	(-2.45)	(-1.23)
Stock return$_{t-1}$	0.0694***	-0.0491***	-0.0069**
	(4.40)	(-3.42)	(-2.02)
County poverty status	0.0294***	0.0407***	0.0001
	(3.00)	(4.03)	(0.10)
County employment status	-0.0045	0.0018	0.0000
	(-1.08)	(0.55)	(0.06)
Ln(County earnings per capita)	0.0140	0.2428**	0.0495***
	(0.13)	(2.26)	(2.81)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes
Adj R^2	0.7897	0.8076	0.6610
Observations	14,433	14,022	14,439

Table 11. Regression results from the two-stage least squares estimation

This table replicates the tests in Tables 4 to 9, IA7 by reporting second-stage regression results from the two-stage least squares estimation. The two instruments for Ln(1 + CEO #Superfund exposure) are: (1) the total number of births by the county of the mother's legal residence, scaled by the total number of births by state of the mother's legal residence in the CEO's birth year; and (2) U.S. state governors' party affiliations based on the most recent gubernatorial election prior to the CEO's birth year. The data on U.S. governors are from Kaplan (2021). The state governor's partisan affiliation is coded as 1 for Democratic governors and 0 for Republican governors. Ln(1+CEO #Superfund exposure) is treated as endogenous in the first-stage model. In each case, we control for the same control variables as in the corresponding previous tables. t-values are based on robust standard errors clustered by CEO-firm and by year (two-way) and are reported in parentheses. We use the Anderson–Rubin Wald chi-square statistic, the Stock–Wright LM S statistic, the Kleibergen–Paap rk Wald F statistic, and the Montiel-Olea-Pflueger Effective F statistic to perform weak identification (WID) tests. We use the Hansen (1982) J-statistic to test for overidentifying restrictions (OID). Variables are defined in the Appendix. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Corresponding table	**4**	**4**	**4**	**IA7**	**IA7**	**IA7**
Dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Predicted Ln(1+CEO #Superfund exposure$_t$)	-0.3094*	0.7756***	-0.5142	1.6077	-178.8571	1925.694***
	(-1.86)	(3.64)	(-0.16)	(0.28)	(-1.52)	(3.75)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
WID (Anderson-Rubin Wald Chi-square statistic) [p-value]	7.03**	19.75***	1.71	0.21	28.88***	23.27***
	[0.030)	[0.000]	[0.426]	[0.902]	[0.000]	[0.000]
WID (Stock-Wright LM S statistic) [p-value]	7.02**	19.70***	1.71	0.21	28.88***	23.18***
	[0.030]	[0.000]	[0.426]	[0.902]	[0.000]	[0.000]
WID (Kleibergen-Paap rk Wald F statistic)	4.049	3.690	6.561	2.228	4.874	1.567
OID (Hansen J-statistic)	3.194*	2.620	1.682	0.127	25.019***	0.755
[p-value]	[0.074]	[0.106]	[0.195]	[0.722]	[0.000]	[0.385]
Lead lender FE	No	No	No	No	Yes	No
Adj R^2	0.8450	0.7428	0.6977	0.2012	0.8158	0.6354
Observations	7,991	8,627	8,809	7,550	11,315	6,002

Corresponding table	5	5	5	5	5
Dependent variable	$\sigma_{Stock\ return}$	$\sigma_{Specific\ return}$	Negative skewness	$\sigma_{Down\text{-}to\text{-}up}$	Crash risk
	(7)	(8)	(9)	(10)	(11)
Predicted Ln(1+CEO #Superfund exposure$_t$)	0.3299***	-0.0514	4.8315***	0.7574***	0.4924
	(2.64)	(-0.31)	(3.41)	(2.58)	(0.63)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
WID (Anderson-Rubin Wald Chi-square statistic) [p-value]	8.60**	3.38	12.54***	6.94*	0.68
	[0.014]	[0.184]	[0.002]	[0.031]	[0.714]
WID (Stock-Wright LM S statistic) [p-value]	8.59**	3.38	12.52***	6.93*	0.68
	[0.014]	[0.184]	[0.002]	[0.031]	[0.714]
WID (Kleibergen-Paap rk Wald F statistic)	4.76	4.736	4.905	4.905	4.904
OID (Hansen J-statistic)	1.02	3.28*	0.01	0.00	0.27
[p-value]	[0.313]	[0.070]	[0.940]	[0.989]	[0.601]
Adj R^2	0.8515	0.7537	0.1904	0.2188	0.2318
Observations	8,137	7,487	7,725	7,725	7,726

Corresponding table	6	6	6	8	8	8
Dependent variable	CAR(-1,1) Market model	CAR(-1,1) FF4 model	Unrelated acquisition (0,1)	ROA	Tobin's Q	Stock return
	(12)	(13)	(14)	(15)	(16)	(17)
Predicted Ln(1+CEO #Superfund exposure$_t$)	-0.0517***	-0.0540***	0.4163***	-0.1080***	-1.0326***	-0.3382**
	(-3.19)	(-3.33)	(3.08)	(-3.94)	(-5.58)	(-2.17)
(Acquirer) industry, Year, (or Industry×Year), Birth Year, Birth County, and (Acquirer) HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
WID (Anderson-Rubin Wald Chi-square statistic) [p-value]	11.81***	13.15***	15.04***	17.78***	34.59***	5.29*
	[0.003]	[0.001]	[0.001]	[0.000]	[0.000]	[0.071]
WID (Stock-Wright LM S statistic) [p-value]	11.79***	13.13***	15.01***	17.75***	34.47***	5.28*
	[0.003]	[0.001]	[0.001]	[0.000]	[0.000]	[0.071]
WID (Kleibergen-Paap rk Wald F statistic)	8.79	8.79	8.79	19.28	18.85	19.29
OID (Hansen J-statistic)	1.23	1.49	5.13**	1.60	0.23	0.50
[p-value]	[0.268]	[0.222]	[0.024]	[0.206]	[0.634]	[0.480]
Adj R^2	0.1402	0.1286	0.4157	0.3291	0.7013	0.3438
Observations	6,591	6,591	6,591	10,055	9,970	10,043

Corresponding table	**9**	**9**
Dependent variable	**Ln(1+CEO tenure)**	**Forced CEO turnover (0,1)**
	(18)	**(19)**
Predicted Ln(1+CEO #Superfund exposure$_t$)	0.0616	0.3399***
	(0.55)	(4.62)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes
WID (Anderson-Rubin Wald Chi-square statistic)	0.31	22.79***
[p-value]	[0.858]	[0.000]
WID (Stock-Wright LM S statistic)	0.31	22.74***
[p-value]	[0.858]	[0.000]
WID (Kleibergen-Paap rk Wald F statistic)	22.07*	21.98*
OID (Hansen J-statistic) (p-value)	0.00	0.22
[p-value]	[0.969]	[0.641]
Pseudo R^2/Adj R^2	0.6097	0.4438
Observations	10,554	10,554

Table 12. Robustness test: Difference-in-differences (DID) analysis on CEOs' sudden deaths

This table repeats tests in Tables 4 to 9 and IA5 to IA7 using DID analysis on CEOs' sudden deaths. We contrast the firm-year observations for the three years before and the three years after the CEO demise using *Post CEO demise* (0,1) on the treatment of deceased CEOs' prenatal Superfund exposures (i.e., *Ln*(1+*deceased CEO #Superfund exposure*)). In each column, we include the same fixed effects as in the corresponding previous tables. *t*-values are based on robust standard errors clustered by CEO-firm and by year (two-way) and are reported in parentheses. Variables are defined in the Appendix and Internet Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Corresponding table	**4**	**4**	**4**	**IA5**
Dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Kink**
	(1)	**(2)**	**(3)**	**(4)**
Post CEO demise $(0,1)_t$ × Ln(1+ deceased CEO #Superfund exposure_t)	0.7155**	-1.5846***	2.3378	3.5273***
	(1.96)	(-4.05)	(0.29)	(2.91)
CEO-firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.9421	0.9780	0.8879	0.2753
Observations	206	205	205	225

Corresponding table	**IA6**	**IA6**	**IA6**	**IA6**	**IA7**	**IA7**	**IA7**
Dependent variable	**Credit rating Ordered probit**	**Junk rating (0,1) OLS**	**Bankruptcy score OLS**	**Default probability OLS**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(5)	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Post CEO demise $(0,1)_t$ × Ln(1+ deceased CEO #Superfund exposure_t)	397.5393***	-1.2334***	-1.8951**	-0.0448*	-0.0334*	-448.4504***	-649.7348***
	(11.33)	(-3.71)	(-2.05)	(-1.84)	(-1.68)	(-4.88)	(-17.05)
CEO-firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead lender FE	-	-	-	-	No	Yes	No
Adj R^2/Pseudo R^2	0.8334	0.9201	0.7931	0.7611	0.8821	0.9792	0.8724
Observations	105	105	170	164	164	114	94

Table 12, continued

Corresponding table	5	5	5	5	5
Dependent variable	$\sigma_{\text{Stock return}}$	$\sigma_{\text{Specific return}}$	Negative skewness	$\sigma_{\text{Down-to-up}}$	Crash risk
	(12)	(13)	(14)	(15)	(16)
Post CEO demise $(0,1)_t$ × Ln(1+deceased CEO #Superfund exposure_t)	-0.2394**	-0.3109***	-2.3685*	-0.6099**	-1.6384***
	(-2.05)	(-2.87)	(-1.83)	(-2.51)	(-2.74)
CEO-firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.8074	0.8414	0.6320	0.6200	0.6372
Observations	187	187	184	165	165

Corresponding table	6	6	6	8	8	8
Dependent variable	CAR(-1,1) Market model	CAR(-1,1) FF4 model	Unrelated acquisition (0,1)	Ind. adj. ROA	Ind. adj. Tobin's Q	Ind. adj. Stock return
	(17)	(18)	(19)	(20)	(21)	(22)
Post CEO demise $(0,1)_t$ ×	-0.0677*	-0.0479	-1.2753***	0.3284***	2.3568***	1.7643**
Ln(1+deceased CEO #Superfund exposure_t)	(-1.72)	(-0.95)	(-7.46)	(7.85)	(2.75)	(2.48)
(Acquirer) firm, Year, Birth Year, Birth County, and (Acquirer) HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.4354	0.4304	0.2927	0.8094	0.9185	0.3655
Observations	113	113	44	274	269	274

	9
	Ln(1+CEO tenure)
	(23)
Post CEO demise $(0,1)_t$ ×	-0.6532**
Ln(1+deceased CEO #Superfund exposure_t)	(-2.41)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes
Adj R^2	0.9895
Observations	274

Internet Appendix A

Variable Name	Definition
Pollution exposure variables	
Developmental toxic chemical (0,1)	An indicator variable that equals one if the contaminant is a developmental toxic substance and zero otherwise. Significant prenatal outcomes related to developmental toxicant exposure include poor infant birth outcomes. Among infants who survive to adulthood, outcomes related to developmental toxicant exposure include growth retardation, functional impairment, or damage to neurodevelopment, psychophysical, and cognitive development. Our toxicity classification is based on the human health risk assessment by the U.S. EPA's IRIS database and the developmental toxicity studies in laboratory animals.
Ln(Length of CEO postnatal exposure)	The natural log of the length of likely CEO postnatal exposure to Superfund sites up to adolescence is calculated as the minimum (maximum length of the pollutants accumulation periods for all nearby Superfund sites after the CEO's birth year, 15 (age of entry into senior high school)).
Firm current polluter? (0,1)	An indicator variable that equals one for the firm-year observations when firms are required to self-report their emissions to the Toxics Release Inventory (TRI) program on Form R, or the firm is one of the potentially responsible parties (PRPs) for the Superfund sites.
HQ current pollution exposure (0,1)	An indicator variable that equals one when there are Superfund sites within a three-mile radius circle around the firm's headquarters (HQ) and zero otherwise. Firms' historical HQ information was collected from the Augmented 10-X Header Data from Software Repository for Accounting and Finance at the University of Notre Dame.
Facility current pollution exposure (0,1)	An indicator variable that equals one when there are Superfund sites within a three-mile radius circle around the firm's facilities and zero otherwise.
Post CEO demise (0,1)	An indicator variable that equals one in the three years after a CEO's sudden death, and zero in the three years before the demise of a CEO. CEOs' sudden deaths refer to heart attack, stroke, plane crash, car, boating, or mountain accident, cancer within a year of diagnosis, and other similar unexpected death events.
Deceased CEO #Superfund exposure	The number of sites later designated as Superfund sites in the deceased CEO's birth county during her birth year.
Pseudo-random CEO birthplace bootstrap resampling	To construct an empirical pseudo-random CEO birthplace bootstrap resampling distribution, we replace the sample CEOs' birth county (and county-level control variables) with a pseudo-CEO birth county randomly chosen from all U.S. counties (not limited to the CEOs' birthplaces in our sample). This is done for each firm-CEO in the sample forming a single pseudo sample. This process is repeated 1,000 times, creating an empirical pseudo-random CEO birthplace bootstrap resampling distribution.
Pseudo-nearest CEO birthplace bootstrap resampling	To construct an empirical pseudo-nearest CEO birthplace bootstrap resampling distribution, we replace the sample CEOs' birth county (and county-level control variables) with a pseudo-CEO birth county randomly chosen from the ten nearest counties. This is done for each firm-CEO in the sample, forming a single pseudo sample. This process is repeated 100 times creating an empirical pseudo-nearest CEO birthplace bootstrap resampling distribution.
Air Quality Index	Used in unreported robustness checks only. The annual county-level exposure to air pollution variables is obtained from the EPA Air Quality Index database.
Corporate debt aggressiveness variable	
Kink	The amount of hypothetical interest where the expected marginal tax-shield benefit function becomes downward sloping, expressed as a proportion of actual interest expense (Graham, 2000; Malmendier, Tate, and Yan, 2011).

Corporate credit risk and default risk variables	
Credit rating	Credit ratings provided by Standard & Poor's (S&P), Moody's, Fitch, and Duff and Phelps, which are given a numerical score increasing by 1 for each increase in credit rating, with a 0 corresponding to a rating of D and 24 corresponding to a rating of AAA. Since the S&P Rating database was discontinued after February 2017, we fill the missing data and data after February 2017 using the Mergent Fixed Income Securities Database (FISD).
Junk rating (0,1)	An indicator variable that equals one if the Standard & Poor's domestic long-term issuer credit ratings or converted credit ratings from other agencies are lower than BBB− in a given year and zero otherwise.
Bankruptcy score	Zmijewski's (1984) bankruptcy score, which is -4.3−(4.5×ROA)+(5.7× Leverage)−(0.004×Current Ratio); higher scores indicate higher levels of financial distress.
Default probability	The estimated probability of default is based on KMV-Merton's (1974) model (Bharath and Shumway, 2008).
Corporate cost of borrowing variables	
Interest expense/Debt	Interest expense divided by total debt.
Bank loan all-in-spread	All-in-spread over LIBOR includes all fees, in basis points, for bank loans at the time of loan initiation. Bank loan data are from DealScan.
Bond issue spread	Spread over the U.S. Treasury yields of equivalent maturity, in basis points, for the firm's newly issued bonds' yield-to-maturity. Bond issue data are from the Mergent Fixed Income Securities Database (FISD).
Firm performance variables	
Ind. adj. ROA	The focal firm's ROA adjusted by the median ROA of firms from the same industry (based on Fama-French (1997) 48-industry classification) as the focal company in a given year.
Ind. adj. Tobin's Q	The focal firm's Tobin's Q adjusted by the median Tobin's Q of firms from the same industry (based on Fama-French (1997) 48-industry classification) as the focal company in a given year.
Ind. adj. Stock return	The focal firm's stock returns adjusted by the median stock returns of firms from the same industry (based on Fama-French (1997) 48-industry classification) as the focal company in a given year.
Firm prestige variable	
MAC (0,1)	An indicator variable equals one indicating a top 50 rank in Fortune's "America's Most Admired Companies" (MAC) ranking and zero otherwise.
MAC score	The score (total score is ten) of the top 50 rank in Fortune's "America's Most Admired Companies" ranking. It is computed based on the average of the attribute scores and zero for the rest of the sample firms.
CEO characteristics control variables	
Pilot CEOs	A dummy variable equal to one if CEO has had at least one certificate in the Federal Aviation Administration (FAA) records and zero otherwise.
PreTenure	An indicator variable that takes the value of one for C-suite (COO, CFO etc.) or divisional head data and zero for years following the CEO transition
Firm and industry characteristics control variables	
ECOST	The expected cost of financial distress (ECOST), which is the product of a term related to the likelihood of economic distress (the standard deviation of the first difference in the firm's historical EBIT, divided by the mean level of book assets) and a term related to intangibles (, and the sum of research and development expense and advertising expense divided by sales).

CYCLICAL	The standard deviation of operating earnings divided by mean assets, calculated for each firm, and then averaged in a given Fama-French (1997) 48 industry and year; the means and the standard deviation are estimated on a rolling basis.
Z-score	Modified Altman's (1968) Z-score; (3.3×EBIT +1×Sales +1.4×Retained Earnings + 1.2×Working Capital)/Total Assets.
Computer industry (0,1)	An indicator variable that equals one if the firms are in the computer industry (three-digit SIC code 357) and zero otherwise.
Semiconductor industry (0,1)	An indicator variable that equals one if the firms are in the semiconductor industry (three-digit SIC code 367) and zero otherwise.
Chemicals industry (0,1)	An indicator variable that equals one if the firms are in chemicals and allied products industries, including drugs (three-digit SIC codes 280 to 289) and zero otherwise.
Aircraft industry (0,1)	An indicator variable that equals one if the firms are in aircraft, guided missiles, and space vehicles industry (three-digit SIC codes 372 and 376) and zero otherwise.
Other sensitive industry (0,1)	An indicator variable that equals one if the firms are in other sensitive industries (three-digit SIC codes 340 to 400, excluding 357, 367, 372, and 376) and zero otherwise.
Bank loan and bond issuance contract characteristics variables	
Previous lending relationship (0,1)	An indicator variable that equals one if the same lead bank arranged other loans for the same borrower over the previous three years and zero otherwise (Ivashina, 2009). We use the variable LeadArrangerCredit from DealScan to identify if a lender is also a lead arranger.An indicator variable that equals one if over the previous three years the same lead bank arranged other loans for the same borrower and zero otherwise (Ivashina, 2009). We use the variable LeadArrangerCredit from DealScan to identify if a lender is also a lead arranger.
Ln(Facility amount)	Natural logarithm of the offering amount of the largest facility within the same loan package with the earliest active date. Bank loan data are from DealScan.
Maturity (in months)	Maturity, measured in months, of the largest facility within the same loan package with the earliest active date. Bank loan data are from DealScan.
Number of facilities	The number of facilities within the same bank loan package. Bank loan data are from DealScan.
Collateral (0,1)	An indicator variable that equals one if the bank loan is securitized and zero otherwise. Bank loan data are from DealScan.
Financial covenants (0,1)	An indicator variable that equals one if the bank loan has financial covenants and zero otherwise. Bank loan data are from DealScan.
Prime base rate (0,1)	An indicator variable that equals one if the base rate for the bank loan is prime and zero otherwise. Bank loan data are from DealScan.
Performance pricing (0,1)	An indicator variable that equals one if the bank loan has a performance pricing provision and zero otherwise. Bank loan data are from DealScan.
Ln(Amount)	Natural logarithm of the bond offering amount. Bond issue data are from Mergent FISD.
Covenants (0,1)	An indicator variable that equals one if the bond has covenant protection and zero otherwise. Bond issue data are from Mergent FISD.
Callable (0,1)	An indicator variable that equals one if the bond is callable and zero otherwise. Bond redemption data are from Mergent FISD.

Internet Appendix B

Summary of the previous literature on CEOs' early life experiences, their effects, and outcomes

This table summarizes the existing studies on CEOs' early life experiences, their effects, and outcomes. For every early life experience, we identify three types of effects: Pure treatment effect (T): A pure exogenous effect of early life exposure; Selection effect (S): The effect of the early life experience is potentially driven by selection effects from themselves or their families; Cohort effect (C): The effect of the early life experience affects all people born during the shock periods. *We only consider the economic magnitudes of the treatment on the dependent variables that (1) are explicitly stated in the paper and (2) also discussed in Rau, Wu, and Ieong (2025).

Study	**Early life experience**	**Sample size**	**Effect(s)**			**Economic magnitudes***
			(T)	(S)	(C)	
Rau, Wu, and Ieong (2025)	#Superfund exposure	3,001 CEOs	×			Firms managed by CEOs with prenatal exposure to one Superfund site have a 1.32% lower cash-to-assets ratio, 3.13% increase in leverage, 0.58 level of share repurchases, 0.82 reduction in kink, 18.93% higher in bankruptcy scores, 7.13% higher default probability, 11.65 bps higher in all-in-bank loan spread, 64.43 bps higher in bond issue spread, 5.7% increase in annualized total stock return volatilities, 0.2424 higher levels of negative skewness, 0.0579 higher levels of down-to-up volatility, 0.1216 greater levels of crash risk, 43.67-56.14 bps lower acquirer's cumulative abnormal return during the trading days [–1, +1] around the M&A announcement (day 0), 122.69 bps lower ROA, 0.0688 lower Tobin's Q, 365.98 bps drop in annual buy-and-hold stock returns, 3.52% shorter tenures.
Malmendier, Tate, and Yan (2011)	The Great Depression	498 CEOs	×		×	Firms managed by CEOs who experienced the Great Depression have 0.5053 higher kinks
	Military experience		×	×		Firms managed by CEOs with military experience have 13% more leverage.
	World War II Veteran		×	×		Firms with World War II veteran CEOs have 25% higher leverage.
Schoar and Zuo (2017)	Recession when CEOs started their careers	4,152 CEOs	×		×	CEOs who experienced recessions at the beginning of their careers receive 11-16% lower total compensation, including options exercised. Their firms have 0.4% lower capital expenditures, 0.4% lower R&D expenditures, 1.2% lower SG&A expenses, 0.8% lower leverage, 1.8% lower working capital needs, 1.6% lower sales growth, 4% lower stock return volatility, and 0.2% lower ROA.
Benmelech and Frydman (2015)	Military experience	4,013 CEOs	×	×		Firms managed by CEOs with military experience are associated with reductions of 8.1% in corporate investment, 10.7% in R&D expenditure, 5.4% in book leverage, and 6.2% in market leverage related to their unconditional means.

Bernile, Bhagwat, and Rau (BBR, 2017)	Moderate disaster fatality experience	1,508 CEOs	×	×	Compared to firms with CEOs without disaster experience, firms with Medium Fatality CEOs have 1.2% less cash per dollar of assets, 3.3% higher leverage, 7.1% more likely to have below-investment-grade ratings, 1.6% higher annual interest expenses per dollar of outstanding long-term debt, 18.9 basis points higher bond issue spread, 6.1% more likely to attempt an acquisition, 7.4% less likely to make an all-stock acquisition, 7.9% more likely to announce unrelated acquisitions, and 3.73% higher annualized stock volatility; these firms also earn 0.57% lower abnormal returns during the five trading days around the merger announcements when being acquired.
	Extreme disaster fatality experience		×	×	Compared to firms with CEOs without disaster experience, firms with Extreme Fatality CEOs have 2.2% more cash per dollar of assets, 3.5% lower leverage, 8.8% less likely to have below-investment-grade ratings, 1.5% lower annual interest expenses per dollar of outstanding long-term debt, 20.6 basis points lower bond issue spread, 8.1% less likely to attempt an acquisition, and 3.61% lower annualized stock volatility; these firms also use 15 cents less debt financing to cover financing deficits and earn 1.25% higher abnormal returns during the five trading days around the merger announcements when being acquired.
Chen, Fan, Yang, and Zolotoy (2021)	Natural disasters	429 CEOs	×	×	Firms with CEOs who experienced natural disasters during their early life have a 0.069 increase in one-year ahead probability of stock price crash, 0.105 one-year-ahead negative skewness, and 0.0603 one-year-ahead down-to-up volatility.
Gao, Pi, Wu, and Yuan (2022)	Natural disasters	1,858 CEOs	×	×	Firms with a disaster CEO have 0.0669 higher stock return volatilities and 0.2193 greater operating cash flow volatilities.
Cronqvist and Yu (2017)	Birth of a daughter	416 CEOs	×	×	Having a daughter is associated with a 3.2% increase in SG&A expenses.
Al-Sabah (2023)	Community diversity (D&I scores)	1,963 CEOs	×	×	A standard deviation (Std. Dev.) increases in (instrumented) D&I scores is associated with drops of 0.38 Std. Dev. in book leverage and 0.39 Std. Dev. in capex-to-assets ratio but increases of 0.47 Std. Dev. in R&D-to-assets ratio and 0.45 Std. Dev. in SG&A-to-assets ratio.
Henderson and Hutton (2018)	Early childhood experience - Socioeconomic status	1,258 CEOs	×	×	Firms replacing a CEO from the lowest socioeconomic class with one from the highest show reductions of 15.4% in total volatility, 18.2% in idiosyncratic volatility, 46.2 R&D, 19.1% in capital expenditures, 6.9% in leverage, 29% in Tobin's Q, and 105% change in market-adjusted returns.
	Firstborn		×	×	Firms replacing a firstborn CEO with a later-born CEO reduce total volatility by 0.026 of the sample mean and CapEx by 0.063 of the sample mean.
Chen, Luo, Tang, and Tong (2023)	Pre-career exposure to religion	3,820 CEOs	×	×	Firms with CEOs who attended religious schools have 3% lower risk-taking behaviors (measured by the sum of R&D expenditure, CapEx, and the amount spent on M&As).

Internet Appendix C

A brief overview of the federal Superfund program[1]

Superfund sites, among the most hazardous contaminated locations in the U.S., encompassing manufacturing facilities, nuclear sites, processing plants, landfills, and mining sites, have been actively polluted for decades during the twentieth century. Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the EPA developed a nationwide program to address emergencies, gather and analyze information, identify responsible parties for contaminant releases, and conduct site cleanups. CERCLA also established a trust fund, known as the Superfund, to finance these activities. In 1982, the EPA introduced the Hazardous Ranking System (HRS) to numerically assess each site's potential threat to human health and the environment. Sites with an HRS score of at least 28.5 are eligible for the National Priorities List (NPL). Sites unsuitable for the NPL are given No Further Remedial Action Planned (NFRAP) status, with cleanup managed by states, tribes, and other federal agencies. Superfund sites are classified as proposed NPL, NPL, or deleted NPL according to their listing milestones. Cleaning up Superfund sites is a complex, multi-phase process that takes several years. The first milestone is when a site is labeled "construction complete," indicating that required cleanup tasks are finished.[2] The second milestone, achieved when all public health or environmental threats are addressed, is when the site is deleted from the NPL.

Figure IA.F1 in the Internet Appendix shows that these sites are distributed across all 50 states and the District of Columbia, with a higher concentration in densely populated states such as New Jersey, Pennsylvania, New York, California, Michigan, and Florida.[3] For instance, Silicon Valley, which houses over 2,000 tech companies and the headquarters of over 30 Fortune 1000 corporations, is in California's Santa Clara County. This county has 23 active Superfund sites, more than any other county in the United States.

We collect detailed information about each Superfund site on its corresponding EPA website, including the site name, interactive map of the location, EPA ID, HRS score, site size, background

[1] The history of the Superfund program is available at: https://www.epa.gov/history/epa-history-superfund.

[2] It is important to note that even after completion, all threats are not necessarily neutralized. For instance, once constructed, a groundwater treatment system may need to operate for an extended period to remove all contaminants. Similarly, the source of contamination may have been removed, but the surrounding media could remain toxic, delaying its return to general use.

[3] Figure IA.F1 does not show Superfund sites in the five U.S. territories (Puerto Rico, American Samoa, Commonwealth of Northern Marianas, Virgin Islands, and Guam) and the Federated States of Micronesia.

information, a complete list of contaminants, and archived key documents such as Records of Decision and administrative records.[4]

Table IA1 presents summary statistics for the Superfund sites. Of the 1,803 Superfund sites, 1,463 (81%) were proposed in the 1980s and 1990s, 203 (11%) in the 2000s, and 137 (8%) between 2010 and 2018. The average (mean) HRS score at the time of NPL listing is 43.85, while the median score is 43.70.[5] Due to some large sites such as military bases, nuclear sites, and rivers, the average Superfund site size is substantially larger (6,852 acres) than the median site size (38 acres). The median time from the NPL proposal date to the start of remedial action is about 7.83 years, to the construction completion milestone is 12.36 years, and to the site being deleted from the NPL is 13.69 years. It takes over two decades (median 24.13 years) to reuse and redevelop a site.[6] The three non-mutually exclusive contaminated media at Superfund sites are air, water, and ground.[7] For example, due to gravity or rainfall, liquid contaminants can seep through soil into groundwater.

The fetal origins hypothesis: The effect of in-utero exposure to hazardous waste sites and air pollution on neurodevelopment

The fetal origins hypothesis (Barker, 1990) suggests that the impact of pollution exposure might not be immediately apparent, with lasting consequences that can remain latent for many years. Almond and Currie (2011) argue that the delayed effects of fetal conditions are persistent, manifesting in economic outcomes such as reduced educational attainment and lower wages in adulthood. Margolis et al. (2016) show that prenatal exposure to pollutants leads to long-lasting deficits in self-regulatory capacities, resulting in high-risk behaviors during adolescence. Almond, Edlund, and Palme (2009) and Black et al. (2019) study the effects of prenatal radiation exposure from the 1986 Chernobyl incident in Sweden and nuclear weapon testing in Norway, respectively,

4 For example, the website homepage for the A.L. Taylor (Valley of Drums) site in Brooks, KY on the EPA website is at: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0402072.

5 These sites are proposed by the states as their top-priority site and are limited to one per state. According to CERCLA, sites that do not attain the requisite score of 28.5 or do not apply the HRS can be added to the NPL as proposed by the state as its top-priority site and are limited to one per state. There are 23 sites with missing HRS scores and one site with an HRS score below the requisite 28.5.

6 397 sites have their remedial action started dates marked as “not yet achieved,” which means that the remedial action has not started yet at this particular site. 598 sites have their construction completion status marked as “not yet achieved.” 1,391 sites have their deletion status marked as “not yet achieved.” 932 sites have their ready for reuse and redevelopment status marked as “not yet achieved.”

7 Ground media consist of debris, landfills, landfill gas, leachate, soil, sediment, sludge waste disposed in underground injection wells, surface impoundments, or spills and leaks released to land. Water media consist of groundwater, surface water, fish tissue, liquid waste, or non-aqueous phase liquids.

finding significantly lower adult cognitive abilities and earnings. For example, those exposed to the highest quintile of radioactive fallout experienced a 2% decrease in earnings at age 35 compared to those exposed to the lowest quintile during months 3 and 4 of pregnancy. Persico, Figlio, and Roth (2020) demonstrate that prenatal exposure to Superfund sites is linked to significantly lower elementary school test scores and higher behavioral incidents. Aizer and Currie (2019) find that boys born near high-traffic roads with high lead exposure have higher rates of juvenile detention and incarceration, with a 1-unit increase in blood lead levels increasing the probability of such outcomes by 57%.

Relevant to our study, Superfund sites release endocrine-disrupting chemicals (EDCs), which have been associated with several behavioral and neurological disorders during adolescence, including learning and memory impairments, anxiety, delinquent behaviors, aggressiveness, and ADHD (Shoaff et al., 2019; Long et al., 2019; Samon et al., 2023). Tachachartvanich et al. (2018) show that Trichloroethylene (TCE), an EDC, is present at more than 60% of proposed Superfund sites. Fetal development is a critical period of vulnerability, as the developing brain is highly susceptible to EDCs and other contaminants.[8] Raja, Subhashree, and Kantayya (2022) provide a comprehensive summary showing that in-utero exposure to EDCs is associated with permanent alterations to neurobehavioral functions, leading to behavioral disorders in adulthood. Persico, Figlio, and Roth (2020) document the long-term negative impacts of prenatal exposure to Florida Superfund sites on behavioral outcomes.[9] Studies indicate that prenatal exposure to contaminants from the New Bedford Harbor Superfund site, listed on the NPL in 1983, increases risk-taking behavior and hyperactivity in adolescents (Orenstein et al., 2014; Oppenheimer et al., 2022; Vieira et al., 2021). Ke et al. (2021) review epigenetic studies and show that prenatal exposure to heavy metal developmental toxicants, such as arsenic, lead, cadmium, antimony, and methylmercury, found at most Superfund sites and are ranked among the top contaminants on the ATSDR 2022 Substance Priority List, contributes to the risk of ADHD behavior problems in children.

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[8] See, for example, the Endocrine Society's position statement at https://www.endocrine.org/advocacy/position-statements/endocrine-disrupting-chemicals.

[9] Although genes influence cognitive disabilities such as learning disabilities, intellectual disability, *ADHD*, or autism, there is evidence that the development of cognitive disabilities is strongly influenced by the environment (Escudero-Lourdes, 2016; Bellinger, O'Leary, Rainis, and Gibb, 2016). There is also increasing evidence that the developing brain is highly vulnerable to toxic chemical exposure (Grandjean and Landrigan, 2006; Grandjean and Landrigan, 2014*;* Lanphear, 2015).

Exposure to EDCs can affect fetal brain development through epigenetics or other mechanisms. Herrnstadt et al. (2021) and Nazzari et al. (2023) identify several channels through which pollution increases aggression, impulsivity, and ADHD. First, prenatal exposure to pollutants can alter epigenetic regulation in stress-related genes, such as the serotonin transporter gene in newborns. Second, pollutants can cause neuro-inflammation, affecting dopaminergic pathways. Third, pollution can directly alter brain chemistry by lowering serotonin levels, which is linked to increased aggression and impulsivity (Murphy et al., 2013; Yokota et al., 2016). Perera et al. (2014) and Myhre et al. (2018) show that prenatal exposure to air pollution significantly increases the risk of ADHD behavior problems in children.

Existing literature suggests that ADHD, impulsivity, hyperactivity, and aggression are linked to increased engagement in risky behaviors. Satterfield et al. (2007) conduct a 30-year follow-up survey showing that children with ADHD are at higher risk for adult criminality. Margolis et al. (2016) perform a cohort-based study of children born in New York City and find that prenatal exposure to pollutants leads to long-lasting impairments in self-regulatory capacities, resulting in high-risk behaviors during adolescence. The perceived overestimation of benefits from risk-taking significantly explains the association between ADHD and increased engagement in risky behaviors (Shoham et al., 2016; Shoham et al., 2021).

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Table IA1. Summary statistics for the Superfund program 1981-2018

This Table presents summary statistics on Superfund sites placed on the NPL before December 31, 2018. The duration (in years) of accumulation of the worst hazardous contaminants at the later-designated NPL sites is the period of rendering the later-designated NPL sites.

	Observations
Number of Superfund sites proposed to NPL	1,803
1981–1985	796
1986–1989	418
1990–1994	122
1995–1999	127
2000–2004	124
2005–2009	79
2010–2014	86
2015–2018	51

	Mean	Median	First quartile	Third quartile	Standard deviation	Observations
Duration (in years) of accumulation of the worst hazardous contaminants at the later-designated NPL sites	25.519	19.000	11.000	32.000	22.782	1,786
Hazard Ranking System scores	43.850	43.70	35.108	50.000	9.961	1,780
Size of Superfund site (in acres)	6852.15	38.00	9.50	200.00	81,812.34	1,783
Superfund cleanup durations (years) from NPL proposal date until:						
Remedial action started date	8.583	7.831	5.235	11.088	4.996	1,406
Construction completion date	13.201	12.358	9.211	16.250	6.035	1,205
Deletion from NPL date	15.238	13.693	10.448	19.750	7.487	412
Reuse and redevelopment date	24.002	24.128	20.803	27.925	5.937	871
Contaminated environmental media						
Air medium	4.881%	0.000%	0.000%	0.000%	21.553%	1,803
Ground medium	82.03%	100.000%	100.00%	100.00%	38.404%	1,803
Water medium	87.97%	100.000%	100.00%	100.00%	32.547%	1,803

Table IA2. Comparisons of proportions of Superfund infants, infant mortality rates, and low birthweight rates

Panel A compares the percentage of Superfund CEOs among all CEOs in our sample with the percentage of Superfund infants (newborns in a county with at least one Superfund site during its actively polluting period) among all infants. Panel B and C compare the infant mortality rates and low birthweight rates, respectively, between counties with Superfund sites during the pollutant-accumulation periods and (1) all counties, (2) counties with Superfund sites during periods before or after the pollutant-accumulation periods, or (3) counties without Superfund sites. Newborns weighing less than 2,500 grams are classified as low birthweight newborns. ***, **, and * denote a significant difference at the 1%, 5%, and 10% level, respectively. Tests of differences in means (medians) are two-sample t-tests (Kruskal-Wallis H tests), and one of the two samples is the sample of counties during pollutant-accumulation periods. Data for infant mortality and low birthweight rates are from Bailey et al. (2016) U.S. County-Level Natality and Mortality Data, 1915-2007 (available at https://www.openicpsr.org/openicpsr/project/100229/version/V4/view).

Panel A. Comparison of the percentage of Superfund CEOs and the percentage of Superfund infants

	Percentage of Superfund infants among all infants	Percentage of Superfund CEOs among all CEOs
Annual mean	30.3749%	24.4585% (=734/(734+2,267))

Panel B. Comparison of infant mortality rates

	Infant mortality rate in all counties	Infant mortality rate in counties during pollutant-accumulation periods	Infant mortality rate in counties during other periods	Infant mortality rate in the remaining counties
Annual mean	1.8571%	2.0477%	1.5520%***	1.8248%****
Annual median	1.2658%	2.0270%	1.1881%***	0.5952%****

Panel C. Comparison of low birthweight rates

	Low birthweight rate in all counties	Low birthweight rate in counties during pollutant-accumulation periods	Low birthweight rate in counties during other periods	Low birthweight rate in the remaining counties
Annual mean	7.9607%	9.2372%	7.9821%***	7.5429%***
Annual median	8.4279%	10.4790%	8.3985%***	7.2315%***

Table IA3. Comparisons of sample firms with full Compustat and Execucomp universe

Columns (1) to (3) report summary statistics for our sample firms. Columns (4) to (6) report summary statistics for the Compustat firms. Columns (7) to (9) report similar statistics for the Execucomp firms. Tests of differences in means (medians) are two-sample t-tests (Kruskal-Wallis H-tests). ∗∗∗, ∗∗, and ∗ denote significant differences at the 1%, 5%, and 10% level, respectively.

	All sample CEOs			Compustat universe			Execucomp universe			*t*-stat Sample vs. Compustat	*t*-stat Sample vs. Execucomp
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.		
Size											
Ln(Assets)	19,488	8.1273	1.9171	240,935	5.1418	2.9240	52,659	7.4037	1.8921	199.44***	45.17***
Ln(Sales)	19,453	7.6998	1.7207	222,449	4.7316	2.8293	52,488	6.9762	1.7641	216.37***	49.76***
Performance											
ROA	19,517	0.0415	0.0632	258,354	-0.1354	0.3884	52,970	0.0375	0.0699	210.45***	7.19***
Tobin's Q	18,378	1.7587	0.9384	226,134	2.2736	2.2489	51,778	1.8360	1.0275	-61.42***	-9.36***
Stock return	17,460	0.2290	0.7611	169,216	0.1397	0.8715	47,069	0.1827	0.6595	14.54***	7.11***
Growth opportunities											
PP&E/Assets	19,172	0.2894	0.2455	236,969	0.2662	0.2761	51,721	0.2587	0.2413	12.50***	14.86***
Capex	18,543	0.0554	0.0588	227,049	0.0660	0.9094	50,797	0.0524	0.0605	-5.42***	5.87***
R&D	19,488	0.0239	0.0881	240,935	0.1266	6.1920	52,659	0.0313	0.1191	-8.14***	-9.10***
Debt risk											
Leverage	19,453	0.2120	0.2015	259,370	0.3233	10.4563	52,836	0.2042	0.2152	-5.41***	4.53***
Cash/Assets	19,518	0.1219	0.1526	259,765	0.1907	0.2444	52,994	0.1427	0.1712	-57.67***	-15.78***
Credit rating	13,027	16.1893	3.5057	71,655	14.2963	4.0439	26,915	15.3060	3.4898	55.31***	23.64***
Default probability	15,208	0.1061	0.2364	116,183	0.8458	1.6611	41,477	0.1058	0.2244	-141.25***	0.16
Interest expense/Debt	17,575	0.1978	4.6365	204,864	0.5691	19.6879	45,502	0.4044	14.2940	-6.65***	-2.73***
Equity risk											
Dividend (0,1)	19,482	0.6826	0.4655	241,131	0.4199	0.4936	52,642	0.5845	0.4928	75.41***	24.72***
Ln(1+Share repurchase)	17,790	2.5869	2.7171	238,966	0.6583	1.5598	49,239	2.0398	2.4197	93.53***	23.68***
$\sigma_{\text{Stock return}}$	16,849	0.3902	0.1658	198,603	0.5733	0.4609	48,952	0.4385	0.2401	-111.42***	-28.84***
$\sigma_{\text{Specific return}}$	15,677	0.3046	0.1544	169,765	0.4275	0.3729	45,156	0.3484	0.2330	-80.37***	-26.51***
Other risk											
Acquisition (0,1)	19,573	0.3387	0.4733	310,598	0.1193	0.3241	53,398	0.2828	0.4504	63.94***	14.34***

Table IA4. Effects of CEOs' prenatal Superfund exposures on the likelihood of pilot CEOs

This table presents coefficients from probit regression of the effect of prenatal Superfund exposures on the likelihood of becoming pilot CEOs (a dummy variable equal to one if CEO has had at least one certificate in the Federal Aviation Administration (FAA) records and zero otherwise). Variables are defined in the Appendix and Internet Appendix A. Constant terms are not reported. Z-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Pilot CEO (0,1)**		
	(1)	**(2)**	**(3)**
Ln(1+ CEO #Superfund exposure$_t$)	1.2522***	4.2490***	4.7506***
	(3.04)	(5.09)	(4.76)
Ln(Assets)$_{t-1}$		0.4658***	0.6724***
		(4.43)	(3.97)
Leverage$_{t-1}$		3.1567***	3.2193***
		(3.07)	(2.96)
R&D$_{t-1}$		9.3853***	12.3267***
		(4.24)	(4.46)
Growth in sales$_{t-1}$		-0.1453	-0.4011
		(-0.37)	(-0.85)
ROA$_{t-1}$		1.6352*	2.5507**
		(1.81)	(2.24)
Ln(B/M)$_{t-1}$		1.0993***	1.3403***
		(5.42)	(5.69)
Ln(Firm age)$_{t-1}$		1.4348***	1.5093***
		(5.59)	(5.38)
Ln(1+CEO tenure)$_{t-1}$			0.0481
			(0.16)
CEO duality (0,1)$_{t-1}$			-0.9892***
			(-2.97)
Ln(1+CEO Vega)$_{t-1}$			-0.0401
			(-0.33)
Ln(1+CEO Delta)$_{t-1}$			-0.1227
			(-1.420
Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes
Pseudo R^2	0.4413	0.6830	0.7127
Observations	1,173	774	739

Table IA5. Effects of CEOs' prenatal Superfund exposure on corporate debt aggressiveness

This table reports coefficients from censored Tobit (column 1) and OLS (column 2) regressions of *kink* as a measure of the aggressiveness of debt policy for fiscal year *t* on our CEOs' prenatal Superfund exposure measure and control variables (of lagged firms, lagged CEOs, and counties characteristics) with fixed effects. In the Tobit model, observations are left-censored at 0 and right-censored at 8. Variables are defined in the Appendix and Internet Appendix A. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Kink (Tobit)**	**Kink (OLS)**
	(1)	**(2)**
Ln(1+ CEO #Superfund exposure$_t$)	-0.7161***	-1.1758***
	(-30.78)	(-4.90)
Dividend (0,1)$_t$	0.0738***	-0.0573
	(2.98)	(-0.57)
NOL carryforward (0,1)$_t$	-0.3936***	-0.6161***
	(-21.47)	(-8.76)
ECOST$_t$	-5.2221***	-4.4243
	(-7.76)	(-1.37)
CYCLICAL$_t$	0.0080***	0.0049
	(7.18)	(1.14)
ROA$_t$	17.7599***	6.8840***
	(136.52)	(7.73)
Ln(Sales)$_t$	0.3185***	0.3732***
	(146.55)	(3.95)
Z-score$_t$	2.2349***	0.6204***
	(296.88)	(3.05)
Quick ratio$_t$	0.5214***	0.3329***
	(45.37)	(2.83)
Current ratio$_t$	-0.5843***	-0.3704***
	(-65.89)	(-3.47)
PP&E/Assets$_t$	-0.8684***	-0.8862**
	(-29.47)	(-2.01)
Tobin's Q$_t$	1.0894***	0.2295***
	(96.16)	(5.38)
R&D/Sales$_t$	-4.7964***	0.5934**
	(-16.03)	(2.03)
AD/Sales$_t$	0.3164	-3.8864**
	(1.04)	(-2.08)
Computer industry (0,1)	0.2779***	-0.4894
	(2.80)	(-0.33)
Semiconductor industry (0,1)	14.8542***	3.3349**
	(154.66)	(2.01)
Chemicals industry (0,1)	3.3040***	0.1949
	(85.24)	(0.10)
Aircraft industry (0,1)	2.8714***	0.6179
	(49.92)	(0.36)
Other Sensitive industry (0,1)	3.5062***	1.2026
	(125.15)	(0.72)
Ln(CEO age)$_{t-1}$	-10.4142***	-7.4851**
	(-2258.43)	(-2.53)

Ln(1+CEO tenure)$_{t-1}$	0.4554***	0.2591***
	(56.96)	(3.37)
CEO duality (0,1)$_{t-1}$	-0.3341***	-0.2591***
	(-19.12)	(-2.78)
Founder CEO (0,1)$_{t-1}$	0.1540***	0.3856
	(4.74)	(1.45)
CEO ownership$_{t-1}$ (%)	-0.0145***	-0.0084*
	(-11.38)	(-1.77)
Inst. ownership$_{t-1}$ (%)	1.1209***	0.9066***
	(42.94)	(3.83)
County poverty status	-0.0458***	0.0307
	(-76.21)	(1.49)
County employment status	0.0249***	-0.0192***
	(54.61)	(-2.71)
Ln(County earnings per capita)	-0.4963***	-0.4951*
	(-196.15)	(-1.81)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes
Adj R^2	0.4386	0.7842
Observations	8,740	8,740

Table IA6. Effects of CEOs' prenatal Superfund exposure on corporate credit risk and default risk

This table reports coefficients from ordered probit and OLS regressions of *Credit rating*, *Junk rating*, *Bankruptcy score*, and *Default probability* for fiscal year *t* on our CEOs' prenatal Superfund exposure measure and control variables (of lagged firms, lagged CEOs, and counties characteristics) with fixed effects. Our control variables are similar to those reported in the leverage regression in Table 4. Variables are defined in the Appendix and Internet Appendix A. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Credit rating Ordered probit**	**Junk rating (0,1) OLS**	**Bankruptcy score OLS**	**Default probability OLS**
	(1)	**(2)**	**(3)**	**(4)**
Ln(1+CEO #Superfund exposure$_t$)	-0.9963**	0.0907	0.2731**	0.1029***
	(-2.52)	(1.55)	(1.99)	(3.22)
Assets volatility$_{t-1}$	0.6664*	-0.1078*	0.3172**	-0.2057***
	(1.77)	(-1.83)	(2.09)	(-5.44)
Tobin's Q$_{t-1}$	0.0396	-0.0080	0.0182*	0.0024
	(0.89)	(-1.47)	(1.66)	(0.93)
Ln(Assets)$_{t-1}$	0.8908***	-0.1000***	0.0915***	0.0317***
	(10.41)	(-6.26)	(2.59)	(3.92)
Capex$_{t-1}$	5.3197***	-0.6127***	0.7059**	-0.0667
	(7.24)	(-4.27)	(2.23)	(-0.85)
R&D$_{t-1}$	14.0291***	-1.1331***	-1.2359*	-0.1693
	(5.72)	(-3.26)	(-1.85)	(-1.47)
Dividend (0,1)$_{t-1}$	0.8038***	-0.0808***	-0.0112	-0.0127
	(7.66)	(-3.87)	(-0.24)	(-1.10)
ROA$_{t-1}$	2.6272***	-0.2616**	-0.2735*	-0.2245***
	(2.79)	(-2.23)	(-1.83)	(-3.83)
PP&E/Assets$_{t-1}$	1.1642***	-0.0858	0.0134	0.0441
	(2.90)	(-1.16)	(0.06)	(0.86)
Growth in sales$_{t-1}$	-0.2346**	0.0330*	-0.1671*	-0.0169**
	(-2.08)	(1.95)	(-1.84)	(-2.13)
Ln(CEO age)$_{t-1}$	9.7135**	-2.2709***	-0.3365	-0.6523**
	(2.41)	(-3.44)	(-0.26)	(-2.14)
Ln(1+CEO tenure)$_{t-1}$	0.1396	-0.0100	0.0185	0.0134
	(1.23)	(-0.48)	(0.47)	(1.55)
CEO duality (0,1)$_{t-1}$	-0.0404	-0.0246	0.0983**	0.0109
	(-0.43)	(-1.32)	(2.07)	(1.00)
Founder CEO (0,1)$_{t-1}$	-0.2701	0.0810	-0.4741***	0.0447*
	(-0.97)	(0.97)	(-3.04)	(1.73)
CEO ownership$_{t-1}$ (%)	-0.0108*	0.0006	0.0042	0.0012**
	(-1.70)	(0.67)	(1.44)	(2.07)
Inst. ownership$_{t-1}$ (%)	0.2388	-0.0681	0.1481	-0.1433***
	(0.97)	(-1.60)	(1.25)	(-4.99)
County poverty status	0.0718**	-0.0090**	-0.0112	-0.0007
	(2.49)	(-2.20)	(-0.97)	(-0.27)
County employment	0.0157	0.0002	0.0097**	0.0025***
	(1.51)	(0.12)	(2.53)	(2.97)
Ln(County earnings per capita)	-2.1558***	0.0667	-0.0141	0.0314
	(-4.51)	(1.01)	(-0.09)	(1.02)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes	Yes
Pseudo/Adj R^2	0.5321	0.8471	0.7478	0.5677
Observations	5,630	5,630	8,962	8,174

Table IA7. Effects of CEOs' prenatal Superfund exposure on corporate cost of borrowing

This table reports coefficients from OLS regressions of *Interest expense/Debt*, *Bank loan all-in-spread*, and *Bond issue spread* for fiscal year *t* on our CEOs' prenatal Superfund exposure measure and control variables (of lagged firms, lagged CEOs, loans/bonds, and counties characteristics) with fixed effects. Each observation in columns (2) and (3) corresponds to each loan/bond issue. Variables are defined in the Appendix and Internet Appendix A. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(1)	**(2)**	**(3)**
Ln(1+CEO #Superfund exposure$_t$)	0.3587	16.8135**	92.9586***
	(0.99)	(2.03)	(3.99)
Assets volatility$_{t-1}$	-0.0293		
	(-0.07)		
Tobin's Q$_{t-1}$	0.0054		
	(0.40)		
Ln(Assets)$_{t-1}$	-0.0565	5.3618	34.6749**
	(-0.88)	(1.21)	(2.40)
Capex$_{t-1}$	-2.2620		
	(-1.01)		
R&D$_{t-1}$	3.2572		
	(1.37)		
Dividend (0,1)$_{t-1}$	0.0559		
	(0.78)		
ROA$_{t-1}$	0.3256	-22.6039	-68.1358
	(1.54)	(-1.04)	(-0.96)
PP&E/Assets$_{t-1}$	-1.2891		
	(-1.30)		
Growth in sales$_{t-1}$	-0.0782		
	(-1.37)		
Ln(CEO age)$_{t-1}$	-4.9900		
	(-1.43)		
Ln(1+CEO tenure)$_{t-1}$	0.1295		
	(1.31)		
CEO duality (0,1)$_{t-1}$	-0.1219		
	(-0.90)		
Founder CEO (0,1)$_{t-1}$	-0.2733		
	(-1.03)		
CEO ownership$_{t-1}$ (%)	0.0387		
	(0.99)		
Inst. ownership$_{t-1}$ (%)	-0.4529		
	(-0.77)		
Credit rating$_{t-1}$		-11.2940***	2.0166
		(-12.84)	(0.70)
Previous lending relationship (0,1)$_t$		-6.5777***	
		(-4.71)	
Ln(Sales)$_{t-1}$		-1.3785	-24.1376
		(-0.31)	(-1.57)
Leverage$_{t-1}$		20.7259	19.2789
		(1.52)	(0.45)
Ln(Facility amount)$_t$		-12.5337***	
		(-8.71)	
Maturity (in months)$_t$		0.1243**	0.3210***
		(2.13)	(17.70)

Number of facilities$_t$		7.4039***	
		(5.01)	
Collateral (0,1)$_t$		58.2976***	-138.5135**
		(13.78)	(-2.42)
Financial covenants (0,1)$_t$		-1.9909	
		(-0.64)	
Prime base rate (0,1)$_t$		184.1533***	
		(11.48)	
Performance pricing (0,1)$_t$		-17.8439***	
		(-5.12)	
Ln(Amount)$_t$			-31.4236***
			(-7.26)
Covenants (0,1)$_t$			-8.1138
			(-0.96)
Callable (0,1)$_t$			-55.5740***
			(-3.59)
County poverty status	0.0048	-0.0303	5.3009
	(0.51)	(-0.01)	(1.54)
County employment status	0.0067	0.4013**	0.9394
	(0.65)	(2.19)	(1.01)
Ln(County earnings per capita)	-0.0393	4.1257	78.6634*
	(-0.31)	(0.36)	(1.78)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes
Lead lender FE	No	Yes	No
Adj R^2	0.1295	0.8258	0.7672
Observations	7,833	11,693	6,273

Table IA8. Effects of CEOs' prenatal Superfund exposures on the likelihood of working in Fortune's list of America's Most Admired Companies (MAC)

This table reports coefficients from probit and OLS regressions of the likelihood of working in Fortune's list of America's Most Admired Companies (MAC) for fiscal year *t* on our CEOs' prenatal Superfund exposure measure and control variables (of lagged firms, lagged CEOs, and counties characteristics) with fixed effects. MAC is a dummy variable that equals one indicating a top 50 in Fortune's "America's Most Admired Companies" list and zero otherwise. MAC score is the score (total score is ten) of the top 50 in Fortune's "America's Most Admired Companies" ranking. It is computed based on the average of the attribute scores and zero for the rest of the sample firms. Variables are defined in the Appendix and Internet Appendix A. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Probit MAC (0,1)**	**OLS MAC (0,1)**	**OLS Ln(1+MAC score)**
Ln(1+CEO #Superfund exposure$_t$)	4.6209***	0.0130**	0.0188*
	(4.35)	(2.25)	(1.86)
Stock return$_{t-1}$	-0.3802**	-0.0053***	-0.0105***
	(-1.98)	(-3.13)	(-3.29)
ROA$_{t-1}$	12.4151***	-0.0051	-0.0132
	(4.70)	(-0.56)	(-0.83)
Ln(Sales)$_{t-1}$	1.7333***	0.0115***	0.0221***
	(3.60)	(4.39)	(4.59)
Growth in sales$_{t-1}$	-1.5093***	0.0001	0.0002
	(-2.77)	(0.06)	(0.09)
Ln(Mktcap)$_{t-1}$	1.7940***	0.0254***	0.0494***
	(5.04)	(8.31)	(9.07)
Ln(Assets)$_{t-1}$	0.4229	0.0051	0.0023
	(1.01)	(1.48)	(0.39)
Ln(Firm age)$_{t-1}$	3.1485***	0.0127***	0.0209***
	(5.51)	(5.15)	(4.77)
Tobin's Q$_{t-1}$	0.2690*	0.0033	0.0070
	(1.72)	(1.34)	(1.62)
Ln(CEO age)$_{t-1}$	-5.5421	-0.4345***	-0.8417***
	(-0.45)	(-3.12)	(-3.25)
Founder CEO (0,1)$_{t-1}$	0.0014	0.0354***	0.0604***
	(0.00)	(6.67)	(6.13)
CEO duality (0,1)$_{t-1}$	0.2383	-0.0068*	-0.0149**
	(0.48)	(-1.81)	(-2.16)
County poverty status	0.2023**	0.0000	0.0011
	(2.07)	(0.01)	(0.95)
County employment status	0.0870***	0.0001	0.0000
	(5.68)	(0.46)	(0.10)
Ln(County earnings per capita)	1.2911	0.0070	0.0040
	(0.71)	(1.29)	(0.44)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes
Pseudo R^2/Adj R^2	0.8298	0.4260	0.4355
Observations	3,860	13,903	13,903

Table IA9. Robustness test: Hazard analysis on the effect of Superfund CEOs on other firm consequences

The table reports hazard ratios from Cox proportional hazards (PH) models on the hazard of announced (model 1) and completed takeovers (model 2), as well as the hazard of delisting (model 3). We define "failure" (the occurrence of the examined hazard) as one when the firm receives a takeover announcement, completes a takeover, or is delisted from the stock exchange due to takeovers, liquidations, bankruptcy, or financial reasons during the CEO's tenure and zero otherwise. Duration is the time to the failure event, measured as the number of years from becoming CEO to the event or right-censoring without an event during the sample period. A coefficient or hazard ratio greater (less) than one implies a greater (smaller) risk. *Block* is a dummy variable that equals one if (at least) one institutional investor holds more than 5% of the company's stock and zero otherwise. *Industry peer events* is the natural log of one plus the number of announced (model 1), completed (model 2) takeovers, or of delisting events (model 3) in the firm's industry (based on the Fama-French 48-industry classifications) in the prior year. *Share turnover* is the average daily turnover of the stock. The rest of the variables are defined in Appendix A. All models include year, industry, and firm state headquarter fixed effects. Z-values are reported in parentheses and are based on robust standard errors clustered by industry and year (two-way). *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Takeover announcements**	**Completed takeovers**	**Firm delisted**
	(1)	**(2)**	**(3)**
Ln(1+ CEO #Superfund exposure)	1.6107***	1.7155***	1.6651***
	(3.08)	(4.87)	(4.69)
PP&E/Assets	1.0047	0.6720	0.7202
	(0.01)	(-0.93)	(-0.77)
Tobin's Q	0.9042*	0.9538	0.9596
	(-1.74)	(-1.07)	(-0.96)
Cash/Assets	0.5240	0.5530	0.5287
	(-1.16)	(-1.37)	(-1.48)
Block (0,1)	2.0858***	2.1848***	1.9591***
	(3.43)	(4.83)	(4.33)
Ln(Mktcap)	0.8928**	0.8825***	0.8673***
	(-2.28)	(-3.25)	(-3.72)
Industry peer events	2.3774***	2.0410***	1.9297***
	(7.47)	(7.50)	(7.33)
Leverage	1.2776	1.7330	1.3726
	(0.56)	(1.52)	(0.87)
ROA	0.7969	0.5775	0.5051
	(-0.24)	(-0.89)	(-1.17)
Capex	0.0274**	0.1124*	0.0440**
	(-2.08)	(-1.75)	(-2.43)
Share turnover($\times 10^6$)	1.0000	1.0000	1.0000
	(1.11)	(0.67)	(0.73)
Ln(Firm age)	0.7095***	0.7467***	0.7355***
	(-3.00)	(-3.22)	(-3.46)
Stock return	1.0871	1.1588	1.1549
	(0.58)	(1.59)	(1.58)
Dividend yield	1.7105	0.1991	0.0720
	(0.27)	(-0.53)	(-0.85)
Firm ROA volatility	2.4142	2.3979	2.6504*
	(1.27)	(1.63)	(1.83)
log-likelihood	-1797.4107	-2889.4243	-2936.5655
Observations	2,221	2,227	2,227

Table IA.10. Regression results from the two-stage least squares estimation

This table replicates the tests in Tables 4 to 9, IA7 by reporting first atage regression results from the two-stage least squares estimation. The two instruments for Ln(1 + CEO #Superfund exposure) are: (1) the total number of births by the county of the mother's legal residence, scaled by the total number of births by state of the mother's legal residence in the CEO's birth year; and (2) U.S. state governors' party affiliations based on the most recent gubernatorial election prior to the CEO's birth year. The data on U.S. governors are from Kaplan (2021). The state governor's partisan affiliation is coded as 1 for Democratic governors and 0 for Republican governors. Ln(1+CEO #Superfund exposure) is treated as endogenous in the first-stage model. In each case, we control for the same control variables as in the corresponding previous tables. t-values are based on robust standard errors clustered by CEO-firm and by year (two-way) and are reported in parentheses. We use the Anderson–Rubin Wald chi-square statistic, the Stock–Wright LM S statistic, the Kleibergen–Paap rk Wald F statistic, and the Montiel-Olea-Pflueger Effective F statistic to perform weak identification (WID) tests. We use the Hansen (1982) J-statistic to test for overidentifying restrictions (OID). Variables are defined in Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	1st stage					
Corresponding table	**4**	**4**	**4**	**IA7**	**IA7**	**IA7**
1st stage dependent variable	**Ln(1+CEO #Superfund exposure$_t$)**					
2nd stage dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Ratio of county births	0.1339***	0.1235***	0.1359***	0.0620***	0.0138	0.0743***
	(6.73)	(6.40)	(7.61)	(2.99)	(0.92)	(5.01)
State governors' party affiliation	-0.0043*	-0.0057***	-0.0089***	-0.0070***	-0.0159***	-0.0054**
	(-1.95)	(-2.57)	(-4.13)	(-2.91)	(-6.56)	(-2.04)
Sanderson-Windmeijer multivariate F test	24.36***	23.52***	36.74***	8.55***	22.05***	14.49***
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Montiel-Olea-Pflueger Effective F statistic	24.360	23.522	36.742	8.554	22.053	14.493
Lead lender FE	No	No	No	No	Yes	No
Adj R^2	0.8450	0.7428	0.6977	0.2012	0.8158	0.6354
Observations	7,991	8,627	8,809	7,550	11,315	6,002

	1st stage				
Corresponding table	**5**	**5**	**5**	**5**	**5**
1st stage dependent variable	**Ln(1+CEO #Superfund exposure$_t$)**				
2nd stage dependent variable	**$\sigma_{\text{Stock return}}$**	**$\sigma_{\text{Specific return}}$**	**Negative skewness**	**$\sigma_{\text{Down-to-up}}$**	**Crash risk**
	(7)	**(8)**	**(9)**	**(10)**	**(11)**
Ratio of county births	0.1494***	0.1276***	0.1798***	0.1798***	0.1798***
	(7.96)	(6.62)	(9.86)	(9.86)	(9.86)
State governors' party affiliation	-0.0068***	-0.0076***	-0.0055***	-0.0055***	-0.0055***
	(-3.22)	(-3.50)	(-2.71)	(-2.71)	(-2.71)
Sanderson-Windmeijer multivariate F test	36.91***	28.12***	52.32***	52.32***	52.32***
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Montiel-Olea-Pflueger Effective F statistic	36.913	28.122	52.320	52.320	52.320
Adj R^2	0.8515	0.7537	0.1904	0.2188	0.2318
Observations	8,137	7,487	7,725	7,725	7,726

	1st stage					
Corresponding table	**6**	**6**	**6**	**8**	**8**	**8**
1st stage dependent variable	**Ln(1+CEO #Superfund exposure$_t$)**					
2nd stage dependent variable	**CAR(-1,1) Market model**	**CAR(-1,1) FF4 model**	**Unrelated acquisition (0,1)**	**ROA**	**Tobin's Q**	**Stock return**
	(12)	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**
Ratio of county births	0.6520***	0.6520***	0.6520***	0.6200***	0.6314***	0.6198***
	(13.09)	(13.09)	(13.09)	(15.08)	(15.09)	(15.06)
State governors' party affiliation	-0.0181**	-0.0181**	-0.0181**	-0.0094	-0.0092	-0.0092
	(-2.44)	(-2.44)	(-2.44)	(-1.43)	(-1.39)	(-1.40)
Sanderson-Windmeijer multivariate F test	91.47***	91.47***	91.47***	115.39***	115.44***	115.12***
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Montiel-Olea-Pflueger Effective F statistic	91.468	91.468	91.468	115.391	115.442	115.116
Adj R^2	0.1402	0.1286	0.4157	0.3291	0.7013	0.3438
Observations	6,591	6,591	6,591	10,055	9,970	10,043

	1st stage	
Corresponding table	**9**	**9**
1st stage dependent variable	**Ln(1+CEO #Superfund exposure$_t$)**	
2nd stage dependent variable	**Ln(1+CEO tenure)**	**Forced CEO turnover (0,1)**
	(18)	**(19)**
Ratio of county births	0.6221***	0.6226***
	(16.42)	(16.44)
State governors' party affiliation	-0.0084	-0.0083
	(-1.39)	(-1.37)
Sanderson-Windmeijer multivariate F test	136.05***	136.31***
[p-value]	[0.000]	[0.000]
Montiel-Olea-Pflueger Effective F statistic	136.052	136.313
Pseudo R^2/Adj R^2	0.6097	0.4438
Observations	10,554	10,554

Table IA11. Second-stage regression results from the two-stage least squares estimation

This table repeats tests in Tables 4 to 9, IA7 by reporting first and second-stage regressions results from the two-stage least squares estimation. The instrument for *Ln*(1+*CEO #Superfund exposure*) is the total number of births by county of the mother's legal residence scaled by the total number of births by state of the mother's legal residence in the CEO birth year. Ln(1+CEO #Superfund exposure) is treated as endogenous in the first-stage model. In each case, we control for the same control variables as in the corresponding previous tables. *t*-values are based on robust standard errors clustered by CEO-firm and by year (two-way) and are reported in parentheses. We use the Anderson–Rubin Wald chi-square statistic, the Stock–Wright LM S statistic, the Kleibergen–Paap rk Wald F statistic, and the Montiel-Olea-Pflueger Effective F statistic to perform weak identification (WID) tests. We use the Hansen (1982) J-statistic to test for overidentifying restrictions (OID). Variables are defined in Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A. First stage regression results

	1st stage					
Corresponding table	**4**	**4**	**4**	**IA7**	**IA7**	**IA7**
1st stage dependent variable	**Ln(1+CEO #Superfund exposure$_t$)**					
2nd stage dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Ratio of county births	0.1453***	0.1421***	0.1589***	0.1082***	0.0282*	0.0981***
	(7.04)	(7.03)	(8.42)	(5.03)	(1.87)	(5.78)
Sanderson-Windmeijer multivariate F test	49.53***	49.36***	70.98***	25.33***	3.50*	33.36***
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.0612]	[0.000]
Montiel-Olea-Pflueger Effective F statistic	49.535	49.361	70.978	25.332	3.505	33.361
Lead lender FE	No	No	No	No	Yes	No
Adj R^2	0.8516	0.7173	0.6950	0.1262	0.1176	0.6429
Observations	8,278	8,932	9,113	7,811	11,673	6,273

	1st stage				
Corresponding table	**5**	**5**	**5**	**5**	**5**
1st stage dependent variable	**Ln(1+CEO #Superfund exposure$_t$)**				
2nd stage dependent variable	$\sigma_{\text{Stock return}}$	$\sigma_{\text{Specific return}}$	**Negative skewness**	$\sigma_{\text{Down-to-up}}$	**Crash risk**
	(7)	**(8)**	**(9)**	**(10)**	**(11)**
Ratio of county births	0.1782***	0.1708***	0.2107***	0.2107***	0.2107***
	(9.02)	(8.34)	(10.77)	(10.77)	(10.77)
Sanderson-Windmeijer multivariate F test	81.37***	69.51***	116.00***	116.00***	116.00***
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Montiel-Olea-Pflueger Effective F statistic	81.368	69.508	116.003	116.003	116.003
Adj R^2	0.8555	0.7458	0.1939	0.2185	0.2278
Observations	8,435	7,773	8,013	8,013	8,014

Table IA11. Panel A continued

	1st stage					
Corresponding table	**6**	**6**	**6**	**8**	**8**	**8**
1st stage dependent variable	**Ln(1+CEO #Superfund exposure$_t$)**					
2nd stage dependent variable	**CAR(-1,1) Market model**	**CAR(-1,1) FF4 model**	**Unrelated acquisition (0,1)**	**ROA**	**Tobin's Q**	**Stock return**
	(12)	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**
Ratio of county births	0.6481***	0.6481***	0.6481***	0.6253***	0.6398***	0.6250***
	(13.03)	(13.03)	(13.03)	(15.41)	(15.42)	(15.39)
Sanderson-Windmeijer multivariate F test	169.76***	169.76***	169.76***	237.50***	237.64***	236.99***
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Montiel-Olea-Pflueger Effective F statistic	169.760	169.760	169.760	237.500	237.641	236.991
Adj R^2	0.1296	0.1188	0.3991	0.3254	0.7031	0.3448
Observations	6,780	6,780	6,780	10,406	10,317	10,394

	1st stage	
Corresponding table	**9**	**9**
1st stage dependent variable	**Ln(1+CEO #Superfund exposure$_t$)**	
2nd stage dependent variable	**Ln(1+CEO tenure)**	**Forced CEO turnover (0,1)**
	(18)	**(19)**
Ratio of county births	0.6203***	0.6209***
	(16.52)	(16.54)
Sanderson-Windmeijer multivariate F test	272.90***	273.66***
[p-value]	[0.000]	[0.000]
Montiel-Olea-Pflueger Effective F statistic	272.903	273.663
Pseudo R^2/Adj R^2	0.6092	0.4427
Observations	10,930	10,930

Panel B. Second-stage regression results from the two-stage least squares estimation

Corresponding table	**4**	**4**	**4**	**IA7**	**IA7**	**IA7**
Dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Predicted Ln(1+CEO #Superfund exposure$_t$)	-0.1954	0.8510***	-1.5991	-2.3910	1622.198*	1617.981***
	(-1.29)	(4.19)	(-0.53)	(-0.30)	(1.87)	(3.92)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
WID (Anderson-Rubin Wald Chi-square statistic) [p-value]	1.69	23.91***	0.28	0.09	17.68***	23.66***
	[0.193]	[0.000]	[0.594]	[0.762]	[0.000]	[0.000]
WID (Stock-Wright LM S statistic) [p-value]	1.69	23.84***	0.28	0.09	17.65***	23.57***
	[0.193]	[0.000]	[0.594]	[0.762]	[0.000]	[0.000]
WID (Kleibergen-Paap rk Wald F statistic)	7.77	6.34	9.46	4.66	0.93	2.14
OID (Hansen J-statistic) [p-value]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]
Lead lender FE	No	No	No	No	Yes	No
Adj R^2	0.8516	0.7173	0.6950	0.1262	0.1176	0.6429
Observations	8,278	8,932	9,113	7,811	11,673	6,273

Corresponding table	**5**	**5**	**5**	**5**	**5**
Dependent variable	$\sigma_{\text{Stock return}}$	$\sigma_{\text{Specific return}}$	**Negative skewness**	$\sigma_{\text{Down-to-up}}$	**Crash risk**
	(7)	**(8)**	**(9)**	**(10)**	**(11)**
Predicted Ln(1+CEO #Superfund exposure$_t$)	0.2047*	-0.1239	3.9706***	0.6318**	0.4606
	(1.86)	(-0.87)	(3.21)	(2.46)	(0.68)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
WID (Anderson-Rubin Wald Chi-square statistic) [p-value]	3.57*	0.76	10.99***	6.26**	0.46
	[0.059]	[0.383]	[0.001]	[0.012]	[0.499]
WID (Stock-Wright LM S statistic) [p-value]	3.57*	0.76	10.98***	6.25**	0.46
	[0.059]	[0.383]	[0.001]	[0.012]	[0.499]
WID (Kleibergen-Paap rk Wald F statistic)	9.16	8.51	10.27	10.27	10.26
OID (Hansen J-statistic) [p-value]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]
Adj R^2	0.8555	0.7458	0.1939	0.2185	0.2278
Observations	8,435	7,773	8,013	8,013	8,014

Corresponding table	6	6	6	8	8	8
Dependent variable	CAR(-1,1) Market model	CAR(-1,1) FF4 model	Unrelated acquisition (0,1)	ROA	Tobin's Q	Stock return
	(12)	(13)	(14)	(15)	(16)	(17)
Predicted Ln(1+CEO #Superfund exposure$_t$)	-0.0548***	-0.0576***	0.4868***	-0.1104***	-0.9832***	-0.3014**
	(-3.25)	(-3.42)	(3.44)	(-4.11)	(-5.42)	(-1.98)
(Acquirer) industry, Year, (or Industry×Year), Birth Year, Birth County, and (Acquirer) HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
WID (Anderson-Rubin Wald Chi-square	11.02***	12.32***	12.43***	17.60***	32.10***	3.97**
statistic) [p-value]	[0.001]	(0.000]	[0.000]	[0.000]	[0.000]	[0.046]
WID (Stock-Wright LM S statistic)	11.01***	12.30***	12.41***	17.57***	32.00***	3.96**
[p-value]	[0.001]	[0.001]	[0.000]	[0.000]	[0.000]	[0.047]
WID (Kleibergen-Paap rk Wald F statistic)	15.35	15.35	15.35	40.07***	38.34***	40.11***
OID (Hansen J-statistic) [p-value]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]	0.000 [1.000]
Adj R^2	0.1296	0.1188	0.3991	0.3254	0.7031	0.3448
Observations	6,780	6,780	6,780	10,406	10,317	10,394

Corresponding table	9	9
Dependent variable	Ln(1+CEO tenure)	Forced CEO turnover (0,1)
	(18)	(19)
Predicted Ln(1+CEO #Superfund exposure$_t$)	0.0505	0.3284***
	(0.45)	(4.49)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes
WID (Anderson-Rubin Wald Chi-square statistic)	0.20	21.21***
[p-value]	[0.651]	[0.000]
WID (Stock-Wright LM S statistic)	0.20	21.16***
[p-value]	[0.651]	[0.000]
WID (Kleibergen-Paap rk Wald F statistic)	43.66***	43.47***
OID (Hansen J-statistic) [p-value]	0.000 [1.000]	0.000 [1.000]
Pseudo R^2/Adj R^2	0.6092	0.4427
Observations	10,930	10,930

Table IA12. Robustness test: Difference-in-differences (DID) analysis on pre-CEO analysis

This table presents coefficients from OLS regressions of firm internal efficiency measures (*Cash conversion cycle* (*CCC*), *Asset turnover*, *Capital Expenditure efficiency*, *Employee productivity, and Layoff severity*) for fiscal year *t* as the dependent variables. The sample only includes insider CEOs who are promoted internally from within the firm. We examine firm-level patterns during periods when future CEOs occupied senior executive positions. In each column, we include the same fixed effects as in the corresponding previous tables. Variables are defined in the Appendix and Internet Appendix A. Constant terms are not reported. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A. Base regressions

Corresponding table	**7**	**7**	**7**	**7**	**7**	**7**
Dependent variable	**CCC (Sales)**	**CCC (Revenue)**	**Asset turnover**	**Capex efficiency (REVT/CAPX)**	**Employee productivity (REVT/EMP)**	**Layoff severity**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
PreTenure × Ln(1+CEO #Superfund exposure$_t$)	0.1498*	0.1718**	-0.0212*	0.0516**	0.0137	0.0991
	(1.94)	(2.29)	(-1.93)	(2.07)	(1.24)	(0.83)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year, Industry, CEO Birth Year, CEO Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.9475	0.9062	0.9441	0.8599	0.9475	0.3558
Observations	10,197	8,998	10,939	9,777	10,624	10,549

Panel B. Mechanism: Adding ΔInventory/Assets and ΔCapital Expenditures/Assets

Corresponding table	**7**	**7**	**7**	**7**	**7**	**7**
Dependent variable	**CCC (Sales)**	**CCC (Revenue)**	**Asset turnover**	**Capex efficiency (REVT/CAPX)**	**Employee productivity (REVT/EMP)**	**Layoff severity**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
PreTenure × Ln(1+CEO #Superfund exposure$_t$)	0.1836**	0.1836**	-0.0207	0.0267	0.0032	0.0632
	(2.42)	(2.42)	(-1.46)	(1.12)	(0.29)	(0.48)
ΔInventory/Assets$_t$	-0.0496	-0.0496	0.8193***	-0.2495*	-0.1913***	-19.3597***
	(-0.21)	(-0.21)	(6.57)	(-0.78)	(-2.59)	(-15.08)
ΔCapital Expenditures/Assets	-1.4715***	-1.4715***	0.5493***	-4.7551***	0.1685**	-9.5053***
	(-2.63)	(-2.63)	(5.27)	(-21.28)	(2.18)	(-10.47)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year, Industry, CEO Birth Year, CEO Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.8569	0.8565	0.9319	0.8815	0.9529	0.4524
Observations	8,665	8,664	8,792	8,740	8,683	8,648

Table IA13. Robustness test: Effect of CEOs' prenatal exposures on their overconfidence

This table reports coefficients from probit and OLS regressions on CEO overconfidence measured by *Holder 67*. Following Malmendier and Tate (2005), *Holder 67* is a dummy variable that equals one if CEOs fail to exercise their executive stock options after the stock price exceeds the option exercise price by more than 67% at least twice during the sample period. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. Variables are defined in the Appendix and Internet Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent variable	**Holder 67 (0,1) Probit**	**Holder 67 (0,1) Probit**	**Holder 67 (0,1) OLS**	**Holder 67 (0,1) OLS**
Ln(1+CEO #Superfund exposure$_t$)	-0.1343*	-5.4782***	-0.0319*	0.0190
	(-1.88)	(-2.99)	(-1.77)	(0.41)
Ln(Sales)$_t$	0.0621***	0.7639***	0.0177***	0.0293***
	(3.68)	(4.26)	(3.98)	(2.97)
Leverage$_t$	-0.1005	-0.8082	-0.0073	-0.0040
	(-0.63)	(-1.31)	(-0.18)	(-0.09)
Tobin's Q$_t$	0.0622***	0.0090	0.0188***	0.0157***
	(3.04)	(0.14)	(3.56)	(3.12)
Growth in sales$_t$	-0.0234	-0.0251	-0.0032	-0.0024
	(-0.48)	(-0.65)	(-0.74)	(-0.89)
CEO Salarycomp$_t$	-0.6666***	-1.2817***	-0.1550***	-0.0787***
	(-5.79)	(-4.46)	(-5.88)	(-3.79)
Ln(CEO age)$_t$	4.1479**	8.6800	0.5747	1.9415***
	(2.25)	(0.89)	(1.36)	(4.03)
Ln(1+CEO tenure)$_t$	0.7994***	3.2039***	0.1926***	0.1856***
	(25.33)	(15.56)	(26.62)	(16.25)
PP&E/Assets$_t$	0.2790*	0.8218	0.0737**	0.0253
	(1.93)	(0.96)	(2.00)	(0.41)
Cash/Assets$_t$	-1.0621***	-3.7497***	-0.2431***	-0.1277***
	(-6.33)	(-5.24)	(-5.70)	(-2.66)
Dividend (0,1)$_t$	0.0922*	-0.0837	0.0156	-0.0015
	(1.84)	(-0.33)	(1.21)	(-0.11)
NOL carryforward (0,1)$_t$	0.1245***	-0.9777***	0.0249**	-0.0070
	(2.83)	(-6.09)	(2.21)	(-0.63)
ROA$_t$	-0.4600***	0.8056	-0.1050***	-0.0624**
	(-2.67)	(1.36)	(-2.63)	(-2.26)
Bankruptcy score$_t$	-0.0801***	-0.1146*	-0.0169***	-0.0179***
	(-3.10)	(-1.83)	(-2.78)	(-3.39)
Stock return$_t$	-0.0439	-0.1362**	-0.0110*	-0.0161***
	(-1.45)	(-2.16)	(-1.73)	(-2.86)
Stock return$_{t-1}$	0.0294	-0.0517	0.0059	0.0021
	(1.25)	(-0.96)	(0.97)	(0.45)
County poverty status	0.0160**	0.5246	0.0026	0.0159***
	(2.21)	(1.37)	(1.55)	(4.33)
County employment status	0.0119***	0.0604*	0.0025***	0.0042**
	(3.63)	(1.85)	(3.64)	(2.50)
Ln(County earnings per capita)	0.4924***	3.8360	0.0654***	0.0903**
	(4.95)	(0.77)	(3.51)	(2.23)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	No	Yes	No
Firm, Year, Birth Year, Birth County, and HQ State FE	No	Yes	No	Yes
Clustered by CEO-firm and year	Yes	Yes	Yes	Yes
Pseudo R^2/Adj R^2	0.3172	0.8448	0.4444	0.7706
Observations	8,752	5,204	10,877	11,179

Table IA14. Robustness test: Effect of CEOs' prenatal exposures to developmental toxic chemicals

This table repeats tests in Tables 4 to 9 and IA5 to IA7, focusing on CEOs' prenatal exposure to developmental toxic chemicals. Here, we regress our models on *Developmental toxic chemical* (0,1), which identifies whether the contaminant the CEO was exposed to is a developmental toxic substance. Each observation corresponds to one CASRN chemical released by the Superfund sites. In each case, we control for the same control variables as in the corresponding previous tables and add chemical fixed effects. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. Variables are defined in the Appendix and Internet Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Corresponding table	**4**	**4**	**4**	**IA5**
Dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Kink**
	(1)	**(2)**	**(3)**	**(4)**
Developmental toxic chemical $(0,1)_t$	-0.0028***	-0.0061***	0.0998***	-0.0270
	(-3.26)	(-5.03)	(5.40)	(-0.90)
Chemical, Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes
Adj R^2	0.7753	0.6030	0.5792	0.3372
Observations	299,148	326,240	332,184	310,401

Corresponding table	**IA6**	**IA6**	**IA6**	**IA6**	**IA7**	**IA7**	**IA7**
Dependent variable	**Credit rating Ordered probit**	**Junk rating (0,1) OLS**	**Bankruptcy score OLS**	**Default probability OLS**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(5)	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Developmental toxic chemical $(0,1)_t$	-0.0489***	0.0038	0.0448***	0.0065***	0.1492***	2.2208***	7.6080***
	(-9.82)	(1.46)	(2.65)	(4.37)	(4.75)	(3.60)	(4.74)
Chemical, Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead lender FE	-	-	-	-	No	Yes	No
Adj R^2/Pseudo R^2	0.6093	0.6786	0.4614	0.4615	0.0895	0.8096	0.6932
Observations	218,591	218,591	326,730	293,698	286,064	518,689	216,585

Table IA14, continued

Corresponding table	5	5	5	5	5
Dependent variable	$\sigma_{\text{Stock return}}$	$\sigma_{\text{Specific return}}$	**Negative skewness**	$\sigma_{\text{Down-to-up}}$	**Crash risk**
	(12)	**(13)**	**(14)**	**(15)**	**(16)**
Developmental toxic chemical $(0,1)_t$	0.0046***	0.0055***	0.0628***	0.0098***	0.0222***
	(5.56)	(7.35)	(7.54)	(5.54)	(4.94)
Chemical, Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.7266	0.6374	0.1592	0.1577	0.1324
Observations	303,534	281,334	285,623	285,623	285,677

Corresponding table	6	6	6	8	8	8
Dependent variable	**CAR(-1,1) Market model**	**CAR(-1,1) FF4 model**	**Unrelated acquisition (0,1)**	**ROA**	**Tobin's Q**	**Stock return**
	(17)	**(18)**	**(19)**	**(20)**	**(21)**	**(22)**
Developmental toxic chemical $(0,1)_t$	-0.0004*	-0.0002	0.0708***	-0.0075***	-0.0530***	-0.0182***
	(-1.79)	(-0.81)	(5081)	(-5.77)	(-8.29)	(-5.40)
Chemical, (Acquirer) Industry, Year, (or Industry × Year), Birth Year, Birth County, and (Acquirer) HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.2004	0.1879	0.3647	0.5150	0.7901	0.4870
Observations	323,404	323,404	308,017	392,408	388,115	392,185

Corresponding table	9	9
Dependent variable	**Ln(1+CEO tenure)**	**Forced CEO turnover (0,1)**
	(23)	**(24)**
Developmental toxic chemical $(0,1)_t$	-0.0303***	0.1462***
	(-8.27)	(7.47)
Chemical, Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes
Adj R^2/Pseudo R^2	0.6987	0.5147
Observations	479,435	353,606

Table IA15. Robustness test: Effect of Superfund CEOs' postnatal pollution exposure

This table repeats tests in Tables 4 to 9 and IA5 to IA7, focusing on the non-moving Superfund CEOs' likely postnatal exposure to pollution up to adolescence. Non-moving Superfund CEOs are Superfund CEOs born and went to high school in the same county or college in the same state. In each case, we control for the same control variables as in the corresponding previous tables. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. Variables are defined in the Appendix and Internet Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Corresponding table	**4**	**4**	**4**	**IA5**
Dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Kink**
	(1)	**(2)**	**(3)**	**(4)**
Ln(Length of CEO postnatal exposure)	0.6439	3.9679***	1.9184	0.3394
	(1.11)	(5.07)	(0.13)	(0.00)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes
Adj R^2	0.8874	0.8290	0.7311	0.7819
Observations	2,054	2,231	2,275	2,161

Corresponding table	**IA6**	**IA6**	**IA6**	**IA6**	**IA7**	**IA7**	**IA7**
Dependent variable	**Credit rating Ordered probit**	**Junk rating (0,1) OLS**	**Bankruptcy score OLS**	**Default probability OLS**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(5)	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Ln(Length of CEO postnatal exposure)	-0.2496***	0.1052**	13.2074**	-5.0409***	44.6186	302.6094**	-24105.39***
	(-2.68)	(2.14)	(2.03)	(-3.30)	(1.08)	(2.23)	(-2.91)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead lender FE	-	-	-	-	No	Yes	No
Adj R^2/Pseudo R^2	0.5451	0.6992	0.7423	0.6136	0.2006	0.8374	0.7417
Observations	1,531	1,531	2,137	1,978	1,927	3,359	1,806

Table IA15, continued

Corresponding table	**5**	**5**	**5**	**5**	**5**
Dependent variable	$\sigma_{\text{Stock return}}$	$\sigma_{\text{Specific return}}$	**Negative skewness**	$\sigma_{\text{Down-to-up}}$	**Crash risk**
	(12)	**(13)**	**(14)**	**(15)**	**(16)**
Ln(Length of CEO postnatal exposure)	-1.5987***	-1.1264	48.8684***	10.3128***	-10.4635***
	(-3.25)	(-0.84)	(2.88)	(3.03)	(-2.63)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.8722	0.7691	0.2338	0.2379	0.2360
Observations	2,080	1,928	1,932	1,932	2,001

Corresponding table	**6**	**6**	**6**	**8**	**8**	**8**
Dependent variable	**CAR(-1,1) Market model**	**CAR(-1,1) FF4 model**	**Unrelated acquisition (0,1)**	**ROA**	**Tobin's Q**	**Stock return**
	(17)	**(18)**	**(19)**	**(20)**	**(21)**	**(22)**
Ln(Length of CEO postnatal exposure)	0.0080	0.0041	-0.0568	-0.0062	-0.1047**	0.0465
	(0.81)	(0.40)	(-0.67)	(-0.72)	(-2.50)	(0.98)
(Acquirer) industry, Year, (or Industry × Year), Birth Year, Birth County, and (Acquirer) HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.2653	0.2740	0.5094	0.5725	0.8467	0.5132
Observations	1,691	1,691	1,691	2,677	2,648	2,676

Corresponding table	**9**	**9**
Dependent variable	**Ln(1+CEO tenure)**	**Forced CEO turnover (0,1)**
	(23)	**(24)**
Ln(Length of CEO postnatal exposure)	0.0385	0.8409**
	(0.85)	(1.96)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes
Pseudo R^2/Adj R^2	0.7268	0.6460
Observations	2,815	1,629

Table IA16. Robustness test: CEOs' current exposure to pollutants at the workplace

This table repeats tests in Tables 4 to 9 and IA5 to IA7 with three additional variables to control for firms' different relationships with pollution. *Firm current polluter?* (0,1) identifies whether the firm is a polluter listed on EPA's databases. *HQ current pollution exposure* (0,1) and *Facility current pollution exposure* (0,1) capture whether the firm's headquarters and its facilities are currently exposed to toxic pollutants, respectively. In each column, we include the same control variables and fixed effects as the corresponding previous tables. *t*-values are based on robust standard errors clustered by CEO-firm and by year (two-way) and are reported in parentheses. Variables are defined in the Appendix and Internet Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Corresponding table	**4**	**4**	**4**	**IA5**
Dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Kink**
	(1)	**(2)**	**(3)**	**(4)**
Ln(1+CEO #Superfund exposure$_t$)	-0.0180	0.0437***	-0.7189**	-0.6574***
	(-1.56)	(2.82)	(-2.19)	(-28.22)
Firm current polluter? (0,1)$_t$	-0.0035	0.0124*	-0.3483**	0.0023
	(-0.50)	(1.68)	(-2.35)	(0.12)
HQ current pollution exposure (0,1)$_t$	-0.0017	-0.0171***	0.0753	0.2242***
	(-0.37)	(-3.31)	(0.73)	(12.41)
Facility current pollution exposure (0,1)$_t$	-0.0052	-0.0105	-0.2528*	-0.0220
	(-0.82)	(-1.55)	(-1.77)	(-1.16)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.8553	0.7922	0.6959	0.4387
Observations	8,298	8,955	9,136	8,740

Corresponding table	**IA6**	**IA6**	**IA6**	**IA6**	**IA7**	**IA7**	**IA7**
Dependent variable	**Credit rating Ordered probit**	**Junk rating (0,1) OLS**	**Bankruptcy score OLS**	**Default probability OLS**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(5)	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Ln(1+CEO #Superfund exposure$_t$)	-0.9889**	0.0919	0.2737**	0.1045***	0.2922	16.6494**	91.7241***
	(-2.49)	(1.57)	(1.99)	(3.27)	(0.91)	(2.01)	(3.91)
Firm current polluter? (0,1)$_t$	-0.0549	-0.0063	-0.0307	-0.0264	0.0533	9.6089*	53.0752***
	(-0.29)	(-0.22)	(-0.43)	(-1.53)	(0.57)	(1.12)	(2.84)
HQ current pollution exposure (0,1)$_t$	0.0326	-0.0021	-0.0569	0.0086	-0.4473	9.0600**	-22.2886**
	(0.34)	(-0.11)	(-1.16)	(0.80)	(-1.07)	(2.03)	(-1.96)
Facility current pollution exposure (0,1)$_t$	0.0295	-0.0221	0.0027	0.0120	0.0497	-7.6088	-11.5610
	(0.18)	(-0.90)	(0.04)	(0.75)	(0.62)	(-0.77)	(-0.63)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead lender FE	-	-	-	-	No	Yes	No
Adj R^2/Pseudo R^2	0.5321	0.8471	0.6324	0.5679	0.1305	0.8260	0.7681
Observations	5,630	5,630	8,962	8,174	7,833	11,693	6,273

Table IA16, continued

Corresponding table	5	5	5	5	5
Dependent variable	**$\sigma_{Stock\ return}$**	**$\sigma_{Specific\ return}$**	**Negative skewness**	**$\sigma_{Down\text{-}to\text{-}up}$**	**Crash risk**
	(12)	**(13)**	**(14)**	**(15)**	**(16)**
Ln(1+CEO #Superfund exposure$_t$)	0.0301**	0.0242	0.3622**	0.0844**	0.1856**
	(2.41)	(1.54)	(2.00)	(2.26)	(2.02)
Firm current polluter? (0,1)$_t$	-0.0024	-0.0014	-0.1392	-0.0297	-0.0563
	(-0.35)	(-0.17)	(-1.60)	(-1.58)	(-1.22)
HQ current pollution exposure (0,1)$_t$	0.0042	-0.0015	0.0462	0.0071	0.0033
	(1.03)	(-0.29)	(0.89)	(0.67)	(0.12)
Facility current pollution exposure (0,1)$_t$	0.0112*	0.0133*	0.0650	0.0285	-0.0176
	(1.77)	(1.76)	(0.77)	(1.62)	(-0.38)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.8593	0.7485	0.2440	0.2447	0.2293
Observations	8,458	7,795	8,036	8,036	8,037

Corresponding table	6	6	6	8	8	8
Dependent variable	**CAR(-1,1) Market model**	**CAR(-1,1) FF4 model**	**Unrelated acquisition (0,1)**	**ROA**	**Tobin's Q**	**Stock return**
	(17)	**(18)**	**(19)**	**(20)**	**(21)**	**(22)**
Ln(1+CEO #Superfund exposure$_t$)	-0.0082***	-0.0065**	0.2695***	-0.0172***	-0.0993***	-0.0520**
	(-2.67)	(-2.11)	(2.63)	(-3.29)	(-2.90)	(-2.13)
Firm current polluter? (0,1)$_t$	-0.0006	-0.0008	0.0749	0.0095*	0.0479	0.0405
	(-0.16)	(-0.25)	(0.60)	(1.90)	(1.04)	(1.33)
HQ current pollution exposure (0,1)$_t$	0.0002	0.0010	-0.0975	-0.0027	0.0353	0.0146
	(0.09))	(0.43)	(-1.23)	(-0.69)	(1.21)	(0.66)
Facility current pollution exposure (0,1)$_t$	0.0020	0.0020	0.0934	0.0062	-0.0268	-0.0027
	(0.61)	(0.62)	(0.81)	(1.29)	(-0.59)	(-0.09)
(Acquirer) industry, Year (or Industry×Year), Birth Year, Birth County, and (Acquirer) HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.1670	0.1646	0.3353	0.3547	0.7284	0.3509
Observations	6,799	6,799	6,065	10,433	10,344	10,421

Table IA16, continued

Corresponding table	9	9
Dependent variable	**Ln(1+CEO tenure)**	**Forced CEO turnover (0,1)**
	(23)	**(24)**
Ln(1+CEO #Superfund exposure$_t$)	-0.0526**	0.2619***
	(-2.47)	(3.06)
Firm current polluter? (0,1)$_t$	0.0333	0.0025
	(0.99)	(0.02)
HQ current pollution exposure (0,1)$_t$	0.0478***	0.1264
	(2.68)	(1.61)
Facility current pollution exposure (0,1)$_t$	-0.0692**	-0.4643***
	(-2.11)	(-3.46)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes
Adj R^2/Pseudo R^2	0.6117	0.3473
Observations	10,962	7,637

Table IA17. Robustness test: Superfund CEOs versus Non-Superfund CEOs – Nearest birthplace matching sample

This table repeats tests in Tables 4 to 9 and IA5 to IA7 using the nearest birthplace matching sample. This matching sample comprises CEO-firm-year pairs with Superfund CEOs matched with non-Superfund CEOs. Matched CEO-firm-year pairs satisfy: (1) their CEOs were born in the same year if feasible (or in the same decade, if not), and (2) they are in the same FF48 industry. For those satisfying the above requirements, we choose our control non-Superfund CEO as the one born in the nearest neighboring counties to the Superfund CEO. In each column, we include the same control variables and fixed effects as the corresponding previous tables. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. Variables are defined in Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Corresponding table	**4**	**4**	**4**	**IA5**
Dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Kink**
	(1)	**(2)**	**(3)**	**(4)**
Ln(1+CEO #Superfund exposure$_t$)	-0.8693***	1.5276***	-5.4005*	-4.3419*
	(-6.58)	(5.92)	(-1.66)	(-1.74)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.8935	0.6259	0.5988	0.4625
Observations	3,720	3,016	3,115	3,851

Corresponding table	**IA6**	**IA6**	**IA6**	**IA6**	**IA7**	**IA7**	**IA7**
Dependent variable	**Credit rating Ordered probit**	**Junk rating (0,1) OLS**	**Bankruptcy score OLS**	**Default probability OLS**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(5)	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Ln(1+CEO #Superfund exposure$_t$)	-12.3076***	0.8318*	5.9016***	0.0106**	0.2418*	362.3219***	472.2387*
	(-3.45)	(1.76)	(3.03)	(2.36)	(1.72)	(3.61)	(1.91)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead lender FE	-	-	-	-	No	Yes	No
Adj R^2/Pseudo R^2	0.5635	0.8743	0.6320	0.6107	0.4978	0.8636	0.5047
Observations	2,604	2,604	3,702	3,647	3,455	5,267	2,164

Table IA17, continued

Corresponding table	5	5	5	5	5
Dependent variable	$\sigma_{\text{Stock return}}$	$\sigma_{\text{Specific return}}$	Negative skewness	$\sigma_{\text{Down-to-up}}$	Crash risk
	(12)	(13)	(14)	(15)	(16)
Ln(1+CEO #Superfund exposure_t)	0.1530	0.5284***	4.6745**	0.7517*	2.8189**
	(1.09)	(3.03)	(1.96)	(1.71)	(2.02)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.8893	0.7867	0.3031	0.3006	0.2876
Observations	3,818	3,528	3,648	3,648	3,649

Corresponding table	6	6	6	8	8	8
Dependent variable	CAR(-1,1) Market model	CAR(-1,1) FF4 model	Unrelated acquisition (0,1)	ROA	Tobin's Q	Stock return
	(17)	(18)	(19)	(20)	(21)	(22)
Ln(1+CEO #Superfund exposure_t)	-0.0193***	-0.0181**	0.7678***	-0.0157	-0.0794	-0.0732
	(-2.73)	(-2.48)	(2.58)	(-1.48)	(-1.20)	(-1.60)
(Acquirer) industry, Year, (or Industry × Year), Birth Year, Birth County, and (Acquirer) HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.2574	0.2628	0.3825	0.5770	0.7947	0.4890
Observations	2,789	2,789	2,326	4,795	4,735	4,794

Corresponding table	9	9
Dependent variable	Ln(1+CEO tenure)	Forced CEO turnover (0,1)
	(23)	(24)
Ln(1+CEO #Superfund exposure_t)	-0.1532***	1.3110***
	(-4.77)	(4.87)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes
Adj R^2/Pseudo R^2	0.6932	0.5179
Observations	5,049	2,943

Table IA18. Robustness test: Superfund CEOs versus Non-Superfund CEOs – Nearest firm headquarters matching sample

This table repeats tests in Tables 4 to 9 and IA5 to IA7 using the nearest firm headquarters matching sample. This matching sample comprises CEO-firm-year pairs with Superfund CEOs matched with non-Superfund CEOs. Matched CEO-firm-year pairs satisfy: (1) their CEOs were born in the same year if feasible (or in the same decade, if not), and (2) they are in the same FF48 industry. For those satisfying the above requirements, we choose the control firm managed by a non-Superfund CEO with headquarter located in the nearest neighboring counties to the treated firm managed by a Superfund CEO. In each column, we include the same control variables and fixed effects as the corresponding previous tables. *t*-values are based on robust standard errors clustered by CEO-firm and year (two-way) and are reported in parentheses. Variables are defined in Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Corresponding table	**4**	**4**	**4**	**IA5**
Dependent variable	**Cash/Assets**	**Leverage**	**Ln(1+Share repurchase)**	**Kink**
	(1)	**(2)**	**(3)**	**(4)**
Ln(1+CEO #Superfund exposure$_t$)	-1.0406**	0.7763**	-12.9506***	0.1029***
	(-2.45)	(2.40)	(-2.65)	(2.93)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.6227	0.8444	0.4565	0.4703
Observations	3,134	4,322	4,141	4,296

Corresponding table	**IA6**	**IA6**	**IA6**	**IA6**	**IA7**	**IA7**	**IA7**
Dependent variable	**Credit rating Ordered probit**	**Junk rating (0,1) OLS**	**Bankruptcy score OLS**	**Default probability OLS**	**Interest expense/Debt**	**Bank loan all-in-spread**	**Bond issue spread**
	(5)	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Ln(1+CEO #Superfund exposure$_t$)	-8.3166***	-0.4487	4.7935**	2.7135***	0.1151**	2286.412*	438.67**
	(-5.93)	(-0.35)	(2.16)	(6.39)	(5.49)	(1.89)	(2.12)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead lender FE	-	-	-	-	No	Yes	No
Adj R^2/Pseudo R^2	0.1785	0.8743	0.6281	0.5768	0.5131	0.8712	0.7434
Observations	3,504	2,980	4,179	4,023	2,901	4,313	2,630

Table IA18, continued

Corresponding table	5	5	5	5	5
Dependent variable	$\sigma_{Stock\ return}$	$\sigma_{Specific\ return}$	**Negative skewness**	$\sigma_{Down\text{-}to\text{-}up}$	**Crash risk**
	(12)	**(13)**	**(14)**	**(15)**	**(16)**
Ln(1+CEO #Superfund exposure$_t$)	0.3087	0.3484**	7.4815***	1.0445***	3.1280***
	(1.48)	(2.34)	(4.43)	(2.77)	(2.90)
Firm, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes	Yes	Yes	Yes
Adj R^2	0.8735	0.8941	0.3486	0.3364	0.1376
Observations	4,175	4,175	4,010	4,010	4,011

Corresponding table	6	6	6	8	8	8
Dependent variable	**CAR(-1,1) Market model**	**CAR(-1,1) FF4 model**	**Unrelated acquisition (0,1)**	**ROA**	**Tobin's Q**	**Stock return**
	(17)	**(18)**	**(19)**	**(20)**	**(21)**	**(22)**
Ln(1+CEO #Superfund exposure$_t$)	-0.0109*	-0.0212*	2.5571***	-0.0432***	-0.4442***	-0.1766*
	(-1.81)	(-1.67)	(3.21)	(-3.92)	(-3.02)	(-1.93)
(Acquirer) industry, Year, (or Industry × Year), Birth Year, Birth County, and (Acquirer) HQ State FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R^2/Pseudo R^2	0.3507	0.4357	0.4282	0.5459	0.6052	0.3716
Observations	2,670	2,670	2,080	5,577	5,332	5,435

Corresponding table	9	9
Dependent variable	**Ln(1+CEO tenure)**	**Forced CEO turnover (0,1)**
	(23)	**(24)**
Ln(1+CEO #Superfund exposure$_t$)	-0.0517	3.5235***
	(-1.07)	(4.58)
Industry, Year, Birth Year, Birth County, and HQ State FE	Yes	Yes
Adj R^2/Pseudo R^2	0.8369	0.7170
Observations	5,726	1,976

Table IA19. Placebo test: Random assignment of the CEO's birthplace

This table repeats tests in Tables 4 to 9 and IA5 to IA7 using randomly assigned CEO's birthplaces for two empirical bootstrap resampling distributions. To construct each empirical distribution, we replace the sample CEOs' birth county (and county-level control variables) with a pseudo-CEO birth county. In column (1), for each firm-CEO in the sample, the pseudo-county is randomly chosen from all U.S. counties (not limited to the CEOs' birthplaces in our sample). The main regressions are run on this pseudo-sample. This process is repeated 1,000 times, forming an empirical bootstrap resampling distribution. In column (2), for each firm-CEO in the sample, the pseudo-county is randomly chosen from the ten nearest counties to the CEO birth county, and the main regressions are run on this pseudo-sample. This process is repeated 100 times, forming the second empirical bootstrap resampling distribution. In both columns, we use *Ln*(1+ *Pseudo-random CEO #Superfund exposure*) to capture the effect of randomly assigning the CEO's prenatal Superfund exposures for the bootstrap resampling distributions. In each column, we include the same control variables and fixed effects as the corresponding previous tables. We report the fraction of the total number of bootstrap regressions that report similar significant (p-value ≤0.05) coefficients *Ln*(1+ *Pseudo-random CEO #Superfund exposure*) as our main tables. Variables are defined in the Appendix and Internet Appendix A. Bolded values signify cases when the pseudo-random procedure results in significant (p-value ≤0.05) coefficients similar to our main results more than 5% of the time.

		Fraction of significant bootstrapped coefficients	
Dependent variable	Corresponding table	Pseudo-random CEO #Superfund exposure (Random assignment of CEO birth county to all counties in the US) (1)	Pseudo-nearest CEO #Superfund exposure (Random assignment of CEO birth county to one of closest 10 counties) (2)
Cash/Assets	4	**0.095**	0.030
Leverage	4	**0.087**	0.000
Ln(1+Share repurchase)	4	**0.097**	0.010
Kink	IA5	0.019	0.000
Credit rating	IA6	**0.130**	**0.250**
Junk rating (0,1)	IA6	**0.062**	0.030
Bankruptcy score	IA6	0.032	0.000
Default probability	IA6	0.018	0.000
Interest expense/Debt	IA7	0.002	0.000
Bank loan all-in-spread	IA7	0.047	0.000
Bond issue spread	IA7	**0.098**	0.000
$\sigma_{\text{Stock return}}$	5	**0.078**	0.010
$\sigma_{\text{Specific return}}$	5	0.036	0.010
Negative skewness	5	0.027	0.020
$\sigma_{\text{Down-to-up}}$	5	0.017	0.010
Crash risk	5	0.016	0.040
CAR(-1,1) Market model	6	0.013	0.000
CAR(-1,1) FF4 model	6	0.011	0.000
Unrelated acquisition (0,1)	6	0.004	0.000
ROA	8	0.033	**0.060**
Tobin's Q	8	0.047	0.040
Stock return	8	0.017	0.000
Ln(1+CEO tenure)	9	**0.097**	**0.120**
Forced CEO turnover (0,1)	9	**0.121**	**0.120**

Figure IA.F1. Geographic distribution of Superfund sites listed on the National Priorities List (NPL)

This Figure illustrates the number of Superfund sites in each county in the United States. These Superfund sites include all the sites as of December 31, 2018, that were, have been, or are being listed on the National Priorities List (NPL). This Figure does not show Superfund sites in the five U.S. territories (Puerto Rico, American Samoa, Commonwealth of Northern Marianas, Virgin Islands, and Guam) and the Federated States of Micronesia.

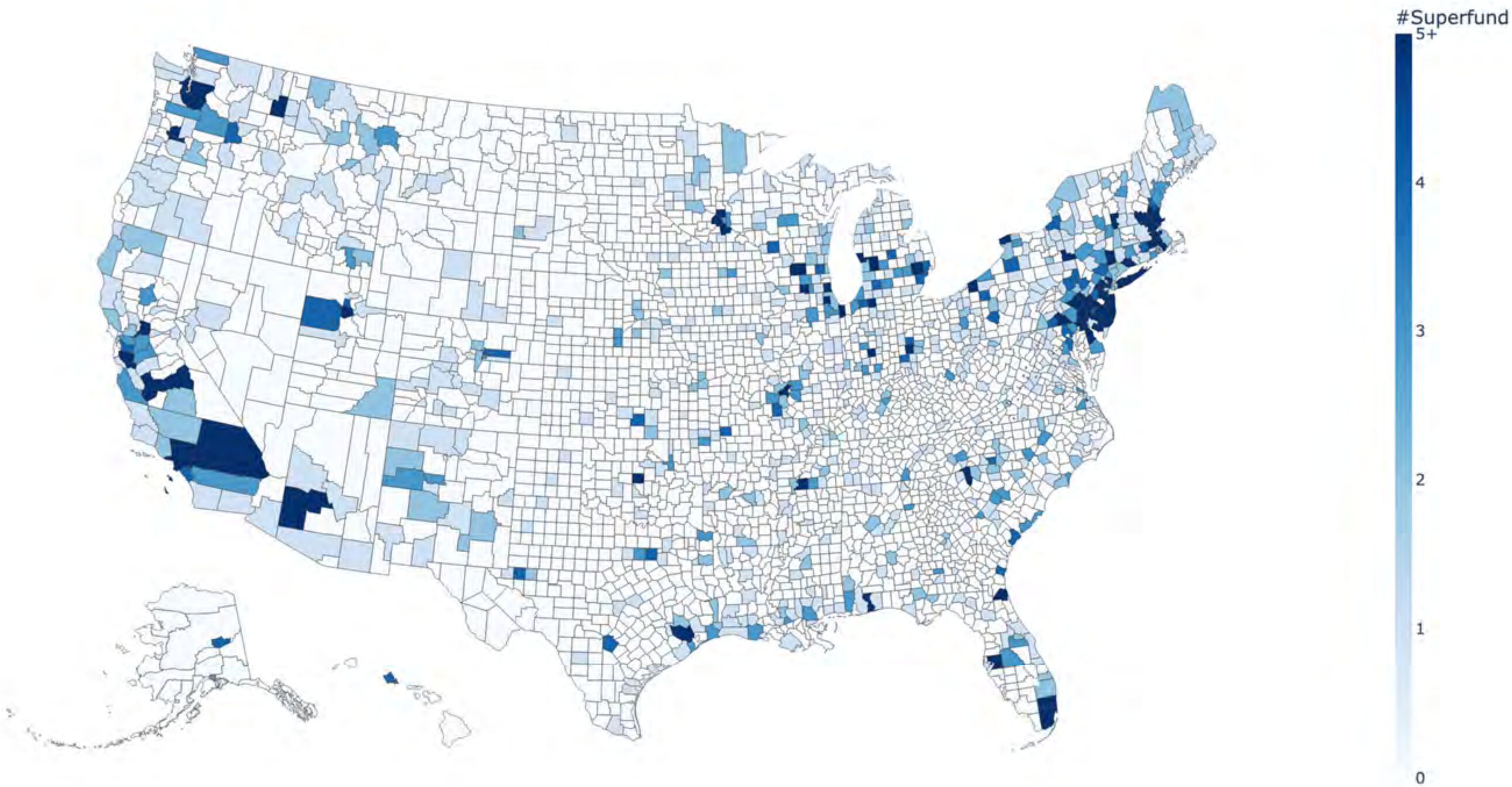

Figure IA.F2 Dynamics of reversible/short feedback internal firm-level policies around CEO promotion

These figures show estimated event-study coefficients (β_k) and 95% confidence intervals from running

$$Y_{it} = \sum_{k\in[-4,4]} \beta_k\left(\text{SuperfundInternal}_i \times \mathbf{1}\{\text{Year} = k\}\right) + X_{it}\delta + \lambda_t + \mu_i + \varepsilon_{it}$$

where k is the year relative to the promotion date (k = –1 omitted). Each panel plots a different internal efficiency matrix.