Location Matters: The Impact of Local Air Quality on CEO Compensation Structure*

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Abstract

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JEL Classification Code: M12, M52, G34, I10

Keyword: CEO Compensation Level, CEO Compensation Structure, Local Air Pollution, Environmental Pollution, Corporate Headquarter Relocation, Acid Rain Program, CEO Power

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Abstract

Are executives compensated differently in polluted environments? We propose a model that predicts CEOs will optimally receive more cash and less incentive pay as the environment deteriorates. We find empirical support for the prediction, using local air-quality as our pollution measure. We mitigate causality and identification concerns by (inter alia) using a quasi-natural experiment: the acid rain project. The impact of pollution increases with managerial bargaining power, as indicated by CEO power, managerial ability, and outside opportunities. Environmental consciousness in the media also increases this effect. These findings are consistent with policy, investor, and corporate goals of mitigating environmental damage.

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1 Introduction

Corporations and consumers have become increasingly conscious of pollution. This includes concerns about the long-term impact of pollution on climate change. It also encompasses health concerns. Indeed, the overwhelming preponderance of research shows that air pollution harms peoples' health over time (Deryugina et al. (2019), Knittel et al. (2016), Isen et al. (2017)). Air pollution may not only damage the physical health of human beings (Pope III and Dockery (2006)), but could also cause a series of psychological issues (WHO (2016)). Thus, for highly qualified workers (such as CEOs), with myriad job options, pollution would be one factor they might consider when deciding where to work. This is especially the case for older workers. Indeed, CEOs are 54 years old on average, and 25% of CEOs are over 60. In the paper, we study whether CEOs are offered a significantly different level and structure of compensation for working in polluted areas and what conditions moderate, or amplify this effect.

We begin by extending a standard principal-agent model to understand the effect of pollution on CEO compensation. We use the Holmstrom and Milgrom (1981) one-period framework, assuming for simplicity that the CEO has exponential utility and is offered a linear contract in end-of-period output. Pollution is modeled as increasing the CEO's marginal disutility of effort. This model delivers several testable implications. In particular, we show that in our setting, the CEO will optimally receive *higher* cash compensation and *lower* incentive pay as local air quality deteriorates. The intuition is that this is akin to increasing the CEO's certainty equivalent wage. These effects on CEO compensation are shown to be stronger for CEOs that have higher ability or greater bargaining power.

In our empirical analysis, we test whether CEOs that work in more polluted areas receive relative greater cash compensation and lower incentive pay. For our measure of pollution, we use US county-level air pollution data, focusing on the Air Quality Index (AQI) provided by the EPA. This measure has been relatively commonly used in prior research in medicine (Wen et al. (2009); Neidell (2004)), economics (Deschenes et al. (2017); Chay and Greenstone (2005)) and finance (Heyes et al. (2016)). The AQI is built based on main pollutants harmful to human health, including sulfur oxides, nitrogen oxides, carbon monoxide, ozone, and particulate pollutants (PM2.5, PM10, and PM20). We analyze CEO compensation between 1993 and 2018, using the set of firms in the Execucomp universe. When analyzing the relationship between air quality and compensation, we also control for other county-level factors that could be correlated with pollution (i.e., population density, income, GDP level, education). We also control for myriad CEO and firm-level factors. This is in addition to various combinations of fixed effects. We further assuage identification concerns and establish causality through a difference-in-difference test and by analyzing the impact of moderating factors on the relationship between CEO pay and pollution.

We identify an economically and statistically significant relationship between pollution and CEO compensation. We find that polluted counties are associated with significantly higher levels of both total and cash compensation, along with significantly lower incentive pay. When the air pollution level of the county increases by one standard deviation, CEOs' cash (total) compensation increases 4.8% (0.55%) on average. By contrast, there is a 7.9% to 9.3% decrease in incentive compensation.This is supportive of our model's predictions.

This effect holds whether or not we include CEOs of firms that themselves are in polluting industries in the sample. This helps to assuage the identification concern that the results merely reflect corporate performance. Some industries produce air pollution during daily operations, so for these industries, local air pollution may provide novel information on firms' sales and even profits not reflected by firms' financial attributes. Thus, the positive relationship between local air pollution and CEO compensation in such industries may reflect CEOs' operating performance instead of negative health impacts. We mitigate this effect in two key ways. First, we find that the results hold if we exclude firms that *directly* pollute the environment (i.e., coal mining, crude petroleum, petroleum refinement, and electricity service). Second, we find that the results hold if we exclude firms that *indirectly* pollute the environment through their connections to other direct polluters or through other means. These industries are covered in the Toxic Release Inventory (TRI) program launched by EPA.

We additionally use a difference-in-difference test to establish causality. We do this by using a quasi-natural experiment: the Acid Rain Program (ARP) regulations. This represents an exogenous regulatory shock that reduces pollution levels. In phase II of the ARP, most fossil electricity power plants are required to decrease their sulfur oxides and nitrogen oxides by 2000. The regulation has more impact on the counties with, or near to, large fossil power plants. Thus, some counties are treated, whereas others are not. We find that after the ARP, the compensation premium in treated counties decreases (relative to untreated counties). This further helps to establish a causal relationship between pollution and the need for a compensation premium.

We undertake several additional tests, including robustness tests. We examine the effect of firms' headquarters relocation on CEO compensation and find results that are consistent with our predictions. The results are also similar if we look at COOs or CFOs, instead of CEOs. This suggests that non-CEO executives also receive more cash compensation and lower incentive pay when working in polluted environments, supporting our main results. We also find that the results are robust to relaxing how we define what constitutes a polluted day and, thus, a polluted county. We obtain similar results when we measure pollution based on neighboring counties, given that pollution is mobile and pollution in a neighboring county would plausibly influence the focal company.

As predicted by our model, we find that several factors moderate or amplify the impact of pollution on CEO compensation. Powerful CEOs amplify the impact of pollution on compensation. Prior literature shows that powerful CEOs can often influence corporate policies more than do other CEOs, which can extend to rent extraction (Adams et al. (2005), Morse et al. (2011), Song and Wan (2019)). Consistent with this, we find that powerful CEOs receive a greater increase in cash compensation and greater reduction in incentive pay due to pollution than do other CEOs. Effects are similar for CEOs with a higher "managerial ability" (see Rajgopal et al. (2006), Song and Wan (2019), Gabaix and Landier (2008))). Similarly, we find that CEOs' outside opportunities in polluted environments raises their cash compensation and lowers incentive pay in comparison to other CEOs. We capture this by using the inevitable disclosure doctrine (IDD) as a quasi-exogenous shock to CEOs' outside opportunities, especially for science-based industries. The IDD significantly reduced CEOs' abilities to transfer to competitors and was premised on the idea that there might be an inevitable disclosure of trade secrets at the new firm. Our results indicate that managerial outside opportunities significantly increase (decrease) the impact of pollution on cash (incentive) compensation.

We further explore the impact of environmental awareness on compensation for pollution. We hypothesize that a greater level of environmental awareness will amplify such an effect. We capture this using both media and governmental level variables. We find that the greater the amount of media coverage, the greater the positive (negative) relationship between CEO cash compensation (incentive pay) and pollution. Similarly, periods during which government passes more environmental regulations are associated with a more positive (negative) relationship between cash (incentive) compensation and pollution.

We undertake a battery of robustness tests to alleviate econometric concerns. These are in addition to the aforementioned quasi-exogenous natural experiments (the Acid Rain Project and the Inevitable Disclosure Doctrine). We find similar results when we use alternative pollution measures. This includes changing the threshold for what constitutes "pollution", using the pollution ratios in nearby counties and capturing the number of nearby fossil fuel power plants. We also ensure the results are robust to looking at non-CEO executives and using alternative model specifications.

The results make a significant contribution to the literature and to policy and practice. We highlight that CEOs receive greater cash compensation and lower incentive pay when working in polluted environments and that this is robust to causality-related concerns and is moderated or amplified in an expected way. Climate change has become an increasingly important political issue. It has also factored into the growth of ESG funds, especially focusing on how sustainability might influence performance (see, e.g., Amel-Zadeh and Serafeim (2018)). However, there is relatively little evidence on how pollution impacts firms' employees and firms' relationships with those employees. This is important regardless of whether the firm pollutes. For polluting firms, it might signal the importance of either reducing pollution or ensuring that employees are not exposed to it. For non-polluters, it could influence whether such firms might want to pressure for greater environmental benefits in their location. Or, it could impact whether it is beneficial to shift headquarters location. Given that funds primarily focus on how sustainability influences performance (see, e.g., Amel-Zadeh and Serafeim (2018)), it would also be important for funds when incorporating ESG metrics into their portfolios.

The results also contribute to the literature on corporate location. Prior literature indicates that corporate location can influence myriad corporate policy decisions (Carosi (2016), Kuvvet and Palkar (2020)) to social activity (Di Giuli and Kostovetsky (2014), Kim et al. (2019)). For example, geographic distance from analysts and financial centers can arguably give rise to greater problems of information asymmetry, which can worsen liquidity (Loughran and Schultz (2005), Loughran (2008)). There can also be geographic clustering in corporate activities, such as takeovers (Almazan et al. (2010)). We contribute to this literature by focusing on geographic and environmental characteristics. We highlight that pollution can itself influence corporate policy decisions and costs, especially focusing on executive employment costs. In so doing, we demonstrate the additional need to consider environmental factors and sustainability considerations when analyzing corporate geography.

The results are also important for regulators. Regulators often acknowledge the importance of improving air quality and the environment. However, governments must also consider the economic impact of such regulations. We highlight that pollution can impose costs on firms. Over the long run, these costs could deter firms from moving to polluted locations, could encourage such firms to leave locations, or could reduce their desire to expand their footprint in such locations. This is a logical corollary of the firms' need to pay CEOs (and non-CEO executives) higher salaries for working in polluted environments. Thus, we highlight an economic incentive to encourage cleaner environments.

The remainder of the paper proceeds as follows. Section II develops the hypotheses and presents a theoretical model for how pollution might impact compensation. Section III discusses the sample selection procedure and data. Section IV presents the empirical results, and Section V concludes.

2 Model and Testable Hypotheses

In this section, we develop testable hypotheses about how pollution might impact the structure of executive compensation. Our approach is premised on the notion that corporate boards offer optimal compensation contracts to risk-averse executives. Because pollution tends to lower executives' quality of life, we contend that it can be optimal for boards to raise the level of executive compensation and reduce their incentive pay in more polluted environments.

Prior literature suggests that pollution adversely affects productivity. For instance, it is widely accepted that air pollution harms health. Knittel et al. (2016) find that ambient pollution levels, specifically particulate matter, have a large impact on weekly infant mortality rates. Deryugina et al. (2019) adopts a novel machine learning method and argues that air pollution leads to a higher mortality rate, more hospitalizations, and higher inpatient spending. Due, in part to these health effects, pollution is then negatively related to labor force participation (Isen et al., 2017). Unsurprisingly, pollution thus manifests in reduced property values (Chay and Greenstone, 2005). Using a quasi-experimental setting Deschenes et al. (2017) document that improvements in air quality lower pharmaceutical purchases and mortality.

Studies suggest that pollution impacts productivity and behavior in highly skilled fields. The World Health Organization argues that air pollution can affect individuals' mood, cognition and mental function (WHO, 2016). In principle, such biophysical and psychological impacts could change investors' behavior and thus affect stock returns and volatility. Supportive of this, Heyes et al. (2016) finds that local air pollution around New York city is negatively related to S&P 500 stocks returns while air pollution in other big cities in US have no relation to stock returns. Levy and Yagil (2011) use the four stock exchange data in US and finds similar results. They argue that it is the air pollution where the investor is located – not where the exchange is located – that matters. Such an air pollution impact is not unique to the US. Huang et al. (2020) use private trading account data in China, and find that local air pollution is negatively related to trading performance. Similarly, Li et al. (2019) find that air pollution significantly increases investors' disposition effects by analyzing the trading information from a large Chinese mutual fund family.

With this literature in mind, we develop below a model for how pollution might impact compensation structure. We discuss the impact of pollution on compensation contracts and some factors that might amplify or moderate the impact of that pollution.

2.1 Basic setting

We follow a standard Holmstrom and Milgrom(1981) one-period framework. The CEO has exponential utility, or $u(x) = -exp\{-\rho x\}$, where ρ is the coefficient of the absolute risk aversion. We assume that the CEO is offered a linear contract of the form $W = \alpha + \beta V$, where V is the end-of-period output. The output is determined by the CEO's effort as described below and an additive random error. It is assumed that the CEO's company located in a county with some degree of air pollution. The disutility to the CEO from effort is $f(e)$, where $f(.)$ is an increasing function and e is the CEO's effort.

In this principal-agent setting, the corporate board (on behalf of shareholders) acts as the principal and selects the compensation contract terms $\{\alpha, \beta\}$, offered to the CEO. The board is taken to be risk-neutral and to maximize the net expected output that the shareholders receive, after accounting for the CEO's compensation W. As is standard in principal-agent analysis, the maximization is subject to the the agent's (or CEO's) participation and incentive constraints. The board's constrained optimization problem can be expressed as:

$$\max_{\alpha,\beta} E[V(e^*) - W] \tag{1}$$

$$s.t.\ E[-exp\{-\rho(W - f(e^*))\}] \geq -exp\{-\rho W_r\} \tag{2}$$

$$e^* \in \arg\max E[-exp\{-\rho(W - f(e^*))\}] \tag{3}$$

where equation (2) is the participation constraint and W_r denotes the minimum compensation to meet CEO's reservation utility. Equation (3) is the incentive compatibility condition that characterizes the optimal effort e^* chosen by the CEO. In deriving the optimal contract we will utilize the fact that maximizing the expectation of exponential utility with normally distributed payoffs is equivalent to maximizing a mean-variance utility. We now turn to the issue of pollution in the environment in which the CEO works. To capture the notion of pollution, we denote by θ the level of "cleanliness" (i.e., the converse of pollution) of the environment. The CEOs' marginal disutility of effort is assumed to increase as θ decreases:

$$\frac{\partial f(e, \theta)}{\partial \theta \partial e} < 0. \tag{4}$$

The output is determined by capital γ, the CEO's effort e and her talent or ability η.

Specifically, we assume that the end-of-period output has the form:

$$V(e, \eta) = \eta ln(\gamma e) + \epsilon, \tag{5}$$

The random error term is ϵ is normally distributed $\epsilon \sim N(0, \sigma^2)$. Further, in order to obtain closed form solutions, we specify the disutility function and reservation compensation as:

$$f(e, \theta) = \frac{e}{\theta} \tag{6}$$

$$W_r = \frac{W_0}{\theta}. \tag{7}$$

We note that the CEOs' disutility increases quicker than output as effort increases, which guarantees that there exists an optimal effort level.[1] As air pollution increases i.e., as θ decreases, the CEO's reservation wage increases as well. As noted, maximizing the CEO's expected exponential utility function (3) is equivalent to maximizing a mean-variance utility of the form:

$$E[W - f(e^*)] - \frac{1}{2}\rho Var(W - f(e^*)) \tag{8}$$

We substitute equations (6), (7) above and the wage equation $W = \alpha + \beta V$ into the CEO's objective function (8) to give :

$$\alpha + \beta\eta ln(\gamma e) - \frac{1}{2}\rho\beta^2\sigma^2 - \frac{e}{\theta} \tag{9}$$

CEO's utility consists of three parts: $\alpha + \beta ln(\gamma\eta e)$ denotes the expected compensation, $\frac{1}{2}\rho\beta^2\sigma^2$ denotes the disutility from output variance and $\frac{e}{\theta}$ denotes the disutility from effort. Taking the derivative (9) w.r.t e, we obtain the CEO's optimal effort e^*:

$$e^* = \beta\eta\theta \tag{10}$$

As indicated by equation (10), the optimal effort level decreases as air pollution increases (i.e., θ decreases), under our assumption that the disutility of effort in increasing in pollution level. In order to satisfy the participation constraint, the board can be presumed to offer a compensation contract such that the CEO's expected utility is equal to her reservation wage:

$$\alpha + \beta E(V) - \frac{1}{2}\rho\beta^2\sigma^2 - \frac{1}{\theta}e^* = \frac{W_0}{\theta}. \tag{11}$$

[1] The marginal disutility of effort is $\frac{1}{\theta}$, while the marginal output $\frac{\delta V}{\delta e} = \frac{\gamma}{e}$ which is decreasing in the effort level e.

Substituting for e^* from equation (10) and rearranging terms yields:

$$E(W) = \alpha + \beta E(V) = \frac{W_0}{\theta} + \frac{1}{2}\rho\beta^2\sigma^2 + \beta\eta \tag{12}$$

Given the CEO's effort level and expected wage, we can determine the optimal contact that would be offered by the board. Observe that the expected output of the firm E(V) = ηln(γe*) and that the board's objective function can be expressed as: $E(\eta ln(\gamma e^*) - W)$. Substituting for e^* and $E(W)$ from equations (10) and (12), respectively, the board's objective function can be expressed as:

$$E(\eta ln(\gamma e^*) - W) = \eta ln(\gamma\beta\eta\theta) - (\frac{W_0}{\theta} + \frac{1}{2}\rho\beta^2\sigma^2 + \beta\eta). \tag{13}$$

The first order condition with respect to β from the above equation is:

$$\frac{\eta}{\beta} - \rho\sigma^2\beta - \eta = 0. \tag{14}$$

There is only one positive solution for the optimal β^* from the quadratic function (14).

$$\beta^* = \frac{-\eta + \sqrt{\eta^2 + 4\rho\sigma^2\eta}}{2\rho\sigma^2} = \frac{\sqrt{\eta}(-\sqrt{\eta} + \sqrt{\eta + 4\rho\sigma^2})}{2\rho\sigma^2} \tag{15}$$

After some simplification, we obtain:

$$\beta^* = \frac{2\sqrt{\eta}}{\sqrt{\eta + 4\rho\sigma^2} + \sqrt{\eta}} \tag{16}$$

Substituting β^* into (12) gives the optimal cash compensation:

$$\alpha^* = \frac{W_0}{\theta} + \frac{1}{2}\rho\beta^{*2}\sigma^2 + \beta^*\eta - \beta^*\eta ln(\gamma\beta^*\eta\theta) \tag{17}$$

From the above discussion, we can characterize the relationship between CEO compensation and air quality as follows:

Proposition 1. *Keeping other parameters fixed:*

1. *CEO's cash compensation increases as local air quality decreases*
   i.e., $\frac{\partial\alpha^*}{\partial\theta} < 0$

2. *CEO's incentive compensation decreases as local air quality decreases*
   i.e., $\frac{\partial(\beta^* V^*)}{\partial\theta} > 0$

Proof. Taking the first order derivative of cash compensation (17) on air quality factor, we obtain:

$$\frac{\partial \alpha^*}{\partial \theta} = -\frac{2\eta^{3/2}}{\theta(\sqrt{\eta} + \sqrt{\eta + 4\rho\sigma^2})} - \frac{W_0}{\theta^2} < 0 \tag{18}$$

The last inequality holds since all the parameters are positive. Next, we take the first order derivative of CEO incentive compensation on air quality to obtain:

$$\frac{\partial(\beta^* V^*)}{\partial \theta} = \frac{2\eta^{3/2}}{\theta\left(\sqrt{\eta + 4\rho\sigma^2} + \sqrt{\eta}\right)} > 0 \tag{19}$$

The last inequality holds since both numerator and denominator are positive. ■

We next examine the effect of managerial ability θ on the manager's compensation structure:

Proposition 2. *Keeping other parameters fixed, the effect of pollution increase on the compensation for CEOs with higher ability is:*

1. *Cash compensation increases more for higher ability CEOs: i.e.,* $\frac{\partial^2 \alpha^*}{\partial\theta\partial\eta} < 0$;
2. *Incentive compensations decreases more: i.e.,* $\frac{\partial^2(\beta^* V^*)}{\partial\theta\partial\eta} > 0$.

Proof.

$$\frac{\partial \alpha^*}{\partial\theta\partial\eta} = -\frac{1}{\theta^2}\left(\frac{\theta(3\sqrt{\eta(\eta + 4\rho\sigma^2)} - \eta)}{\sqrt{\eta(\eta + 4\rho\sigma^2)} + \eta + 4\rho\sigma^2} + W_0\right) < 0 \tag{20}$$

The inequality above holds since $3\sqrt{\eta(\eta + 4\rho\sigma^2)} - \eta$, $\sqrt{\eta(\eta + 4\rho\sigma^2)} + \eta + 4\rho\sigma^2$, and W_0 are positive.

$$\frac{\partial(\beta^* V^*)}{\partial\theta\partial\eta} = \frac{1}{\theta}\frac{3\sqrt{\eta(\eta + 4\rho\sigma^2)} - \eta}{\sqrt{\eta\left(\eta + 4\rho\sigma^2\right)} + \eta + 4\rho\sigma^2} > 0 \tag{21}$$

The inequality holds out of the same reason. ■

Corollary 1. *Given other conditions the same, CEOs' cash compensation increases as reservation utility increases.*

Proof. Directly follows from Equation (17). ■

3 Sample selection and data source

3.1 Air quality data

We obtain air quality data from the Environment Protection Association (EPA, 2010) website. We adopt the yearly air quality index (AQI), calculated based on several kinds of pollutants, including Carbon monoxide (CO), Sulfur oxide (SO_X), and Nitrogen oxide (NO_X), Ozone, and Particulate pollutants (PM2.5, PM10). Corresponding to different levels of health concern associated with air pollution, the quality index has five levels: Good(0∼50), Moderate(51∼100), and Unhealthy for sensitive groups(101∼150), Unhealthy(151∼200), Very unhealthy(201∼300), and Hazardous(301∼500). Detailed definitions and explanations are in the Appendix. The EPA website documents the number of days the equality is at which level for every calendar year from 1991 to 2018. To measure the yearly air quality in a specific county, we introduce two definitions: Bad ratio and Poison ratio. Bad ratio is defined as the number of days when AQI is greater than 100 scaled by the number of days with a record in that specific year. Poison ratio is defined as the number of days when AQI is greater than 150 scaled by the number of days with a record in that specific year. The main regression results use the *Poison Ratio*, though results are qualitatively similar if we use the *Bad Ratio* instead.

Table 1 shows the distribution of yearly air quality in all the counties with records. From the table, we can see that there is a decreasing trend of air pollution as time goes by and more stringent air protection regulations are adopted. In addition, air quality is related to the economy. For instance, air quality improved both in the 2000 Dotcom recession and 2008 financial crisis when there was less industrial activity.

3.2 CEO and firm related controls

The data on CEO characteristics and compensation is from Execucomp. Execucomp includes all S&P1500 companies and is widely used in the literature. We identify the CEO each year by using the CEOANN flag. For companies that have two CEOs listed, we use the one that was CEO at the time of the original 10K filing. We also obtain other compensation and ownership data from Execucomp.

We obtain firms' financial data from CRSP/Compustat. This includes a standard set of firm-level controls that the literature indicates could impact executive compensation (see, e.g., Humphery-Jenner et al. (2016)). We also obtain information on directors from BoardEx. Firms' institutional ownership data is from Thomas Reuters 13F institutional ownership database.

3.3 County level control data and other data

We obtain our county-level data from US county census data. This data includes county land area, population, income per capita, and Education Level data. We obtain the electricity power plant data from the US Energy Information Administration (EIA) website.

The EIA website has detailed data on all the electrical power plants in the US from 1950. This includes the location of each plant, which is provided with its FIPS location code. We merge this data with the air quality data using the FIPS location code for each county in the AQI dataset.

3.4 Univariate Information and Summary Statistics

We conduct univariate tests in Table 2. Here, we analyze whether total compensation and cash compensation differ between highly polluted counties and less polluted counties. We do this for each year in the sample. We define a county as highly polluted if its bad air ratio is in the top decile and as low pollution if its bad ratio is in the bottom quartile. The univariate tests indicate that both total compensation and cash compensation are statistically significantly larger in polluted counties than in relatively clean counties. However, these results do not control for the myriad factors that can influence pollution, which we explore in the following tests.

The summary statistics are in Table 3 and are relatively standard for the literature. Around 30% of compensation comes from cash. The average CEO age is 55 years old, and the average tenure is nearly six years. CEOs own 1.7% of the companies on average in this sample. Most of the CEOs are men. The other firm-level controls are consistent with prior studies that use the CRSP/Compustat dataset.

4 Empirical Analysis

4.1 Local Pollution Level and CEO Compensation

We first examine whether the local air pollution where the firm's headquarter is located influences CEO compensation. We hypothesize that CEO compensation (especially cash compensation) increases with pollution in the HQ county. We explore this by employing an OLS regression framework. The dependent variables are the natural log of cash compensation, or total compensation, in year t and year $t+1$. We also explore compensation in year $t+2$ and find consistent results (unreported for brevity). We measure pollution in two ways: the *Bad Ratio* and the *Poison Ratio*. The *Bad Ratio* is the proportion of days with an AQI worse than 100, and the *Poison Ratio* is the proportion of days with an AQI worse than 150.

We exclude from our analysis firms in industries that are known to contribute significantly to air pollution. The concern is that pollution might correlate with economic growth, especially for those firms that produce pollution when manufacturing. Thus, an issue might be that the results show a correlation between performance and compensation rather than between pollution and compensation. Energy related industries such as power plants, coal and oil are the source for main industrial air pollutants such as sulfur oxide and nitrogen oxide. In particular, the EPA has passed regulations to decrease sulfur oxide, nitrogen oxide, and carbon mono-oxide emissions from power plants. We define the following SIC 2-digit industries as direct contributors to air pollution: coal mining (SIC 12), crude petroleum (SIC 13), petroleum refining (SIC 29), and electricity service (SIC 49).

We also control for myriad corporate, executive, and geographic characteristics that might influence compensation. We capture the firm size and regional income by using cubic splines for each. The regressions include year and industry fixed effects. We do not include firm fixed effects because firms rarely change their HQ locations in the sample, and pollution ranks are relatively sticky, creating collinearity between the firm effects and pollution measures. Thus, we address causality in subsequent sections by using natural experiments.

The main results are in Table 4 and are consistent with expectations. Panel A uses the *Poison Ratio* as the measure of pollution, and Panel B uses the *Bad Ratio* as the pollution measure. We find that there is a positive and statistically significant relationship between pollution and both cash compensation, while the effect on incentive pay is significantly negative. This result is economically meaningful. A one standard deviation increase in the *Poison Ratio* pollution index is associated with a 4.1% increase in cash compensation.[2] By contrast, it is associated with a 9.7% decrease in incentive compensation. The effect on total compensation effect is positive though statistically insignificant.

The coefficients on the control variables are consistent with expectations. For example, longer-tenured CEOs tend to be paid more cash compensation, though incentive pay is lower. albeit this concentrates on a greater amount of cash compensation. CEOs that own more equity tend to receive less total compensation, incentives, and cash compensation, potentially indicating a substitution between ownership and cash compensation and/or the possibility that CEOs who own more equity are more likely to be in smaller entrepreneurial companies that would naturally pay less cash and/or less compensation. Further, both ROA and stock returns are positively related to compensation.

[2] $.032 \times 1.27 = .041$, where .032 is the std. dev. of *Position Ratio* and 1.27 is its regression coefficient in model 1. Calculation is similar for incentive compensation.

4.2 Acid Rain Program As a Quasi Natural Experiment

We next focus on a natural experiment to mitigate identification concerns and ensure a causal relationship between pollution and compensation. The US EPA launched the Acid Rain Program (ARP) under the Clean Air Act of 1990. The aim was to address concerns about acid rain and focused on sulfur oxides and nitrogen oxides from fossil fuel power plants.

To overcome the reverse causality, in this section, we use a difference-in-difference method to show the causality between local air pollution and CEO compensation premium. The Acid Rain Program is launched by US EPA under the Clean Air Act(1990), aiming to decrease the emission of both sulfur oxides and nitrogen oxides from the fossil power plant.

This program is divided into two phases. For the sulfur oxides, in the first phase, 261 large fossil power plants in 21 states are influenced. They are required to decrease their sulfur oxide emission rates to 2.5 pounds per million British thermal units (3.9 kg/MWh) by 1995 January 1. In phase 2, all fossil-fired units over 75 MWe were required to limit emissions of sulfur dioxide to 1.2 pounds per million British thermal units (1.9 kg/MWh) by January 1, 2000. Thereafter, they were required to obtain an emissions allowance for each ton of sulfur dioxide emitted, subject to a mandatory fine of $2,000.00 for each ton emitted more than allowances held. The case is similar to nitrogen oxides. In phase 1 (from 1995 to 1999), Group 1 Boilers (coal-fired dry bottom wall-fired boilers and tangentially fired boilers) are required to decrease the emission of nitrogen oxides by 400,000 tons all over the US per year. In phase 2 (from 2000), both Group 1 Boiler and Group 2 Boiler (wet bottom boilers, cyclones, cell burner boilers, and vertically fired boilers) are required to decrease the emission of nitrogen oxides by a further 890,000 tons annually. Power plants can meet these requirements by either reducing their power generation or adopting new technology, such as the installation of low-NOx burner retrofits.

Based on the analysis above, we adopt the year 2000 as the shock period for two reasons. First, compared to a smaller scale of phase 1, most fossil plants are influenced by phase 2. Second, our sample starts from 1994; we have six years of observations before the regulation change. If we adopt phase 1 as an exogenous shock, we have only one year of observations before the shock. Further, to the extent that any organization had already reduced pollution before 2000, this would count *against* us finding results and bias the relationship between our ARP measure and compensation towards zero (i.e., statistical insignificance).

We first collect the information of all the fossil power plants in the operation of the US from the EPA website, including their location, power capacity, and technology they use. Since air waste emission is diffusible, we use the power capacity scaled by the total area of the county, which is defined as capacity density. Next, we rank all the counties by power capacity density annually. Then we define the variable *ARP* in our regression as the number of fossil power plants within 40 miles radius and year is later than 2000 and as 0 otherwise.

The ARP program will also impact the direct polluter industries' operation and revenues since now they have to pay for the negative externality they make. To meet the emission decrease amount, fossil power plants can adopt the new and clean technology, reduce the use of fossil fuels, buy the emission allowance from EPA, or even close the fossil plant. All these actions can increase the cost of electricity service and impact the sales of fossil fuels, which in return will influence the compensation of CEOs in these industries. Thus, to exclude such potential endogeneity, we again exclude the direct polluter industries.

The results are in Table 6 and are consistent with expectations. For brevity, we only report the results when using the *Poison Ratio* pollution measure. The results are qualitatively similar when using *Bad Ratio*. In these results, pollution continues to be positively and significantly related to cash compensation and total compensation but negatively related to incentives. However, this impact reduces after the ARP. Notably, the ARP does not *eliminate* the impact of pollution. The ARP only impacted some areas because it targeted specific types of pollution. Other forms of pollution would continue to impact compensation. Similarly, one would expect that over time, the precise type of pollution that impacts compensation could change as people recognize emerging pollution threats. Nevertheless, the findings provide evidence for a causal relationship between air pollution and CEO compensation.

4.2.1 Changes in Local Air Pollution Level due to Headquarter Relocation

Firms seldom relocate their headquarters because of surrounding air pollution. Literature suggests that US firms relocate headquarters to metropolitan areas with good airport facilities, low corporate taxes, low average wages, high level of business services, and agglomeration of headquarters in the same sector of activity (Strauss-Kahn and Vives (2009)). Hence, headquarter relocation can serve as another quasi-natural experiment. In our sample, we identify 107 firms that relocate their headquarters to different counties. For our difference-in-difference regressions, we require that sample firms have financial data three years before and three years after the relocation of these firms. Excluding firms without sufficient data, we obtain a sample of 80 firms in which 42 move their headquarters to a more polluted place, while 38 move to a less polluted environment.

The results are in Table 7. *Old poison ratio* denotes the air pollution in the county of firms' headquarters before relocation. *Poison ratio diff* is the difference in air pollution level between the counties of the new and old headquarters. *Poison ratio diff* is zero for firms that do not relocate and, for those that do relocate, it is zero prior to relocation. We are especially interested in the coefficient on *Poison ratio diff* which captures the impact of relocation-related change in pollution on CEO compensation. Columns 1 and 2 examine the impact on cash compensation, while Columns 3 and 4 look at incentive compensation. As indicated, *Poison ratio diff* has a significant positive impact on cash compensation. However, pollution change associated with headquarter relocation is not significantly related to incentive compensation. A possible reason is that our relocation sample is rather limited. In our robustness checks, we restrict the sample to only relocated firms and obtain similar results.

4.3 CEO Attributes, Local Pollution and CEO Compensation

We next explore the impact of CEO managerial ability and other CEO attributes. From Proposition 2, we expect that higher managerial ability will tend to amplify the impact of pollution in terms of increasing cash compensation and reducing incentive pay. We also examine the influence of other indicators of CEO bargaining power such as concentration of titles and the CEO's outside options. We anticipate that greater bargaining power could allow the CEO to extract more pollution-linked compensation.

4.3.1 CEO Management Ability and Pollution-related Compensation

We construct a managerial ability measure following the approach in (Demerjian et al., 2012). This measure is estimates managerial ability as the residual from a regression of firm efficiency onto firm characteristics. The regression results are presented in Table 8 are consistent with the predictions from Proposition 2. As indicated in models (1) and (2), the interaction variable *Managerial ability* $\times$ *Poison Ratio* is estimated with a significantly positive coefficient, implying that pollution tends to have a significantly greater impact on cash compensation for higher levels of *Managerial Ability*. In models (3) and (4) with incentive pay, the interaction variable is estimated with a negative, though insignificant coefficient. *Managerial Ability* itself is positively related to incentive pay. This might reflect the possibility that more capable managers are also more willing to accept incentive compensation due to their confidence that they will satisfy such compensation benchmarks.

4.3.2 CEO Internal Power and Pollution-related Compensation

We expect internally powerful CEOs to be able to extract higher pollution-related compensation. This is consistent with literature that finds that powerful CEOs are able to extract rents from shareholders (Adams et al. (2005), Morse et al. (2011), Song and Wan (2019)), and can have a significant impact on corporate policy (Humphery-Jenner et al. (2021)). We measure CEO power by focusing on title concentration. We build the proxy denoted as *CEO Power*, which is a dummy variable that equals 1 if the CEO is president and chairman of the board at the same time and equals 0 otherwise. This is because measures, such as the 'compensation pay slice' (see Bebchuk et al. (2011)), proxy CEO power using the CEO's compensation, which would be endogenous with our dependent variable.

The results are in Table 9 and are consistent with expectations. Powerful CEOs experience a statistically and economically significantly greater increase in compensation due to pollution than do other CEOs: Their cash compensation increases about 3.4 % more than other CEOs following a one standard deviation increase in the pollution poison ratio. By contrast, more powerful CEOs see a slightly (albeit not statistically significant) smaller decrease in incentives. The *CEO Power* variable is positively related to cash (marginally), incentive and total compensation.

4.3.3 CEOs' Outside Opportunities on Pollution-related Compensation

CEOs' bargaining power increases with their outside opportunities. Fewer opportunities imply a weaker ability to negotiate for higher compensation. We capture CEOs' outside opportunities by exploiting an exogenous shock to them: the staggered adoption of the Inevitable Disclosure Doctrine (IDD). The IDD discourages employees from moving to competitors. It is premised on the idea that there might be an inevitable disclosure of trade secrets if they were to join competitors. Not all states have adopted the IDD. And different states have adopted it at different times. This creates a staggered natural experiment and helps to ensure causality in our results.

We create an indicator $\widehat{IDD}$ that equals one if the state does *not* adopt the IDD and equals zero otherwise (i.e., the indicator is: $\widehat{IDD} = 1 - IDD$ indicator). Hence, the indicator variable implies higher bargaining power due to the absence of IDD. The results are in Table 10 and are consistent with expectations. Managerial outside opportunities tend to significantly increase the impact of pollution on cash compensation. interestingly, there is also a significant decrease in incentive pay. This indicates that CEOs with more outside opportunities are able to extract a greater cash wage, while reducing incentive pay, while working in polluted environments.

4.4 Environmental Consciousness, Pollution and CEO Pay

Environmental awareness is likely to amplify the demand for pollution-linked compensation. Intuitively, if more executives know more about the harm caused by pollution, we would expect more of them to demand compensation for working in polluted areas. In equilibrium, this pressure would force up executive wages in polluted areas. Environmental consciousness would also make the board and shareholders more likely to understand executives' demands and the need to compensate for pollution.

We capture environmental awareness in two main ways. First, we measure media activism. This is the ratio of (a) the number of articles mentioning health and environment issues in mainstream papers to (b) the number of articles mentioning the environment. This aims to capture environmental awareness. Thus, *Media Activism* is an indicator variable that equals 1 if the ratio of health-related articles is above the mean and equals 0 otherwise.

Second, we develop a proxy for government activism. This represents the federal government's attitude toward environmental issues. In practice, this represents the Obama administration years, which is when environmental regulations accelerated.[3] Because the US experienced a serious recession in Obama's first term; environmental activism mainly occurred during the second term. Thus, *Government Activism* is an indicator variable that equals 1 if the year is between 2013 and 2016, inclusive.

The regression results are in Table 11 and are consistent with expectations. Panel A includes the interaction of the government activism measure and pollution, and Panel B includes the interaction of media activism with pollution. In both panels, pollution continues to be a positive and significant influence on cash compensation. The effect on incentive pay and total compensation is insignificant.

4.5 Robustness Tests

We undertake several additional tests to ensure that the results are robust to econometric issues and identification concerns. These are in addition to the foregoing quasi-exogenous natural experiments which help to establish causality.

[3]Obama's main records on environment protection are attached in Appendix

4.5.1 Alternative Proxy for Local Air Pollution Levels

We first consider an alternative proxy for air quality. As noted above, fossil fuel power plants are one of the main sources of air pollution. Thus, the number of fossil fuel power plants near the firm's headquarters could be a good proxy for air pollution. We calculate the total number of fossil fuel power plants within a 40 miles radius of firms' headquarters and use it as the proxy for the local air pollution.[4] We redo baselne regressions using this alternative measure of air quality.

Table 12 presents the results with the alternative proxy and, as indicated, the results are consistent with the baseline regressions in Tables 4 and 5. The number of power plants is positively and statistically significantly related to the amount of cash compensation and negatively related to incentive compensation. The total compensation is insignificantly related to the pollution proxy.

4.5.2 Additional County Controls: Median House Price, Local Government Spending and Crime Rate

We further ensure that the regression results are robust to controlling for county-level controls. The main regressions include a PCI (per capita income) spline. However, house prices could also influence CEOs' pay decisions. On the one hand, higher house prices might signal a higher cost of living. On the other hand, as with luxury goods, high prices are associated exclusivity, which might be attractive to CEOs. Nevertheless, we obtain the natural log of the county median house price and use its spline values as controls Table R1. As indicated, the sign, coefficient, and significance of *Poison Ratio* are similar to those estimated in the baseline regressions: i.e., pollution positively and significantly influences cash compensation but negatively influence incentive pay. . In addition, we also include yearly local government spending as a proxy for possible county level omitted variables. Higher local government spending tends to be associated with more public goods that could improve the quality of life in the area. We obtain the local spending data from the County Census Database collected by the Bureau of Census. As indicated, results are similar to our baseline regression results after controlling for local government spending. We do not include local government spending in our other regression model because the government spending data is limited and leads to a loss of about 5,000 observations.

We also consider per capita GDP and per capita income as controls for the cost of living. While per capita GDP is only available from 2000, per capita income is available from 1969 from county census data. While per capita income likely better captures the

[4]We also calculate the number within 60 miles radius as proxy and obtain similar results.

demographic traits of a region than does per capita GDP, the two variables are highly correlated (about 79.1%) in our sample. Controlling for per capita GDP or per capita income in our baseline regressions leaves them qualitatively unchanged. The results are not tabulated for brevity.

4.5.3 Nearby County Pollution and CEO Compensation

We also examine the impact of pollution in nearby counties on executive compensation. This is relevant since executives can choose to live in a county outside of the firm's headquarter county. Pollution also tends to disperse and can be transported to nearby counties. We obtain this by identifying the five nearest counties within 60 miles of HQ county. We then calculate the average poison ratio in these counties. We denote this *Near Poison Ratio*. We also create a measure (called *Regional Poison Ratio*) to capture both the HQ county pollution level combined with the *Near Poison Ratio*: this is simply 0.5 $\times$ *Poison Ratio* + 0.5 $\times$ Near Poison Ratio.

The results are in Table R2 and are consistent with the baseline regression results. Panel A focuses on the *Near Poison Ratio* and Panel B on the *Regional Bad Ratio*. Both additional pollution measures are positively and statistically significantly related to cash but are negatively related to incentive compensation. Total compensation is not significantly related to either pollution measure. These results help to cross-validate our baseline findings by highlighting that alternative measures of pollution also influence compensation consistently and logically.

4.5.4 Including & Excluding Polluting Firms

Our results till now have excluded firms that are in industries that directly pollute. As discussed, this helps to mitigate concern that such firms might profit from pollution, and those firms' profits drive CEO compensation rather than pollution per se. Here, we bolster these results by also excluding firms that are 'indirect polluters'. These firms might benefit indirectly from pollution-causing activities due (inter alia) to supply chain-related issues. We identify these as firms that are in the EPA's toxic release inventory program. This program requires firms in specific industries to report their toxic waste annually if their waste exceeds 7,000 pounds. The results are in Internet Appendix Table R3 and are consistent with the main results: pollution is positively associated with cash compensation, weakly negatively associated with incentives, and insignificantly associated with total compensation.

We also ensure that our results are robust to including polluters in the sample. This helps to mitigate concerns that the removal of polluters creates an unusual bias that benefits the results. These results are reported in Internet Appendix Table R3 and are consistent with the baseline results. Here, pollution is positively and significantly related to cash compensation, negatively related to incentives, and insignificantly related to total compensation. Thus, the results are robust to the inclusion or exclusion of direct polluters from the analysis.

4.5.5 Local Air Pollution on Compensation of non-CEO Top Executives

While our analysis has focused on CEO compensation, a related question is whether the compensation of non-CEO executives is also affected by local pollution. We focus on the COO and the CFO. In our data, around 33% of COOs eventually become CEOs, and around 8% of CFOs become CEOs.[5]

The results are in Internet Appendix Table R4 and are consistent with the baseline CEO results. Panel A focuses on COO compensation, and Panel B looks at all other top executives. Columns 1 and 2 look at the impact of pollution on COO cash compensation. Columns 3 and 4 look at the impact on COO incentive compensation. The main finding is that pollution remains positively and significantly related to non-CEO executives' cash compensation. For COOs, one standard deviation in the pollution index is associated with about a 3.5% increase in cash compensation. The incentive pay, as with CEOs, is negatively associated with pollution. Part of the reason for the COOs exhibiting a pattern similar to CEOs might be that they are more likely to become CEO. Overall, these results help to cross-validate the results about CEOs and indicate that the results are not merely a quirk of the focus on CEO compensation.

4.5.6 Impact of Changes in Local Air Pollution Level due to Headquarter Relocation on CEO's Compensation Structure: Relocated Firms Only

In the earlier discussion, we include the full sample when we examined the impact of headquarter relocation on CEO compensation. Since the relocation sample is quite small compared to our full research sample, as a robustness check, we do regressions with only relocated firms.

The results are in Internet Appendix Table R5. The definition of *Old poison ratio* and *Poison ratio diff* are defined as before. The main results show that after relocating to

[5]The data is from Execucomp. We identify CFOs by using the annual CFO flag. We identify COOs by using the "title name" variable because there is no annual COO flag. We classify an individual as a COO if their title is "COO" or "Chief Operating Officer"

a more polluted county, the firm increases the CEO's cash compensation and decreases incentive compensation. Overall, these results support our main regression results.

4.5.7 Impact of Local Air Pollution on Firms' CSR Activity

Our research focuses on firms that are not polluters. CSR activity on the environmental dimension of these firms could lead to higher positive effects in more polluted places. Internet Appendix Table R6 finds that both CSR strength score and net score on the environment are positively related to air pollution at the 1% level for the firms in clean industries. Meanwhile, firms in the polluting industries tend to get lower CSR scores on the environment. With this test, we try to exclude the potential endogeneity that local pollution can be a proxy for firms' operations and lead to higher compensation.

5 Conclusion

There has been an increased focus on environmental issues among the general public and investors. However, the business case for a cleaner environment is sometimes not clear-cut. Thus, we ask whether pollution can impact firms' bottom line by increasing their wage bills, especially as executives become concerned about how pollution impacts their health and quality of life.

We develop a theoretical model, hypothesize, and show that higher pollution is associated with higher CEO compensation. We especially expect this will manifest in higher total compensation and a higher certainty equivalent wage, with cash compensation increasing and incentive compensation remaining unchanged or potentially decreasing. We explore this by collecting detailed data on county-level pollution. This also extends to non-CEO executives, such as COOs. This is both economically and statistically significant: A one standard deviation worsening in county-level pollution is associated with a 4.8% increase in CEOs' cash compensation. We deploy a quasi-exogenous natural experiment: the acid rain project, to assuage identification concerns and ensure causality. We also use several alternative measures of pollution to help ensure identification.

The impact of pollution increases with the CEO's bargaining power, and we show this by deploying another quasi-exogenous natural experiment. We demonstrate this in our theoretical model. We then explore this empirically by using several measures of CEO bargaining power, including CEO power and a shock to the CEO's outside opportunities following the inevitable disclosure doctrine (a quasi-exogenous natural experiment). We highlight that bargaining power significantly amplifies the relationship between pollution and compensation.

We also hypothesize and show that environmental awareness influences the impact of pollution. We capture this in several ways. Greater media awareness leads to a greater relationship between pollution and compensation. This is consistent with CEOs becoming more concerned about pollution and boards and shareholders becoming better informed about the rationale for CEOs' pollution-linked compensation demands.

We undertake several additional robustness tests to ensure that the results are robust to econometric issues. As indicated, we use the acid rain project and the inevitable disclosure doctrine as separate quasi-exogenous natural experiments. These help to mitigate identification concerns and ensure causality in our results. However, we also ensure the results are robust to alternative measures of pollution, including looking at pollution in neighboring counties. The results are also robust to analyzing non-CEO executives and to exploring other control variables.

The results make a significant contribution to the literature and to policy and practice. While the literature has primarily focused on ESG investing, it has been relatively less focused on how pollution impacts the corporate bottom line and how it impacts executive compensation and governance. We fill this gap by showing a clear corporate governance impact: CEOs require greater pay for being in polluted environments. This effect extends to non-CEO executives. In so doing, we address a significant gap in the literature. This also has implications for policy and practice. It highlights to corporations the need to be concerned about their environmental impact and that there can be a clear business case for considering pollution, especially as it pertains to wages and staff morale, should wages not compensate for pollution. It also demonstrates another economic impact associated with pollution, buttressing policy calls to support a cleaner environment.

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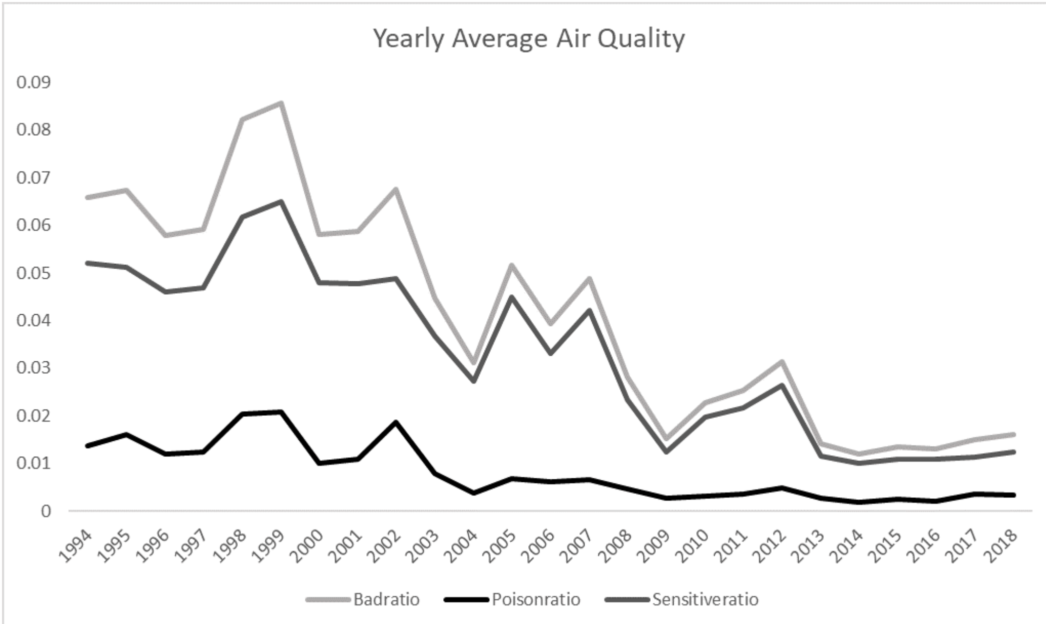

Figure 1: Nationwide yearly average air quality. The figure shows the trend of nationwide air quality from 1994 to 2018. Data comes from EPA website. Poison ratio is defined as the number when air quality index is bigger than 150 scaled by number of days with record. Bad ratio is defined as the number of days when air quality index is bigger than 100 scaled by number of days with record. Sensitive ratio is the difference between Bad ratio and Poison ratio. When the air quality index is between 100 and 150, it is harmful to sensitive group of people and that is why we call it Sensitive ratio

Table 1: Temporal Distribution of Nationwide Air Quality

The table depicts the temporal distribution of Air Quality in the United States between the years 1991 to 2018. We closely follow the definition as stated on the EPA website: *Poison Local Air Quality* is the number of days that the air quality index(AQI) is higher than 150 over the number of days with the record in that specific calendar year (henceforth, *Poison Ratio*). Similarly, the Bad Air Quality is the number of days that the air quality index is higher than 100 scaled by the days with the record in that calendar year (henceforth, *Bad ratio*). When the air quality index is between 100 and 150, air pollution is harmful only to the sensitive group of local residents. *Observations* is the total number of counties with an air quality index.

		Bad Air Quality (Bad Ratio)		Poisonous Air Quality (Poison Ratio)	
Year	Observations	Mean	Std dev	Mean	Std dev
1991	936	0.081	0.113	0.020	0.041
1992	964	0.058	0.094	0.011	0.033
1993	972	0.067	0.098	0.014	0.036
1994	995	0.066	0.094	0.014	0.033
1995	1026	0.067	0.088	0.016	0.032
1996	1029	0.058	0.079	0.012	0.028
1997	1045	0.059	0.078	0.012	0.025
1998	1008	0.082	0.090	0.020	0.031
1999	1077	0.086	0.095	0.021	0.034
2000	1135	0.058	0.075	0.010	0.024
2001	1149	0.059	0.073	0.011	0.025
2002	1156	0.068	0.080	0.019	0.033
2003	1163	0.045	0.063	0.008	0.024
2004	1148	0.031	0.055	0.004	0.018
2005	1144	0.052	0.060	0.007	0.018
2006	1120	0.039	0.058	0.006	0.022
2007	1108	0.049	0.064	0.007	0.020
2008	1100	0.028	0.059	0.005	0.028
2009	1099	0.015	0.048	0.003	0.026
2010	1098	0.023	0.048	0.003	0.024
2011	1093	0.025	0.048	0.004	0.017
2012	1071	0.031	0.055	0.005	0.022
2013	1062	0.014	0.045	0.003	0.018
2014	1054	0.012	0.044	0.002	0.015
2015	1061	0.014	0.045	0.003	0.016
2016	1054	0.013	0.042	0.002	0.018
2017	1062	0.015	0.046	0.004	0.019
2018	1056	0.016	0.039	0.004	0.014

Table 2: Difference in CEO Compensation between Top Decile Clean and Polluted Counties: An Univariate Analysis

This table contains the univariate test results between the difference in Total compensation in highly polluted and clean counties. A county is defined as a highly polluted county if the Bad Ratio in that county is in the top decile. Similarly, a county is defined as a clean county if its Bad ratio is in the bottom decile.

Period	Observations		Ln[Cash Compensation]				Ln[Total Compensation]			
	Clean	Polluted	Clean	Polluted	Diff	P	Clean	Polluted	Diff	P
1993	83	83	6.5489	6.6512	0.1023	0.3366	6.9514	7.1336	0.1822	0.1746
1994	112	150	6.5253	6.6479	0.1226	0.1430	7.0462	7.2694	0.2232	0.0502
1995	120	114	6.5788	6.6994	0.1206	0.1748	7.0916	7.2894	0.1978	0.0732
1996	120	134	6.6948	6.7894	0.0946	0.2866	7.4271	7.5550	0.1279	0.3060
1997	157	153	6.6810	6.8480	0.1670	0.1096	7.4271	7.6929	0.2658	0.0389
1998	147	153	6.7343	6.7109	-0.0234	0.7842	7.5180	7.4275	- 0.0905	0.4389
1999	152	155	6.6247	6.7418	0.1171	0.3066	7.6224	7.6036	- 0.0188	0.8892
2000	159	199	6.6713	6.7188	0.0474	0.6652	7.7184	7.5935	- 0.1250	0.3636
2001	156	160	6.6242	6.7959	0.1716	0.1009	6.6242	6.7959	0.1716	0.2559
2002	150	158	6.6375	6.9282	0.2907	0.0200	6.6375	6.9282	0.2907	0.0992
2003	156	160	6.6430	6.8936	0.2506	0.0463	7.6383	7.7614	0.1231	0.3643
2004	156	174	6.8172	7.0847	0.2675	0.0286	7.7536	7.9623	0.2086	0.0286
2005	208	167	7.2801	7.2091	-0.0710	0.5627	8.2051	8.0934	- 0.1117	0.4084
2006	127	186	6.6482	6.6912	0.0431	0.6581	7.7965	8.0298	0.2333	0.0727
2007	191	219	6.4891	6.6246	0.1355	0.1196	7.7970	7.9239	0.1269	0.3179
2008	189	210	6.5281	6.6115	0.0834	0.3388	7.7871	7.8478	0.0607	0.5888
2009	217	298	6.4929	6.6084	0.1155	0.1436	7.7524	7.9221	0.1697	0.0626
2010	187	193	6.2565	6.7335	0.4770	0.0000	7.6540	8.1582	0.5043	0.0000
2011	202	230	6.4308	6.6722	0.2414	0.0090	7.9396	8.1767	0.2371	0.0252
2012	230	193	6.5536	6.7820	0.2284	0.0089	8.0835	8.2625	0.1790	0.0652
2013	185	175	6.5553	6.7048	0.1494	0.0682	8.0647	8.2158	0.1511	0.1337
2014	295	185	6.4728	6.7199	0.2470	0.0122	8.1150	8.2135	0.0985	0.3927
2015	240	190	6.6420	6.7491	0.1071	0.2086	8.2775	8.3432	0.0657	0.4690
2016	270	175	6.5141	6.8384	0.3243	0.0019	8.2672	8.4594	0.1923	0.0406
2017	158	165	6.7523	6.7731	0.0208	0.7864	8.2377	8.3741	0.1364	0.1633
2018	171	189	6.5587	6.7906	0.2319	0.0280	8.3779	8.5233	0.1454	0.1459

Table 3: Summary Statistics of Dependent Variables, Air Quality Proxies, and Control Variables

This table shows the summary statistics of all the variables winsorized at 1% level. We depict sample averages, median, 25th, and 75th percentiles, and standard deviations of all the variables of interest and controls from the year 1993 to 2018.

Variable	**N**	**Mean**	**Std**	**P25**	**P50**	**P75**
CEO Compensation Variables						
Ln[Cash compensation]	28997	6.726	0.987	6.392	6.770	7.124
Ln[Total Compensation]	28997	7.993	1.173	7.275	8.062	8.765
Ln[Incentive Compensation]	28997	6.085	3.167	5.513	7.229	8.225
Air Quality Proxies						
Bad Ratio	28997	0.075	0.089	0.014	0.044	0.104
Poison Ratio	28997	0.017	0.032	0.000	0.003	0.022
Ln[Power Plant Number]	28997	3.492	0.967	2.944	3.611	4.143
Nearby Poison Ratio	28997	0.014	0.029	0.000	0.003	0.014
Regional Poison Ratio	28997	0.015	0.030	0.000	0.005	0.017
CEO level controls						
Ln[Age]	28997	4.015	0.135	3.932	4.025	4.111
Gender[Female=1]	28997	0.028	0.166	0.000	0.000	0.000
Ln[Tenure]	28997	1.767	0.873	1.099	1.792	2.398
CEO ownership(%)	28997	1.705	4.016	0.798	0.802	0.851
Managerial ability	22019	0.014	0.144	-0.075	-0.022	0.062
CEO Confidence Level	28997	0.298	0.275	0.049	0.256	0.484
CEO Power[Powerful=1]	28997	0.227	0.419	0.000	0.000	0.000
Firm-level controls						
Ln[Total assets]	28997	7.671	1.780	6.431	7.553	8.796
Leverage	28997	0.205	0.191	0.033	0.175	0.315
EBIT/Assets	28997	0.079	0.109	0.036	0.079	0.128
Intangibles/Assets	28997	0.165	0.187	0.017	0.085	0.259
R&D/Sales	28997	0.059	0.280	0.000	0.000	0.032
Market-to-book	28997	1.975	3.058	1.142	1.497	2.174
Institutional ownership	28997	0.757	0.183	0.705	0.768	0.856
Stock return	28997	0.154	0.578	-0.105	0.135	0.300
Volatility	28997	0.108	0.068	0.066	0.097	0.126
Proportion NTD	28997	0.013	0.053	0.008	0.008	0.008
County level controls						
Education level	28997	35.109	10.958	26.900	32.600	42.200
Crime Ratio	28997	0.047	0.238	0.029	0.042	0.062
Population density	28997	0.015	0.902	-0.475	0.063	0.615
Ln[Per Capita Income]	28997	10.755	0.399	10.481	10.725	10.966
Ln[Government Spending]	23469	16.173	1.716	15.007	16.107	17.455
Metropolitan[Within=1]	28997	0.378	0.485	0.000	0.000	1.000
Longitude	28997	-91.869	16.992	-97.691	-87.436	-77.300
Latitude	28997	37.991	4.776	34.196	39.586	41.760

Table 4: The Effect of Local Air Quality on CEO Compensation Level

This table contains models that depict the relationship between firm-level CEO compensation and the environmental quality in the county where the corporate headquarter of the firm is located. The dependent variables are the total Cash compensation, the sum of equity and option compensation, and Total compensation. Detailed variable definitions are in the appendix. All models are Ordinary Least Square (OLS) regressions that include industry(SIC 2-digits), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

Panel A: Poison Ratio as the proxy for Local Air Quality

	Ln[Cash Compensation]		Ln[Incentive Compensation		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	1.266***	1.318***	-3.017***	-2.530***	0.026	0.169
	(7.25)	(7.79)	(-4.03)	(-3.76)	(0.14)	(0.95)
Ln[Age]	0.191***	0.162***	-1.324***	-1.249***	-0.140***	-0.203***
	(3.82)	(3.36)	(-8.69)	(-8.29)	(-3.06)	(-4.38)
Female CEO	0.001	0.001	0.087	-0.034	0.051**	0.024
	(0.04)	(0.03)	(0.86)	(-0.32)	(1.98)	(0.84)
Ln[CEO Tenure]	0.049***	0.031***	-0.046**	-0.033	0.039***	0.036***
	(7.44)	(5.11)	(-1.96)	(-1.42)	(5.59)	(5.26)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.048***	-0.013***	-0.010***
	(-1.96)	(-0.54)	(-7.48)	(-7.38)	(-4.38)	(-3.96)
CEO Confidence Level	0.118***	-0.006	0.166**	0.170**	0.262***	0.183***
	(5.32)	(-0.28)	(2.08)	(2.23)	(9.23)	(6.18)
Leverage	-0.053*	-0.029	-0.805***	-0.907***	-0.170***	-0.172***
	(-1.70)	(-0.90)	(-6.87)	(-7.54)	(-5.34)	(-5.06)
Lagged EBIT/ASSET	0.160**	0.385***	1.605***	2.156***	0.627***	0.916***
	(2.23)	(4.91)	(6.87)	(8.71)	(7.61)	(10.11)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.15)	(-0.96)	(3.71)	(2.92)	(2.99)	(2.63)
Intangibles/Assets	-0.015	0.009	0.095	0.125	0.111***	0.128***
	(-0.45)	(0.26)	(0.82)	(1.05)	(3.15)	(3.61)
R&D/Sales	0.043***	0.085***	0.657***	0.671***	0.225***	0.248***
	(2.67)	(4.43)	(9.61)	(10.50)	(11.44)	(12.83)
Institutional Ownership (%)	0.096***	0.078**	1.599***	1.530***	0.406***	0.403***
	(3.13)	(2.52)	(13.43)	(12.93)	(12.50)	(12.23)
NTD Proportion	0.277**	0.029	-0.714	-1.266***	0.111	-0.046
	(2.22)	(0.36)	(-1.23)	(-2.98)	(0.66)	(-0.38)
Lagged Stock Return	0.029***	0.052***	0.071*	0.123***	0.060***	0.089***
	(3.18)	(5.34)	(1.93)	(3.16)	(4.30)	(5.73)
Lagged Stock Return Volatility	-0.177*	-0.249***	0.829**	0.578*	0.460***	0.349***
	(-1.85)	(-2.64)	(2.53)	(1.75)	(4.05)	(3.10)
County Education Level	-0.002	-0.002	-0.008*	-0.009**	-0.001	-0.001
	(-1.48)	(-1.52)	(-1.88)	(-2.14)	(-0.81)	(-0.94)
County Crime Ratio	-0.054	-0.088	0.111	-0.024	0.762*	0.866**
	(-0.13)	(-0.23)	(0.08)	(-0.02)	(1.92)	(2.30)
County Population Density	0.020***	0.029***	0.052*	0.048*	0.030***	0.030***
	(3.09)	(4.05)	(1.87)	(1.73)	(4.33)	(4.06)
Metropolitan	-0.002	-0.001	0.017	0.053	-0.019	-0.014
	(-0.13)	(-0.06)	(0.28)	(0.86)	(-1.06)	(-0.80)
Longitude	0.008**	0.005	0.004	0.010	0.007	0.006
	(2.08)	(1.18)	(0.25)	(0.63)	(1.45)	(1.34)
Latitude	-0.010**	-0.011**	0.055***	0.057***	0.017***	0.017***
	(-2.13)	(-2.11)	(2.71)	(2.82)	(3.22)	(2.97)
Constant	4.816***	4.605***	4.787***	5.466***	5.392***	5.650***
	(11.81)	(10.78)	(2.86)	(3.31)	(11.60)	(11.83)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26,929	27,151	26,855	27,067	26,852	27,064
Adj. R-sq	0.326	0.312	0.209	0.203	0.541	0.517

Panel B: Bad Ratio as the proxy for Local Air Quality

	Ln[Cash Compensation]		Ln[Incentive Compensation		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Bad Ratio	0.552***	0.593***	-0.955***	-0.784***	0.037	0.082
	(8.26)	(8.76)	(-3.52)	(-3.12)	(0.51)	(1.15)
Ln[Age]	0.195***	0.166***	-1.329***	-1.254***	-0.139***	-0.201***
	(3.91)	(3.45)	(-8.72)	(-8.31)	(-3.03)	(-4.34)
Female CEO	0.002	0.002	0.083	-0.037	0.051**	0.025
	(0.10)	(0.07)	(0.82)	(-0.35)	(2.01)	(0.87)
Ln[Tenure]	0.049***	0.031***	-0.046**	-0.033	0.039***	0.036***
	(7.44)	(5.11)	(-1.97)	(-1.42)	(5.59)	(5.26)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.048***	-0.013***	-0.010***
	(-1.95)	(-0.53)	(-7.49)	(-7.40)	(-4.38)	(-3.95)
CEO Confidence Level	0.118***	-0.006	0.167**	0.170**	0.262***	0.183***
	(5.30)	(-0.29)	(2.09)	(2.24)	(9.23)	(6.17)
Leverage	-0.054*	-0.030	-0.801***	-0.903***	-0.171***	-0.173***
	(-1.74)	(-0.95)	(-6.84)	(-7.51)	(-5.36)	(-5.10)
Lagged EBIT/ASSET	0.157**	0.382***	1.608***	2.159***	0.626***	0.914***
	(2.19)	(4.86)	(6.88)	(8.72)	(7.60)	(10.09)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.14)	(-0.94)	(3.71)	(2.92)	(2.99)	(2.63)
Intangibles/Assets	-0.017	0.007	0.099	0.128	0.110***	0.127***
	(-0.53)	(0.20)	(0.85)	(1.07)	(3.13)	(3.59)
R&D/Sales	0.043***	0.084***	0.657***	0.671***	0.225***	0.248***
	(2.66)	(4.41)	(9.61)	(10.50)	(11.44)	(12.82)
Institutional Ownership (%)	0.096***	0.078**	1.600***	1.530***	0.406***	0.403***
	(3.12)	(2.52)	(13.44)	(12.93)	(12.49)	(12.23)
NTD Proportion	0.277**	0.031	-0.712	-1.269***	0.111	-0.045
	(2.22)	(0.38)	(-1.22)	(-2.98)	(0.66)	(-0.37)
Lagged Stock Return	0.029***	0.052***	0.071*	0.123***	0.060***	0.089***
	(3.18)	(5.36)	(1.93)	(3.15)	(4.30)	(5.74)
Lagged Stock Return Volatility	-0.174*	-0.244***	0.827**	0.574*	0.461***	0.351***
	(-1.81)	(-2.59)	(2.52)	(1.74)	(4.06)	(3.12)
County Education Level	-0.001	-0.001	-0.008*	-0.009**	-0.001	-0.001
	(-1.18)	(-1.22)	(-1.95)	(-2.17)	(-0.77)	(-0.89)
County Crime Ratio	0.008	0.016**	0.075***	0.067**	0.029***	0.027***
	(1.20)	(2.22)	(2.64)	(2.37)	(4.04)	(3.65)
County Population Density	0.002	0.003	0.002	0.037	-0.018	-0.012
	(0.10)	(0.21)	(0.03)	(0.61)	(-1.02)	(-0.67)
Metropolitan	0.008**	0.005	0.003	0.009	0.007	0.007
	(2.07)	(1.19)	(0.19)	(0.56)	(1.47)	(1.40)
Longitude	-0.009*	-0.010*	0.057***	0.059***	0.018***	0.017***
	(-1.86)	(-1.89)	(2.79)	(2.95)	(3.29)	(2.99)
Latitude	0.117	0.070	-0.230	-0.293	0.793**	0.910**
	(0.29)	(0.18)	(-0.17)	(-0.24)	(2.00)	(2.42)
Constant	4.764***	4.559***	4.763***	5.405***	5.388***	5.655***
	(11.68)	(10.65)	(2.83)	(3.26)	(11.59)	(11.85)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26,929	27,151	26,855	27,067	26,852	27,064
Adj. R-sq	0.326	0.312	0.209	0.203	0.541	0.517

Table 5: The Effect of Local Air Quality on CEO Compensation Structure

This table contains models that depict the relationship between firm-level CEO compensation structure and the environmental quality in the county where the corporate headquarter of the firm is located. The dependent variables are the cash(sum of salary and bonus) intensity and incentive(sum of equity and option compensation) intensity. Detailed variable definitions are in the appendix. All models are Ordinary Least Square (OLS) regressions that include industry(SIC 2-digits), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	Cash Intensity		Incentive Intensity	
	(1)	(2)	(3)	(4)
	Current	Lead	Current	Lead
Poison Ratio	0.338***	0.273***	-0.480***	-0.421***
	(4.79)	(4.22)	(-7.02)	(-6.66)
Ln[CEO Age]	0.182***	0.167***	-0.202***	-0.185***
	(13.35)	(12.17)	(-14.38)	(-13.14)
Female CEO	-0.015*	-0.006	0.007	-0.003
	(-1.84)	(-0.72)	(0.82)	(-0.32)
Ln[CEO Tenure]	0.007***	0.003	-0.008***	-0.003
	(3.32)	(1.61)	(-3.81)	(-1.18)
CEO Ownership(%)	0.006***	0.006***	-0.003***	-0.004***
	(9.85)	(9.90)	(-6.58)	(-7.50)
CEO Confidence Level	-0.053***	-0.049***	0.008	0.041***
	(-7.21)	(-6.71)	(1.04)	(5.48)
Leverage	0.070***	0.078***	-0.069***	-0.084***
	(6.83)	(7.33)	(-6.21)	(-7.53)
Lagged EBIT/ASSET	-0.195***	-0.252***	0.166***	0.188***
	(-8.92)	(-10.89)	(7.45)	(7.99)
Lagged Market-to-book	-0.005***	-0.005***	0.006***	0.005***
	(-4.32)	(-3.35)	(3.68)	(3.07)
Intangibles/Assets	-0.024**	-0.022**	0.029***	0.029***
	(-2.29)	(-2.01)	(2.69)	(2.59)
R&D/Sales	-0.076***	-0.075***	0.074***	0.068***
	(-10.75)	(-11.14)	(10.04)	(9.77)
Institutional Ownership (%)	-0.169***	-0.163***	0.176***	0.175***
	(-15.60)	(-15.50)	(16.22)	(16.55)
NTD Proportion	0.124**	0.061*	-0.084	-0.090**
	(2.09)	(1.70)	(-1.51)	(-2.32)
Lagged Stock Return	-0.011***	-0.016***	0.005	0.005
	(-3.10)	(-4.03)	(1.21)	(1.25)
Lagged Stock Volatility	-0.146***	-0.117***	0.215***	0.208***
	(-4.17)	(-3.38)	(5.87)	(5.63)
County Education Level	0.000	0.000	0.000	0.000
	(0.86)	(0.83)	(1.15)	(0.98)
County Crime Ratio	-0.008***	-0.007**	0.005*	0.004
	(-3.08)	(-2.43)	(1.94)	(1.39)
County Population Density	-0.002	-0.004	0.004	0.008
	(-0.42)	(-0.77)	(0.62)	(1.40)
Metropolitan	0.003**	0.002	-0.003*	-0.002
	(1.99)	(1.57)	(-1.89)	(-1.37)
Longitude	-0.004**	-0.004**	0.002	0.003
	(-2.06)	(-2.30)	(1.28)	(1.62)
Latitude	-0.029	-0.064	-0.142	-0.114
	(-0.25)	(-0.57)	(-1.16)	(-1.00)
Constant	0.667***	0.608***	0.373**	0.421***
	(4.32)	(3.95)	(2.41)	(2.74)
Cubic Size Spline	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES
Number of Observations	26,841	27,047	26,841	27,047
Adj. R-sq	0.341	0.324	0.197	0.188

Table 6: Impact of Acid Rain Project (ARP) on the Relationship between Local Air Quality and CEO Compensation

This table contains models that analyze when the government introduced a regulation in 2000 to constrain the emission of SO_x and NO_x of the fossil power plant and how CEOs' compensation in counties where power capacity is high can be influenced. ARP is a proxy for this regulation. It equals the number of fossil power plants around firm headquarters times by a dummy variable equaling to 1 when it is later than 2000 and 0 otherwise. All models are Ordinary Least Square (OLS) regressions that include industry(SIC 2-digits), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	1.245***	1.363***	-4.442***	-3.664***	-0.203	0.067
	(6.41)	(7.20)	(-4.83)	(-4.18)	(-0.85)	(0.29)
Poison Ratio × ARP	-0.152*	-0.183**	1.269***	0.859***	0.132	0.017
	(-1.71)	(-2.26)	(3.64)	(2.81)	(1.45)	(0.19)
ARP	0.031	0.032	-0.355***	-0.361***	-0.027	-0.022
	(1.29)	(1.43)	(-4.00)	(-4.40)	(-1.05)	(-0.90)
Ln[Age]	0.182***	0.155***	-1.357***	-1.285***	-0.157***	-0.217***
	(3.64)	(3.23)	(-8.86)	(-8.48)	(-3.43)	(-4.69)
Female CEO	0.003	0.002	0.093	-0.021	0.053**	0.027
	(0.10)	(0.07)	(0.92)	(-0.20)	(2.06)	(0.94)
Ln[Tenure]	0.048***	0.030***	-0.040*	-0.028	0.039***	0.035***
	(7.24)	(4.90)	(-1.70)	(-1.19)	(5.48)	(5.13)
CEO Ownership(%)	-0.006**	-0.002	-0.050***	-0.047***	-0.013***	-0.010***
	(-2.05)	(-0.70)	(-7.57)	(-7.27)	(-4.40)	(-4.00)
CEO Confidence	0.118***	-0.006	0.162**	0.172**	0.263***	0.185***
	(5.28)	(-0.26)	(2.02)	(2.25)	(9.19)	(6.20)
Leverage	-0.052*	-0.029	-0.800***	-0.908***	-0.167***	-0.171***
	(-1.67)	(-0.90)	(-6.82)	(-7.51)	(-5.22)	(-5.02)
Lagged EBIT/ASSET	0.159**	0.379***	1.612***	2.140***	0.629***	0.911***
	(2.17)	(4.74)	(6.88)	(8.60)	(7.55)	(9.96)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.041***	0.017***	0.019***
	(-2.19)	(-1.05)	(3.73)	(2.92)	(2.98)	(2.62)
Intangibles/Assets	-0.019	0.002	0.096	0.136	0.109***	0.127***
	(-0.60)	(0.06)	(0.82)	(1.13)	(3.08)	(3.56)
R&D/Sales	0.040**	0.081***	0.654***	0.663***	0.222***	0.244***
	(2.44)	(4.20)	(9.55)	(10.37)	(11.24)	(12.58)
Institutional Ownership (%)	0.099***	0.081***	1.598***	1.522***	0.406***	0.402***
	(3.21)	(2.59)	(13.39)	(12.83)	(12.48)	(12.18)
NTD Proportion	0.287**	0.032	-0.708	-1.257***	0.117	-0.045
	(2.30)	(0.39)	(-1.22)	(-2.96)	(0.70)	(-0.37)
Lagged Stock Return	0.029***	0.051***	0.069*	0.122***	0.059***	0.088***
	(3.15)	(5.29)	(1.89)	(3.13)	(4.27)	(5.68)
Lagged Stock Return Volatility	-0.171*	-0.246***	0.778**	0.547*	0.459***	0.353***
	(-1.77)	(-2.59)	(2.37)	(1.65)	(4.03)	(3.11)
County Education Level	-0.001	-0.001	-0.009**	-0.010**	-0.001	-0.001
	(-0.93)	(-0.89)	(-2.24)	(-2.48)	(-0.70)	(-0.74)
County Crime Ratio	0.006	0.013*	0.073**	0.067**	0.028***	0.027***
	(0.92)	(1.74)	(2.38)	(2.16)	(3.60)	(3.30)
County Population Density	0.004	0.005	0.037	0.079	-0.012	-0.007
	(0.22)	(0.31)	(0.59)	(1.26)	(-0.67)	(-0.36)
Metropolitan	0.011***	0.009**	0.004	0.009	0.009*	0.009**
	(3.11)	(2.47)	(0.27)	(0.58)	(1.91)	(1.97)
Longitude	-0.009*	-0.009*	0.056***	0.058***	0.018***	0.018***
	(-1.94)	(-1.80)	(2.75)	(2.87)	(3.31)	(3.14)
Latitude	0.266	0.285	-0.378	-0.386	0.849**	1.019***
	(0.66)	(0.74)	(-0.28)	(-0.30)	(2.08)	(2.62)
Constant	5.119***	5.006***	5.127***	5.742***	5.699***	6.015***
	(13.88)	(13.34)	(3.08)	(3.50)	(12.24)	(12.58)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26737	26960	26664	26877	26661	26874
Adj. R-sq	0.326	0.312	0.209	0.203	0.540	0.516

Table 7: Changes in Local Air Pollution due to Firm's Headquarter Relocation and CEO compensation

In this table, we use the firm headquarters relocation as an exogenous shock to test the impact of air pollution change on CEO compensation. *Old Poison Ratio* is the poison ratio before headquarters relocation. In Panel A, *Poison Ratio Diff Pos* is the poison ratio difference between the new headquarters location and the old location after relocation if the firm moves to a more polluted place and 0 otherwise. *Poison Ratio Diff Neg* is the poison ratio difference between the new headquarters location and the old location after relocation if the firm moves to a cleaner place and 0 otherwise. In Panel B, *Poison Ratio Diff* is the poison ratio difference between the new headquarters location and the old location after relocation. All models are Ordinary Least Square (OLS) regressions that include industry (2-digit SIC), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

Panel A: Whole Sample Regression

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Old Poison Ratio	0.916***	1.012***	-3.364***	-2.815***	-0.080	0.082
	(5.24)	(6.21)	(-4.17)	(-3.96)	(-0.42)	(0.44)
Poison Ratio Diff	6.725***	6.474***	1.015	-0.278	2.277*	2.521*
	(4.17)	(4.13)	(0.47)	(-0.13)	(1.89)	(1.85)
Ln[Age]	0.174***	0.147***	-1.321***	-1.230***	-0.149***	-0.208***
	(3.58)	(3.12)	(-8.63)	(-8.14)	(-3.29)	(-4.55)
Female CEO	0.005	0.004	0.086	-0.036	0.053**	0.025
	(0.19)	(0.16)	(0.85)	(-0.34)	(2.05)	(0.88)
Ln[Tenure]	0.050***	0.031***	-0.051**	-0.041*	0.039***	0.035***
	(7.57)	(5.13)	(-2.15)	(-1.73)	(5.61)	(5.24)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.047***	-0.013***	-0.010***
	(-1.89)	(-0.46)	(-7.47)	(-7.31)	(-4.35)	(-3.93)
CEO Confidence	0.121***	-0.005	0.177**	0.187**	0.265***	0.185***
	(5.44)	(-0.20)	(2.20)	(2.44)	(9.24)	(6.17)
Leverage	-0.047	-0.023	-0.778***	-0.874***	-0.166***	-0.166***
	(-1.53)	(-0.72)	(-6.61)	(-7.23)	(-5.25)	(-4.94)
Lagged EBIT/ASSET	0.176**	0.396***	1.602***	2.127***	0.632***	0.917***
	(2.47)	(5.09)	(6.85)	(8.56)	(7.68)	(10.10)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.04)	(-0.65)	(3.72)	(2.94)	(2.98)	(2.63)
Intangibles	-0.022	0.002	0.079	0.099	0.105***	0.121***
	(-0.67)	(0.06)	(0.68)	(0.83)	(2.98)	(3.40)
R&D/Sales	0.029*	0.072***	0.639***	0.653***	0.218***	0.241***
	(1.73)	(3.71)	(9.26)	(10.09)	(10.93)	(12.20)
Institutional Ownership	0.081***	0.064**	1.591***	1.507***	0.397***	0.395***
	(2.67)	(2.11)	(13.36)	(12.76)	(12.30)	(12.09)
NTD Proportion	0.279**	0.013	-0.692	-1.278***	0.116	-0.045
	(2.26)	(0.16)	(-1.19)	(-2.98)	(0.69)	(-0.36)
Lagged Stock return	0.028***	0.050***	0.072*	0.122***	0.060***	0.089***
	(3.05)	(5.24)	(1.95)	(3.11)	(4.27)	(5.70)
Lagged Volatility	-0.188*	-0.267***	0.767**	0.569*	0.439***	0.328***
	(-1.94)	(-2.80)	(2.35)	(1.72)	(3.90)	(2.91)
Education Level	-0.002*	-0.002*	-0.008**	-0.009**	-0.001	-0.001
	(-1.82)	(-1.75)	(-1.98)	(-2.11)	(-1.03)	(-1.15)
Crime Ratio	0.041	0.006	0.185	0.106	0.781*	0.872**
	(0.10)	(0.02)	(0.14)	(0.08)	(1.95)	(2.30)
Population Density	0.010	0.018**	0.055*	0.049	0.031***	0.031***
	(1.50)	(2.43)	(1.79)	(1.58)	(3.99)	(3.84)
Metropolitan	-0.008	-0.006	0.009	0.044	-0.022	-0.017
	(-0.45)	(-0.37)	(0.15)	(0.72)	(-1.23)	(-0.98)
Longitude	0.008**	0.005	0.007	0.011	0.005	0.005
	(2.02)	(1.28)	(0.42)	(0.68)	(1.19)	(1.09)
Latitude	-0.008*	-0.009*	0.056***	0.057***	0.018***	0.017***
	(-1.70)	(-1.65)	(2.76)	(2.80)	(3.29)	(3.03)
Constant	4.843***	4.679***	5.022***	5.443***	5.304***	5.547***
	(11.83)	(10.88)	(2.97)	(3.27)	(11.40)	(11.65)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26617	26831	26543	26747	26540	26744
Adj. R-sq	0.336	0.320	0.211	0.204	0.546	0.521

Table 8: Impact of CEO's Management Ability on the relationship between Local Air Quality and CEO Compensation

The results in this table show the impacts of the CEO's managerial ability on the relationship between CEO compensation and air quality. *Managerial Ability(MA)* is the proxy for a CEO's managerial ability, of which detailed information comes from the Demerjian, Lev, and McVay(2012) managerial ability. All models are Ordinary Least Square (OLS) regression that includes industry(SIC 2-digits), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	0.913***	1.020***	-1.691*	-0.878	0.079	0.211
	(4.39)	(4.91)	(-1.86)	(-1.17)	(0.36)	(1.02)
Poison Ratio × MA	3.426***	4.644***	-3.870	-3.876	2.130	2.217
	(2.77)	(3.90)	(-0.74)	(-0.72)	(1.54)	(1.45)
MA	0.062	-0.045	0.639***	0.771***	0.373***	0.401***
	(1.35)	(-0.80)	(3.50)	(4.22)	(7.12)	(6.64)
Ln[Age]	0.233***	0.227***	-1.297***	-1.158***	-0.134***	-0.149***
	(4.26)	(4.40)	(-7.63)	(-6.94)	(-2.71)	(-2.92)
Female CEO	0.015	0.032	0.237**	0.125	0.084***	0.072**
	(0.46)	(1.13)	(2.12)	(1.05)	(2.90)	(2.38)
Ln[Tenure]	0.053***	0.034***	-0.069***	-0.051**	0.038***	0.034***
	(6.90)	(4.80)	(-2.61)	(-1.99)	(4.70)	(4.47)
CEO Ownership(%)	-0.007***	-0.005*	-0.047***	-0.048***	-0.015***	-0.014***
	(-2.63)	(-1.72)	(-6.57)	(-6.96)	(-5.80)	(-5.61)
CEO Confidence	0.125***	-0.002	0.176*	0.102	0.234***	0.173***
	(4.75)	(-0.09)	(1.84)	(1.13)	(7.29)	(5.25)
Leverage	-0.011	0.002	-0.839***	-0.947***	-0.171***	-0.153***
	(-0.31)	(0.05)	(-6.36)	(-7.06)	(-4.75)	(-3.98)
Lagged EBIT/ASSET	0.025	0.281***	1.221***	1.648***	0.357***	0.623***
	(0.32)	(3.15)	(4.54)	(5.81)	(3.99)	(6.25)
Lagged Market-to-book	-0.005**	-0.002*	0.037***	0.035***	0.015***	0.016**
	(-2.17)	(-1.66)	(3.42)	(2.64)	(2.79)	(2.46)
Intangibles/Assets	-0.066*	-0.026	-0.020	-0.019	-0.005	0.025
	(-1.77)	(-0.69)	(-0.15)	(-0.14)	(-0.13)	(0.65)
R&D/Sales	0.014	0.069***	0.871***	0.877***	0.263***	0.282***
	(0.69)	(3.25)	(8.40)	(9.52)	(8.97)	(9.88)
Institutional Ownership (%)	0.058	0.055	1.482***	1.483***	0.328***	0.359***
	(1.61)	(1.50)	(10.89)	(10.83)	(8.62)	(9.14)
NTD Proportion	0.225	-0.004	-0.683	-1.078**	0.052	-0.084
	(1.60)	(-0.05)	(-1.09)	(-2.29)	(0.29)	(-0.60)
Lagged Stock Return	0.028***	0.052***	0.066*	0.125***	0.057***	0.086***
	(2.90)	(5.23)	(1.72)	(3.11)	(3.93)	(5.50)
Lagged Stock Return Volatility	-0.324***	-0.389***	0.510	0.087	0.304***	0.185
	(-2.96)	(-3.75)	(1.43)	(0.24)	(2.60)	(1.59)
County Education Level	0.000	0.000	-0.010**	-0.010**	-0.000	-0.001
	(0.03)	(0.04)	(-2.06)	(-2.16)	(-0.36)	(-0.68)
County Crime Ratio	0.052	-0.074	0.027	-0.306	0.814*	0.925**
	(0.11)	(-0.16)	(0.02)	(-0.21)	(1.87)	(2.15)
County Population Density	0.012	0.021**	0.019	0.017	0.018**	0.021**
	(1.38)	(2.32)	(0.53)	(0.48)	(2.03)	(2.25)
Metropolitan	0.019	0.024	-0.029	-0.004	-0.001	0.007
	(0.99)	(1.17)	(-0.42)	(-0.06)	(-0.04)	(0.34)
Longitude	0.007	0.001	0.009	0.012	0.007	0.008
	(1.50)	(0.29)	(0.46)	(0.64)	(1.38)	(1.49)
Latitude	-0.011*	-0.016**	0.028	0.035	0.009	0.009
	(-1.80)	(-2.51)	(1.17)	(1.50)	(1.39)	(1.39)
Constant	4.529***	4.037***	5.564***	5.748***	5.448***	5.674***
	(9.11)	(7.80)	(2.89)	(3.04)	(10.66)	(10.69)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	20342	21120	20283	21053	20280	21050
Adj. R-sq	0.322	0.301	0.211	0.201	0.543	0.512

Table 9: Impact of CEO's Internal Power on Relationship between Local Air Quality and CEO Compensation

The results in this table show the impacts of CEO power on the relationship between CEO compensation and air quality. *CEO power* is a CEO power dummy variable, which equals 1 if CEO is also the chairman and president at the same time and equals 0 otherwise. All models are Ordinary Least Square (OLS) regressions that include industry(SIC 2-digits), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	0.855***	0.933***	-3.108***	-2.602***	-0.146	0.019
	(4.68)	(5.46)	(-3.81)	(-3.70)	(-0.74)	(0.10)
Poison Ratio × CEO Power	1.151***	1.015***	0.560	0.206	0.581*	0.446
	(4.45)	(3.51)	(0.40)	(0.16)	(1.68)	(1.32)
CEO Power	0.021*	0.018	0.183***	0.115**	0.061***	0.055***
	(1.81)	(1.49)	(3.93)	(2.41)	(5.07)	(4.34)
Ln[Age]	0.194***	0.165***	-1.331***	-1.252***	-0.142***	-0.203***
	(3.88)	(3.43)	(-8.75)	(-8.29)	(-3.09)	(-4.40)
Female CEO	0.004	0.002	0.090	-0.033	0.053**	0.025
	(0.14)	(0.10)	(0.89)	(-0.31)	(2.06)	(0.88)
Ln[Tenure]	0.047***	0.029***	-0.055**	-0.039	0.036***	0.033***
	(7.14)	(4.82)	(-2.34)	(-1.64)	(5.11)	(4.84)
CEO Ownership(%)	-0.006**	-0.001	-0.051***	-0.048***	-0.013***	-0.010***
	(-1.98)	(-0.56)	(-7.56)	(-7.43)	(-4.45)	(-4.04)
CEO Confidence	0.119***	-0.006	0.169**	0.171**	0.263***	0.184***
	(5.34)	(-0.27)	(2.12)	(2.25)	(9.28)	(6.20)
Leverage	-0.054*	-0.030	-0.804***	-0.906***	-0.170***	-0.172***
	(-1.74)	(-0.95)	(-6.87)	(-7.53)	(-5.35)	(-5.06)
Lagged EBIT/ASSET	0.160**	0.385***	1.619***	2.165***	0.631***	0.920***
	(2.23)	(4.91)	(6.96)	(8.76)	(7.69)	(10.16)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.11)	(-0.93)	(3.73)	(2.93)	(3.00)	(2.63)
Intangibles/Assets	-0.018	0.006	0.096	0.126	0.110***	0.128***
	(-0.55)	(0.17)	(0.82)	(1.05)	(3.14)	(3.60)
R&D/Sales	0.044***	0.085***	0.660***	0.672***	0.226***	0.248***
	(2.69)	(4.39)	(9.66)	(10.53)	(11.47)	(12.84)
Institutional Ownership (%)	0.091***	0.073**	1.585***	1.520***	0.400***	0.398***
	(2.96)	(2.37)	(13.30)	(12.84)	(12.28)	(12.03)
NTD Proportion	0.277**	0.033	-0.714	-1.262***	0.111	-0.043
	(2.21)	(0.40)	(-1.23)	(-2.96)	(0.66)	(-0.35)
Lagged Stock Return	0.029***	0.052***	0.070*	0.123***	0.059***	0.089***
	(3.16)	(5.35)	(1.90)	(3.16)	(4.27)	(5.73)
Lagged Stock Return Volatility	-0.167*	-0.240**	0.856***	0.589*	0.471***	0.356***
	(-1.75)	(-2.54)	(2.61)	(1.78)	(4.16)	(3.16)
County Education Level	-0.001	-0.001	-0.007*	-0.008**	-0.001	-0.001
	(-1.05)	(-1.13)	(-1.71)	(-2.02)	(-0.48)	(-0.66)
County Crime Ratio	0.115	0.070	0.079	0.002	0.812**	0.917**
	(0.29)	(0.18)	(0.06)	(0.00)	(2.03)	(2.42)
County Population Density	0.009	0.017**	0.055*	0.047	0.027***	0.027***
	(1.29)	(2.25)	(1.81)	(1.54)	(3.52)	(3.35)
Metropolitan	-0.000	0.002	0.015	0.052	-0.019	-0.014
	(-0.02)	(0.10)	(0.24)	(0.85)	(-1.07)	(-0.78)
Longitude	0.008**	0.005	0.004	0.010	0.007	0.006
	(2.17)	(1.28)	(0.24)	(0.62)	(1.47)	(1.36)
Latitude	-0.009*	-0.010*	0.053***	0.056***	0.017***	0.017***
	(-1.84)	(-1.85)	(2.60)	(2.76)	(3.21)	(2.96)
Constant	4.833***	4.632***	4.772***	5.452***	5.395***	5.656***
	(11.82)	(10.80)	(2.84)	(3.30)	(11.62)	(11.85)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26929	27151	26855	27067	26852	27064
Adj. R-sq	0.327	0.312	0.210	0.203	0.542	0.517

Table 10: Impact of CEO's Outside Opportunity on Relationship between Local Air Quality and CEO Compensation

The results in this table show the impacts of CEO outside opportunity on the relationship between CEO compensation and air quality. $\widehat{IDD}$ is the measurement for the CEO's outside opportunity. Higher implies that CEOs have more outside opportunities. We get the IDD adoption and rejection data from Ke Na(2020). All models are Ordinary Least Square (OLS) regression that includes industry(SIC 2-digits), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	0.998***	1.028***	-2.290***	-2.077***	0.013	0.139
	(5.65)	(6.03)	(-3.15)	(-3.19)	(0.07)	(0.75)
Poison Ratio × $\widehat{IDD}$	0.420**	0.627***	-2.662***	-2.182***	-0.103	-0.049
	(2.13)	(3.13)	(-3.04)	(-2.61)	(-0.46)	(-0.22)
Ln[Age]	0.195***	0.166***	-1.327***	-1.251***	-0.139***	-0.202***
	(3.91)	(3.46)	(-8.71)	(-8.29)	(-3.04)	(-4.36)
Female CEO	0.001	0.000	0.092	-0.029	0.051**	0.024
	(0.05)	(0.01)	(0.91)	(-0.27)	(2.00)	(0.85)
Ln[Tenure]	0.049***	0.031***	-0.045*	-0.033	0.039***	0.036***
	(7.43)	(5.08)	(-1.92)	(-1.39)	(5.59)	(5.26)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.048***	-0.013***	-0.010***
	(-1.94)	(-0.52)	(-7.51)	(-7.40)	(-4.38)	(-3.96)
CEO Confidence	0.117***	-0.007	0.170**	0.173**	0.262***	0.183***
	(5.28)	(-0.33)	(2.12)	(2.27)	(9.23)	(6.18)
Leverage	-0.053*	-0.029	-0.808***	-0.910***	-0.171***	-0.172***
	(-1.71)	(-0.91)	(-6.90)	(-7.57)	(-5.35)	(-5.08)
Lagged EBIT/ASSET	0.158**	0.382***	1.605***	2.154***	0.626***	0.915***
	(2.19)	(4.86)	(6.86)	(8.69)	(7.60)	(10.09)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.15)	(-0.98)	(3.69)	(2.90)	(2.99)	(2.62)
Intangibles/Assets	-0.018	0.004	0.105	0.134	0.111***	0.128***
	(-0.57)	(0.12)	(0.90)	(1.12)	(3.15)	(3.60)
R&D/Sales	0.042***	0.083***	0.666***	0.678***	0.225***	0.248***
	(2.58)	(4.32)	(9.70)	(10.58)	(11.41)	(12.84)
Institutional Ownership (%)	0.097***	0.079**	1.594***	1.525***	0.406***	0.403***
	(3.15)	(2.56)	(13.40)	(12.90)	(12.48)	(12.22)
NTD Proportion	0.276**	0.031	-0.708	-1.267***	0.111	-0.045
	(2.21)	(0.39)	(-1.22)	(-2.98)	(0.66)	(-0.37)
Lagged Stock Return	0.029***	0.052***	0.072*	0.123***	0.060***	0.089***
	(3.18)	(5.36)	(1.95)	(3.16)	(4.30)	(5.73)
Lagged Stock Return Volatility	-0.171*	-0.242**	0.811**	0.570*	0.460***	0.350***
	(-1.79)	(-2.56)	(2.48)	(1.73)	(4.05)	(3.11)
County Education Level	-0.001	-0.001	-0.007*	-0.009**	-0.001	-0.001
	(-1.24)	(-1.29)	(-1.81)	(-2.06)	(-0.72)	(-0.85)
County Crime Ratio	0.146	0.125	-0.246	-0.278	0.787**	0.895**
	(0.37)	(0.33)	(-0.18)	(-0.22)	(1.96)	(2.35)
County Population Density	0.010	0.018**	0.053*	0.047	0.027***	0.027***
	(1.42)	(2.37)	(1.76)	(1.53)	(3.54)	(3.39)
Metropolitan	-0.001	0.000	0.025	0.061	-0.018	-0.013
	(-0.05)	(0.01)	(0.41)	(0.98)	(-1.00)	(-0.73)
Longitude	0.007*	0.003	0.010	0.016	0.007	0.006
	(1.80)	(0.80)	(0.62)	(0.96)	(1.48)	(1.36)
Latitude	-0.009*	-0.010*	0.056***	0.058***	0.018***	0.018***
	(-1.89)	(-1.93)	(2.75)	(2.87)	(3.30)	(3.04)
Constant	4.703***	4.445***	5.327***	5.950***	5.406***	5.656***
	(11.46)	(10.30)	(3.18)	(3.59)	(11.59)	(11.80)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26,929	27,151	26,855	27,067	26,852	27,064
Adj. R-sq	0.326	0.312	0.209	0.203	0.541	0.517

Table 11: Impact of Changes in Environmental Consciousness on the Relationship between Local Air Quality and CEO Compensation

This table contains models that analyze the impact of environmental consciousness on the relation between air quality and compensation. *Political Activism(PA)* and *Media Activism* are both proxy for people's environmental consciousness. *Political activism* denotes Obama's second term when many environmental protection laws were passed and enacted. *Media Activism* denotes the total number of articles discussing the relationship between health and environmental issues published in mainstream newspapers scaled by the number of articles related to the environment. All models are Ordinary Least Square (OLS) regressions that include industry(SIC 2-digits), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

Panel A: Periods of High Political Activism on Environmental Causes

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	1.028***	1.065***	-3.010***	-2.490***	-0.047	0.094
	(5.89)	(6.62)	(-3.73)	(-3.45)	(-0.24)	(0.51)
Poison Ratio × Political Activism	1.376**	2.013***	0.937	-0.923	0.613	0.730
	(2.41)	(3.39)	(0.34)	(-0.38)	(1.03)	(1.25)
Ln[Age]	0.195***	0.165***	-1.325***	-1.249***	-0.140***	-0.202***
	(3.90)	(3.44)	(-8.70)	(-8.27)	(-3.04)	(-4.36)
Female CEO	0.002	0.001	0.086	-0.034	0.051**	0.024
	(0.08)	(0.06)	(0.85)	(-0.32)	(1.99)	(0.85)
Ln[Tenure]	0.049***	0.031***	-0.046**	-0.033	0.039***	0.036***
	(7.41)	(5.05)	(-1.97)	(-1.41)	(5.58)	(5.24)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.048***	-0.013***	-0.010***
	(-1.95)	(-0.53)	(-7.48)	(-7.38)	(-4.38)	(-3.96)
CEO Confidence	0.118***	-0.006	0.166**	0.170**	0.262***	0.183***
	(5.31)	(-0.29)	(2.08)	(2.23)	(9.23)	(6.18)
Leverage	-0.053*	-0.028	-0.804***	-0.907***	-0.170***	-0.171***
	(-1.69)	(-0.89)	(-6.86)	(-7.54)	(-5.33)	(-5.05)
Lagged EBIT/ASSET	0.157**	0.381***	1.606***	2.156***	0.626***	0.915***
	(2.19)	(4.86)	(6.88)	(8.71)	(7.60)	(10.10)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.15)	(-0.95)	(3.72)	(2.92)	(2.99)	(2.63)
Intangibles/Assets	-0.017	0.006	0.096	0.126	0.111***	0.128***
	(-0.53)	(0.19)	(0.82)	(1.05)	(3.14)	(3.60)
R&D/Sales	0.042***	0.083***	0.657***	0.672***	0.224***	0.247***
	(2.60)	(4.34)	(9.57)	(10.50)	(11.41)	(12.82)
Institutional Ownership (%)	0.096***	0.079**	1.600***	1.529***	0.407***	0.403***
	(3.14)	(2.55)	(13.43)	(12.91)	(12.50)	(12.24)
NTD Proportion	0.278**	0.032	-0.713	-1.267***	0.111	-0.045
	(2.23)	(0.39)	(-1.23)	(-2.98)	(0.66)	(-0.37)
Lagged Stock Return	0.029***	0.052***	0.071*	0.123***	0.060***	0.089***
	(3.18)	(5.36)	(1.93)	(3.16)	(4.30)	(5.73)
Lagged Stock Return Volatility	-0.175*	-0.246***	0.827**	0.579*	0.460***	0.350***
	(-1.83)	(-2.61)	(2.53)	(1.75)	(4.06)	(3.11)
County Education Level	-0.001	-0.001	-0.008*	-0.009**	-0.001	-0.001
	(-1.02)	(-1.00)	(-1.86)	(-2.14)	(-0.66)	(-0.77)
County Crime Ratio	0.120	0.085	0.070	-0.036	0.809**	0.913**
	(0.30)	(0.22)	(0.05)	(-0.03)	(2.02)	(2.41)
County Population Density	0.009	0.017**	0.056*	0.048	0.028***	0.027***
	(1.37)	(2.33)	(1.83)	(1.56)	(3.55)	(3.39)
Metropolitan	-0.001	-0.000	0.015	0.054	-0.019	-0.014
	(-0.07)	(-0.01)	(0.24)	(0.87)	(-1.07)	(-0.80)
Longitude	0.008**	0.005	0.004	0.010	0.007	0.006
	(2.05)	(1.17)	(0.25)	(0.63)	(1.44)	(1.34)
Latitude	-0.009*	-0.010*	0.054***	0.057***	0.018***	0.018***
	(-1.86)	(-1.88)	(2.68)	(2.82)	(3.29)	(3.03)
Constant	4.788***	4.582***	4.799***	5.466***	5.386***	5.645***
	(11.77)	(10.73)	(2.86)	(3.31)	(11.60)	(11.83)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26,929	27,151	26,855	27,067	26,852	27,064
Adj. R-sq	0.326	0.312	0.209	0.203	0.541	0.517

Panel B: Increasing Media Activism about Environmental Causes

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	1.047***	0.961***	-2.562***	-2.139***	-0.030	0.111
	(5.41)	(5.41)	(-2.96)	(-2.76)	(-0.14)	(0.56)
Poison Ratio × Media Activism	0.278	1.063***	-1.890	-2.085	0.082	0.098
	(0.77)	(3.02)	(-1.04)	(-1.24)	(0.19)	(0.23)
Ln[Age]	0.195***	0.167***	-1.327***	-1.251***	-0.139***	-0.202***
	(3.91)	(3.47)	(-8.70)	(-8.28)	(-3.04)	(-4.35)
Female CEO	0.002	0.001	0.087	-0.033	0.051**	0.024
	(0.09)	(0.05)	(0.86)	(-0.31)	(1.99)	(0.85)
Ln[Tenure]	0.049***	0.031***	-0.046*	-0.033	0.039***	0.036***
	(7.44)	(5.07)	(-1.94)	(-1.40)	(5.58)	(5.25)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.048***	-0.013***	-0.010***
	(-1.95)	(-0.53)	(-7.48)	(-7.38)	(-4.38)	(-3.96)
CEO Confidence	0.118***	-0.007	0.168**	0.171**	0.262***	0.183***
	(5.30)	(-0.32)	(2.09)	(2.25)	(9.23)	(6.17)
Leverage	-0.053*	-0.028	-0.808***	-0.911***	-0.170***	-0.172***
	(-1.71)	(-0.87)	(-6.89)	(-7.57)	(-5.34)	(-5.06)
Lagged EBIT/ASSET	0.157**	0.381***	1.607***	2.158***	0.626***	0.915***
	(2.19)	(4.85)	(6.88)	(8.71)	(7.61)	(10.10)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.15)	(-0.95)	(3.71)	(2.91)	(2.99)	(2.63)
Intangibles/Assets	-0.017	0.006	0.097	0.126	0.111***	0.128***
	(-0.53)	(0.18)	(0.83)	(1.05)	(3.14)	(3.60)
R&D/Sales	0.043***	0.083***	0.660***	0.674***	0.225***	0.248***
	(2.65)	(4.35)	(9.63)	(10.50)	(11.44)	(12.84)
Institutional Ownership (%)	0.096***	0.079**	1.598***	1.527***	0.406***	0.403***
	(3.13)	(2.57)	(13.43)	(12.91)	(12.51)	(12.25)
NTD Proportion	0.277**	0.030	-0.713	-1.264***	0.111	-0.046
	(2.22)	(0.37)	(-1.23)	(-2.97)	(0.66)	(-0.38)
Lagged Stock Return	0.029***	0.052***	0.071*	0.123***	0.060***	0.089***
	(3.19)	(5.36)	(1.93)	(3.16)	(4.30)	(5.73)
Lagged Stock Return Volatility	-0.174*	-0.247***	0.833**	0.583*	0.460***	0.350***
	(-1.82)	(-2.61)	(2.54)	(1.77)	(4.06)	(3.11)
County Education Level	-0.001	-0.001	-0.008**	-0.009**	-0.001	-0.001
	(-1.12)	(-0.97)	(-2.00)	(-2.25)	(-0.71)	(-0.83)
County Crime Ratio	0.110	0.103	-0.027	-0.120	0.802**	0.906**
	(0.28)	(0.27)	(-0.02)	(-0.10)	(2.00)	(2.38)
County Population Density	0.009	0.017**	0.057*	0.049	0.028***	0.027***
	(1.35)	(2.22)	(1.86)	(1.60)	(3.54)	(3.38)
Metropolitan	0.000	0.000	0.020	0.057	-0.019	-0.014
	(0.01)	(0.03)	(0.32)	(0.92)	(-1.03)	(-0.75)
Longitude	0.008**	0.005	0.004	0.011	0.007	0.006
	(2.05)	(1.15)	(0.27)	(0.65)	(1.44)	(1.34)
Latitude	-0.009*	-0.010*	0.054***	0.057***	0.018***	0.018***
	(-1.84)	(-1.84)	(2.68)	(2.81)	(3.29)	(3.03)
Constant	4.784***	4.572***	4.812***	5.489***	5.384***	5.644***
	(11.74)	(10.70)	(2.87)	(3.32)	(11.59)	(11.82)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26929	27151	26855	27067	26852	27064
Adj. R-sq	0.326	0.312	0.209	0.203	0.541	0.517

Table 12: Alternative Proxy for Local Air Quality

In this table, we use the total number of fossil power plant around firms' headquarter as a proxy for the local air quality. Power Plant Number in the regression is the total number of fossil power plants within 40miles of firms' headquarters location. All models are Ordinary Least Square (OLS) regressions that include industry (2-digit SIC), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Number of Power Plant	0.031***	0.040***	-0.084*	-0.084*	0.011	0.016
	(3.27)	(4.05)	(-1.89)	(-1.92)	(0.91)	(1.35)
Ln[Age]	0.173***	0.145***	-1.337***	-1.266***	-0.158***	-0.220***
	(3.46)	(3.02)	(-8.73)	(-8.37)	(-3.46)	(-4.75)
Female CEO	0.004	0.004	0.087	-0.024	0.054**	0.029
	(0.16)	(0.16)	(0.86)	(-0.23)	(2.09)	(1.00)
Ln[Tenure]	0.049***	0.031***	-0.042*	-0.030	0.039***	0.036***
	(7.37)	(5.06)	(-1.78)	(-1.26)	(5.53)	(5.20)
CEO Ownership(%)	-0.006**	-0.002	-0.050***	-0.047***	-0.013***	-0.010***
	(-2.05)	(-0.68)	(-7.59)	(-7.31)	(-4.40)	(-3.99)
CEO Confidence	0.119***	-0.005	0.155*	0.169**	0.262***	0.184***
	(5.34)	(-0.25)	(1.93)	(2.22)	(9.18)	(6.19)
Leverage	-0.055*	-0.032	-0.795***	-0.904***	-0.168***	-0.173***
	(-1.76)	(-0.99)	(-6.77)	(-7.47)	(-5.27)	(-5.10)
Lagged EBIT/ASSET	0.166**	0.388***	1.611***	2.147***	0.632***	0.915***
	(2.27)	(4.86)	(6.87)	(8.64)	(7.60)	(10.04)
LaggedMarket-to-book	-0.004**	-0.001	0.041***	0.041***	0.017***	0.019***
	(-2.19)	(-1.10)	(3.72)	(2.92)	(2.99)	(2.63)
Intangibles/Assets	-0.016	0.006	0.094	0.134	0.110***	0.129***
	(-0.50)	(0.18)	(0.81)	(1.11)	(3.11)	(3.60)
R&D/Sales	0.042**	0.084***	0.651***	0.664***	0.223***	0.245***
	(2.54)	(4.29)	(9.50)	(10.36)	(11.26)	(12.66)
Institutional Ownership (%)	0.097***	0.079**	1.603***	1.523***	0.406***	0.401***
	(3.14)	(2.52)	(13.38)	(12.82)	(12.47)	(12.16)
NTD Proportion	0.286**	0.029	-0.709	-1.261***	0.117	-0.046
	(2.28)	(0.36)	(-1.21)	(-2.96)	(0.71)	(-0.38)
Lagged Stock Return	0.029***	0.051***	0.069*	0.119***	0.059***	0.088***
	(3.15)	(5.34)	(1.87)	(3.06)	(4.26)	(5.68)
Lagged Stock Return Volatility	-0.182*	-0.258***	0.807**	0.569*	0.457***	0.349***
	(-1.88)	(-2.71)	(2.44)	(1.71)	(4.02)	(3.08)
County Education Level	-0.001	-0.001	-0.011**	-0.012***	-0.001	-0.001
	(-0.72)	(-0.66)	(-2.44)	(-2.79)	(-0.75)	(-0.76)
County Crime Ratio	0.326	0.370	-1.102	-1.302	0.652	0.818**
	(0.84)	(0.99)	(-0.84)	(-1.05)	(1.64)	(2.17)
County Population Density	0.000	0.005	0.109***	0.101***	0.029***	0.025***
	(0.01)	(0.69)	(3.34)	(3.16)	(3.51)	(2.82)
Metropolitan	0.021	0.022	-0.041	-0.000	-0.019	-0.011
	(1.16)	(1.19)	(-0.64)	(-0.00)	(-0.98)	(-0.56)
Longitude	0.011***	0.008**	0.001	0.006	0.008*	0.009*
	(3.02)	(2.23)	(0.07)	(0.36)	(1.78)	(1.81)
Latitude	-0.019***	-0.020***	0.073***	0.072***	0.014***	0.013**
	(-4.04)	(-3.96)	(3.76)	(3.77)	(2.71)	(2.32)
Constant	2.980**	3.554***	6.050	5.276	6.630***	6.176***
	(2.51)	(3.13)	(1.36)	(1.31)	(5.36)	(5.15)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26737	26960	26664	26877	26661	26874
Adj. R-sq	0.325	0.311	0.208	0.202	0.540	0.515

Robustness Test

Table R1: Impact of Local Air Quality on CEO Compensation after including other County-level Quality of Life Controls

In this table, apart from local per capita income, we also include local median house value and local government spending to mitigate potential omitted variable problems. All models are Ordinary Least Square (OLS) regressions that include industry (2-digit SIC), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	Ln[Cash Compensation]		Ln[Incentive Compensation		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	1.395***	1.481***	-2.613***	-2.059***	0.220	0.393**
	(7.71)	(8.36)	(-3.41)	(-2.99)	(1.16)	(2.12)
Ln[Age]	0.109**	0.078	-1.273***	-1.222***	-0.216***	-0.291***
	(2.13)	(1.59)	(-7.53)	(-7.27)	(-4.36)	(-5.87)
Female CEO	0.006	-0.001	0.170	0.073	0.070**	0.051*
	(0.20)	(-0.05)	(1.56)	(0.65)	(2.45)	(1.73)
Ln[Tenure]	0.047***	0.028***	-0.049*	-0.033	0.043***	0.037***
	(6.55)	(4.24)	(-1.82)	(-1.28)	(5.56)	(4.97)
CEO Ownership(%)	-0.002	0.000	-0.037***	-0.037***	-0.009***	-0.006**
	(-0.66)	(0.15)	(-4.83)	(-5.15)	(-2.83)	(-2.30)
CEO Confidence	0.133***	0.017	0.143	0.155*	0.264***	0.182***
	(5.13)	(0.75)	(1.51)	(1.83)	(8.18)	(5.76)
Leverage	-0.056	-0.031	-0.814***	-0.899***	-0.173***	-0.174***
	(-1.64)	(-0.85)	(-6.30)	(-6.78)	(-4.97)	(-4.52)
Lagged EBIT/ASSET	0.105	0.320***	1.589***	2.214***	0.593***	0.923***
	(1.32)	(3.73)	(6.08)	(8.35)	(6.42)	(9.60)
Lagged Market-to-book	-0.006*	-0.001	0.058***	0.062***	0.025***	0.029***
	(-1.85)	(-0.58)	(5.38)	(4.99)	(4.32)	(4.20)
Intangibles/Assets	-0.023	0.023	0.038	0.073	0.074**	0.114***
	(-0.76)	(0.73)	(0.28)	(0.53)	(2.01)	(3.13)
R&D/Sales	0.068***	0.100***	0.584***	0.608***	0.211***	0.235***
	(3.35)	(4.61)	(7.45)	(8.77)	(9.56)	(10.93)
Institutional Ownership (%)	0.057*	0.055	1.640***	1.526***	0.379***	0.363***
	(1.68)	(1.64)	(12.30)	(11.39)	(10.48)	(10.12)
NTD Proportion	0.128	0.013	0.162	-1.566***	0.308**	-0.140
	(1.00)	(0.17)	(0.29)	(-3.37)	(2.05)	(-1.19)
Lagged Stock Return	0.025***	0.044***	0.043	0.085**	0.044***	0.068***
	(2.68)	(4.53)	(1.11)	(2.11)	(3.16)	(4.51)
Lagged Stock Return Volatility	-0.084	-0.166*	0.865**	0.693*	0.586***	0.505***
	(-0.81)	(-1.68)	(2.36)	(1.87)	(4.59)	(4.03)
Ln[Government Spending]	-0.007	0.002	0.088	0.104	-0.012	-0.000
	(-0.34)	(0.09)	(1.00)	(1.17)	(-0.52)	(-0.01)
County Education Level	-0.001	-0.002	-0.003	-0.005	-0.000	-0.001
	(-0.94)	(-1.27)	(-0.52)	(-0.96)	(-0.16)	(-0.43)
County Crime Ratio	0.467	0.274	-0.589	-0.094	0.770*	0.917**
	(1.31)	(0.74)	(-0.36)	(-0.06)	(1.77)	(2.12)
Ln[Median House Value]	0.087***	0.079**	-0.083	-0.054	0.063*	0.066*
	(2.99)	(2.51)	(-0.59)	(-0.38)	(1.82)	(1.73)
Population Denstiy	0.026***	0.036***	0.066**	0.061**	0.036***	0.038***
	(3.83)	(4.89)	(2.19)	(2.02)	(4.85)	(4.69)
Metropolitan	-0.036**	-0.030*	0.015	0.045	-0.039**	-0.033*
	(-2.00)	(-1.66)	(0.22)	(0.65)	(-2.04)	(-1.69)
Longitude	0.007	0.003	-0.001	0.005	0.003	0.003
	(1.54)	(0.55)	(-0.05)	(0.29)	(0.69)	(0.58)
Latitude	-0.006	-0.009	0.029	0.030	0.013**	0.012*
	(-1.13)	(-1.59)	(1.35)	(1.41)	(2.29)	(1.93)
Constant	4.779***	4.542***	3.812**	4.552**	5.195***	5.522***
	(10.67)	(9.48)	(2.07)	(2.48)	(10.45)	(10.71)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry ×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	21749	21919	21691	21855	21688	21852
Adj. R-sq	0.310	0.295	0.210	0.206	0.537	0.513

Table R2: Impact of Nearby Air Pollution on CEO Compensation Level

This table depicts the impact of nearby counties' air pollution on the CEO's compensation. In Panel A, we use the average poison ratio of the five counties nearest the county where the firm's headquarters is located. We denote it as *Nearby Poison Ratio*. In Panel B, we use the weighted average poison ratio of both local and nearest-five-counties poison ratio as the proxy for the regional air quality, which is denoted as *Regional Poison Ratio*. All models are Ordinary Least Square (OLS) regressions that include industry (2-digit SIC), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

Panel A: Nearby Poison Ratio as proxy for the Local Air Pollution

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Nearby Poison Ratio	1.349***	1.447***	-2.882***	-2.639***	0.010	0.128
	(7.11)	(7.88)	(-3.45)	(-3.54)	(0.05)	(0.66)
Ln[Age]	0.190***	0.160***	-1.321***	-1.247***	-0.141***	-0.203***
	(3.80)	(3.34)	(-8.67)	(-8.27)	(-3.07)	(-4.40)
Female CEO	-0.000	-0.001	0.087	-0.033	0.050*	0.023
	(-0.02)	(-0.04)	(0.86)	(-0.31)	(1.95)	(0.81)
Ln[Tenure]	0.049***	0.031***	-0.047**	-0.033	0.039***	0.036***
	(7.45)	(5.10)	(-1.98)	(-1.42)	(5.59)	(5.24)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.048***	-0.013***	-0.010***
	(-1.95)	(-0.53)	(-7.49)	(-7.39)	(-4.38)	(-3.96)
CEO Confidence	0.117***	-0.007	0.168**	0.171**	0.262***	0.183***
	(5.29)	(-0.32)	(2.09)	(2.25)	(9.22)	(6.16)
Leverage	-0.052*	-0.028	-0.804***	-0.906***	-0.170***	-0.171***
	(-1.68)	(-0.88)	(-6.86)	(-7.53)	(-5.32)	(-5.05)
Lagged EBIT/ASSET	0.159**	0.383***	1.605***	2.158***	0.626***	0.915***
	(2.22)	(4.89)	(6.87)	(8.71)	(7.60)	(10.10)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.15)	(-0.98)	(3.70)	(2.91)	(2.99)	(2.63)
Intangibles/Assets	-0.017	0.006	0.098	0.129	0.110***	0.127***
	(-0.52)	(0.17)	(0.84)	(1.08)	(3.13)	(3.56)
R&D/Sales	0.042***	0.083***	0.659***	0.673***	0.224***	0.247***
	(2.60)	(4.37)	(9.63)	(10.52)	(11.42)	(12.80)
Institutional Ownership (%)	0.095***	0.078**	1.601***	1.530***	0.406***	0.403***
	(3.12)	(2.51)	(13.44)	(12.93)	(12.49)	(12.23)
NTD Proportion	0.274**	0.028	-0.709	-1.264***	0.110	-0.047
	(2.19)	(0.34)	(-1.22)	(-2.97)	(0.65)	(-0.39)
Lagged Stock Return	0.029***	0.052***	0.071*	0.123***	0.060***	0.089***
	(3.18)	(5.35)	(1.93)	(3.15)	(4.30)	(5.73)
Lagged Stock Return Volatility	-0.172*	-0.245***	0.823**	0.574*	0.463***	0.351***
	(-1.79)	(-2.60)	(2.51)	(1.74)	(4.08)	(3.12)
County Education Level	-0.002*	-0.002*	-0.006	-0.008*	-0.001	-0.001
	(-1.92)	(-1.92)	(-1.57)	(-1.90)	(-0.88)	(-1.07)
County Crime Ratio	0.041	0.020	-0.093	-0.240	0.774*	0.892**
	(0.10)	(0.05)	(-0.07)	(-0.19)	(1.95)	(2.38)
County Population Density	0.023***	0.032***	0.046*	0.043	0.031***	0.031***
	(3.48)	(4.43)	(1.67)	(1.56)	(4.40)	(4.16)
Metropolitan	-0.000	0.000	0.007	0.046	-0.019	-0.014
	(-0.02)	(0.01)	(0.11)	(0.74)	(-1.07)	(-0.77)
Longitude	0.006	0.003	0.006	0.012	0.006	0.005
	(1.59)	(0.65)	(0.37)	(0.76)	(1.23)	(1.08)
Latitude	-0.012**	-0.012**	0.062***	0.062***	0.017***	0.016***
	(-2.51)	(-2.43)	(3.12)	(3.13)	(3.20)	(2.87)
Constant	4.653***	4.411***	4.938***	5.659***	5.308***	5.547***
	(11.35)	(10.25)	(2.96)	(3.41)	(11.38)	(11.52)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26929	27151	26855	27067	26852	27064
Adj. R-sq	0.326	0.312	0.209	0.203	0.541	0.517

Panel B: Regional Poison Ratio as proxy for the Local Air Pollution

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Regional Poison Ratio	1.403***	1.478***	-3.182***	-2.772***	0.019	0.158
	(7.33)	(7.99)	(-3.86)	(-3.75)	(0.09)	(0.82)
Ln[Age]	0.191***	0.161***	-1.322***	-1.248***	-0.140***	-0.203***
	(3.82)	(3.35)	(-8.68)	(-8.28)	(-3.06)	(-4.39)
Female CEO	0.000	-0.000	0.088	-0.033	0.050**	0.023
	(0.00)	(-0.02)	(0.87)	(-0.31)	(1.96)	(0.82)
Ln[Tenure]	0.049***	0.031***	-0.046**	-0.033	0.039***	0.036***
	(7.44)	(5.10)	(-1.97)	(-1.42)	(5.59)	(5.25)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.048***	-0.013***	-0.010***
	(-1.95)	(-0.54)	(-7.48)	(-7.39)	(-4.38)	(-3.96)
CEO Confidence	0.118***	-0.007	0.167**	0.170**	0.262***	0.183***
	(5.30)	(-0.30)	(2.09)	(2.24)	(9.23)	(6.17)
Leverage	-0.052*	-0.028	-0.805***	-0.907***	-0.170***	-0.171***
	(-1.68)	(-0.88)	(-6.87)	(-7.54)	(-5.32)	(-5.05)
Lagged EBIT/ASSET	0.159**	0.384***	1.606***	2.158***	0.626***	0.915***
	(2.22)	(4.89)	(6.87)	(8.71)	(7.61)	(10.11)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.15)	(-0.97)	(3.71)	(2.91)	(2.99)	(2.63)
Intangibles/Assets	-0.016	0.007	0.097	0.128	0.111***	0.127***
	(-0.49)	(0.21)	(0.83)	(1.07)	(3.14)	(3.59)
R&D/Sales	0.043***	0.084***	0.658***	0.672***	0.224***	0.247***
	(2.63)	(4.40)	(9.62)	(10.51)	(11.43)	(12.81)
Institutional Ownership (%)	0.096***	0.078**	1.600***	1.530***	0.406***	0.403***
	(3.13)	(2.52)	(13.44)	(12.93)	(12.50)	(12.23)
NTD Proportion	0.275**	0.028	-0.711	-1.265***	0.110	-0.046
	(2.21)	(0.35)	(-1.22)	(-2.98)	(0.66)	(-0.38)
Lagged Stock Return	0.029***	0.052***	0.071*	0.123***	0.060***	0.089***
	(3.18)	(5.34)	(1.93)	(3.16)	(4.30)	(5.73)
Lagged Stock Return Volatility	-0.174*	-0.247***	0.824**	0.575*	0.461***	0.350***
	(-1.81)	(-2.62)	(2.52)	(1.74)	(4.07)	(3.11)
County Education Level	-0.002	-0.002*	-0.007*	-0.008**	-0.001	-0.001
	(-1.64)	(-1.66)	(-1.75)	(-2.05)	(-0.83)	(-0.99)
County Crime Ratio	-0.003	-0.033	-0.013	-0.146	0.765*	0.876**
	(-0.01)	(-0.09)	(-0.01)	(-0.12)	(1.93)	(2.33)
County Population Density	0.021***	0.030***	0.049*	0.045*	0.030***	0.031***
	(3.28)	(4.24)	(1.77)	(1.65)	(4.37)	(4.13)
Metropolitan	-0.003	-0.002	0.015	0.052	-0.019	-0.014
	(-0.17)	(-0.12)	(0.25)	(0.85)	(-1.08)	(-0.80)
Longitude	0.007*	0.004	0.006	0.012	0.006	0.006
	(1.78)	(0.86)	(0.35)	(0.73)	(1.32)	(1.18)
Latitude	-0.011**	-0.011**	0.057***	0.058***	0.018***	0.017***
	(-2.17)	(-2.12)	(2.85)	(2.91)	(3.26)	(2.98)
Constant	4.712***	4.486***	4.930***	5.613***	5.343***	5.587***
	(11.54)	(10.48)	(2.95)	(3.39)	(11.47)	(11.64)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	26929	27151	26855	27067	26852	27064
Adj. R-sq	0.326	0.312	0.209	0.203	0.541	0.517

Table R3: Impact of Nearby Air Pollution on CEO Compensation Level using Samples Including Direct Polluting Firms and Excluding Indirect Polluting Firms

This panel shows the regression results excluding both direct and indirect polluter industries. These industries are defined as the industries that need to report their operation waste to EPA in Toxic Release Inventory(TRI) program. All models are Ordinary Least Square (OLS) regressions that include industry (2-digit SIC), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

Panel A: Including Direct Polluting Firm

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	1.006***	1.077***	-2.880***	-2.354***	0.030	0.172
	(6.29)	(7.20)	(-3.85)	(-3.59)	(0.17)	(1.05)
Ln[Age]	0.176***	0.144***	-1.338***	-1.263***	-0.161***	-0.225***
	(3.71)	(3.12)	(-9.20)	(-8.76)	(-3.69)	(-5.11)
Female CEO	0.001	0.002	0.077	-0.039	0.042*	0.020
	(0.06)	(0.10)	(0.78)	(-0.37)	(1.70)	(0.73)
Ln[Tenure]	0.054***	0.037***	-0.040*	-0.025	0.044***	0.039***
	(8.61)	(6.29)	(-1.77)	(-1.10)	(6.61)	(6.07)
CEO Ownership(%)	-0.008***	-0.004	-0.053***	-0.051***	-0.014***	-0.012***
	(-2.66)	(-1.55)	(-8.28)	(-8.33)	(-5.02)	(-4.59)
CEO Confidence	0.115***	-0.006	0.188**	0.176**	0.265***	0.187***
	(5.44)	(-0.31)	(2.48)	(2.42)	(9.81)	(6.60)
Leverage	-0.055*	-0.031	-0.733***	-0.854***	-0.162***	-0.172***
	(-1.83)	(-1.02)	(-6.55)	(-7.37)	(-5.35)	(-5.33)
Lagged EBIT/ASSET	0.165**	0.386***	1.491***	2.066***	0.608***	0.896***
	(2.48)	(5.31)	(6.75)	(8.82)	(7.88)	(10.59)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.20)	(-0.92)	(3.78)	(2.99)	(2.92)	(2.59)
Intangibles/Assets	-0.009	0.015	0.086	0.104	0.126***	0.139***
	(-0.27)	(0.47)	(0.75)	(0.88)	(3.64)	(4.00)
R&D/Sales	0.043***	0.084***	0.651***	0.665***	0.224***	0.247***
	(2.67)	(4.51)	(9.68)	(10.62)	(11.62)	(13.12)
Institutional Ownership (%)	0.084***	0.080***	1.494***	1.428***	0.393***	0.392***
	(2.91)	(2.63)	(13.16)	(12.70)	(12.85)	(12.53)
NTD Proportion	0.291**	0.041	-0.620	-1.211***	0.155	-0.044
	(2.49)	(0.52)	(-1.10)	(-3.03)	(0.96)	(-0.39)
Lagged Stock Return	0.029***	0.052***	0.078**	0.132***	0.061***	0.091***
	(3.18)	(5.49)	(2.16)	(3.44)	(4.52)	(6.00)
Lagged Stock Return Volatility	-0.159*	-0.237***	0.643**	0.391	0.456***	0.337***
	(-1.73)	(-2.60)	(2.03)	(1.21)	(4.21)	(3.13)
County Education Level	-0.001	-0.001	-0.007*	-0.008**	-0.002	-0.002*
	(-1.27)	(-1.33)	(-1.76)	(-2.06)	(-1.57)	(-1.65)
County Crime Ratio	0.088	-0.009	0.182	-0.020	0.601	0.673*
	(0.23)	(-0.03)	(0.14)	(-0.02)	(1.56)	(1.84)
County Population Density	0.009	0.017**	0.054*	0.051*	0.031***	0.032***
	(1.39)	(2.34)	(1.86)	(1.73)	(4.25)	(4.13)
Metropolitan	0.002	0.003	0.027	0.057	-0.017	-0.012
	(0.12)	(0.18)	(0.44)	(0.96)	(-0.96)	(-0.71)
Longitude	0.010***	0.007*	0.006	0.007	0.005	0.004
	(2.79)	(1.82)	(0.40)	(0.46)	(1.07)	(0.85)
Latitude	-0.011**	-0.011**	0.056***	0.053***	0.013***	0.012**
	(-2.31)	(-2.26)	(2.92)	(2.79)	(2.63)	(2.19)
Constant	5.072***	4.878***	4.998***	5.167***	5.281***	5.492***
	(13.16)	(12.22)	(3.10)	(3.29)	(11.89)	(12.16)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	29197	29429	29118	29341	29115	29338
Adj. R-sq	0.325	0.309	0.211	0.205	0.550	0.525

Panel B: Excluding Direct Polluting and Indirect Polluting Firms

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	0.477*	0.517**	-1.466	-1.344	0.658**	0.655**
	(1.80)	(2.01)	(-1.36)	(-1.32)	(2.33)	(2.40)
Ln[Age]	0.120*	0.093	-1.262***	-1.159***	-0.126**	-0.199***
	(1.69)	(1.34)	(-5.87)	(-5.49)	(-1.97)	(-3.19)
Female CEO	0.049*	0.033	0.133	-0.001	0.040	0.005
	(1.90)	(1.19)	(0.98)	(-0.01)	(1.21)	(0.14)
Ln[Tenure]	0.055***	0.040***	0.010	0.031	0.049***	0.048***
	(6.10)	(4.80)	(0.31)	(0.94)	(5.28)	(5.22)
CEO Ownership(%)	-0.005	-0.001	-0.052***	-0.047***	-0.007*	-0.003
	(-1.30)	(-0.15)	(-5.69)	(-5.23)	(-1.85)	(-0.94)
CEO Confidence	0.115***	-0.015	0.252**	0.233**	0.270***	0.160***
	(3.83)	(-0.50)	(2.26)	(2.37)	(7.69)	(4.36)
Leverage	-0.051	-0.024	-0.560***	-0.736***	-0.124***	-0.158***
	(-1.19)	(-0.57)	(-3.40)	(-4.43)	(-2.81)	(-3.54)
Lagged EBIT/Assets	0.290**	0.433***	2.470***	2.651***	0.823***	0.871***
	(2.33)	(3.61)	(6.48)	(7.01)	(5.76)	(6.49)
Lagged Market-to-book	-0.014*	-0.005	0.062***	0.097***	0.032***	0.055***
	(-1.74)	(-0.69)	(3.33)	(5.13)	(3.23)	(4.82)
Intangibles/Assets	0.052	0.053	-0.180	-0.112	0.168***	0.180***
	(0.97)	(1.01)	(-1.07)	(-0.64)	(3.19)	(3.44)
R&D/Sales	-0.282***	-0.247	1.191***	0.963***	0.306***	0.215***
	(-2.59)	(-1.50)	(3.68)	(3.22)	(3.36)	(3.43)
Institutional Ownership (%)	0.086**	0.096**	1.812***	1.696***	0.464***	0.449***
	(2.02)	(2.18)	(10.90)	(10.38)	(10.09)	(9.59)
Proportion NTD	0.174	0.024	-1.000	-1.280**	0.174	-0.159
	(1.17)	(0.20)	(-1.47)	(-2.55)	(1.29)	(-1.06)
Lagged Stock Return	0.032**	0.054***	0.024	0.065	0.041*	0.068**
	(2.00)	(3.19)	(0.39)	(1.01)	(1.77)	(2.57)
Lagged Stock Return Volatility	0.107	-0.044	0.818*	0.651	0.561***	0.395**
	(0.85)	(-0.34)	(1.72)	(1.44)	(3.33)	(2.48)
County Education Level	-0.006***	-0.006***	-0.022***	-0.023***	-0.004***	-0.004**
	(-3.53)	(-3.08)	(-3.94)	(-3.92)	(-2.58)	(-2.16)
County Crime Ratio	-0.424	-0.514	-0.718	-1.209	-0.321	-0.789
	(-0.71)	(-1.33)	(-0.21)	(-0.62)	(-0.52)	(-0.91)
County Population Density	0.013	0.027***	0.062	0.061	0.044***	0.047***
	(1.41)	(2.71)	(1.43)	(1.44)	(4.05)	(4.11)
Metropolitan	0.040	0.046	0.069	0.118	0.003	0.018
	(1.33)	(1.57)	(0.64)	(1.12)	(0.09)	(0.59)
Longitude	0.023***	0.020***	-0.032	-0.025	-0.005	-0.005
	(4.03)	(3.43)	(-1.29)	(-1.00)	(-0.67)	(-0.67)
Latitude	-0.006	-0.008	0.074***	0.063**	0.025***	0.020***
	(-0.86)	(-1.14)	(2.73)	(2.29)	(3.39)	(2.64)
Constant	5.152***	5.260***	-13.624**	-12.341**	4.162**	4.378**
	(3.07)	(3.16)	(-2.05)	(-2.03)	(2.27)	(2.40)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State × Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry × Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	15335	15528	15284	15472	15282	15470
Adj. R-sq	0.305	0.294	0.193	0.187	0.510	0.493

Table R4: Impact of Local Air Pollution on COO and Other Top Executives' Compensation

This table examines the relationship between air pollution and the compensation of COOs and other top executives. In Panel B, the dependent variable and executive-level controls are the average value of top executives except for the CEO. All models are Ordinary Least Square (OLS) regressions that include industry(SIC 2-digits), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

Panel A: Impact of Local Air Pollution on COO Compensation

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	1.152***	1.387***	-2.324**	-0.758	-0.161	0.115
	(4.27)	(4.61)	(-2.15)	(-0.59)	(-0.53)	(0.35)
Ln[Age]	0.294***	0.295***	-1.191***	-1.289***	-0.157**	-0.202**
	(4.40)	(3.83)	(-4.57)	(-4.13)	(-2.08)	(-2.31)
Female CEO	0.057	0.073*	-0.445***	-0.554***	-0.003	-0.007
	(1.60)	(1.69)	(-2.65)	(-2.70)	(-0.06)	(-0.14)
Ln[Tenure]	0.126***	0.053***	-0.168***	-0.029	0.108***	0.102***
	(8.25)	(2.96)	(-2.73)	(-0.40)	(6.46)	(5.46)
COO Ownership(%)	0.033***	0.030***	-0.057***	-0.019	0.034***	0.036***
	(6.53)	(5.37)	(-3.25)	(-0.83)	(5.65)	(5.55)
Leverage	-0.022	-0.025	-0.880***	-0.988***	-0.266***	-0.280***
	(-0.37)	(-0.35)	(-4.66)	(-4.21)	(-4.74)	(-4.20)
Lagged EBIT/ASSET	0.472***	0.752***	1.510***	2.500***	0.701***	1.170***
	(5.19)	(5.99)	(3.69)	(5.21)	(4.86)	(6.45)
Lagged Market-to-book	-0.005*	-0.001	0.060**	0.085***	0.032***	0.045***
	(-1.70)	(-0.36)	(2.43)	(4.14)	(2.63)	(3.13)
Intangibles/Assets	-0.031	-0.033	0.382*	0.364	0.029	-0.000
	(-0.63)	(-0.56)	(1.91)	(1.50)	(0.51)	(-0.00)
R&D/Sales	0.135***	0.190***	0.651***	0.766***	0.277***	0.340***
	(4.69)	(5.84)	(4.84)	(5.36)	(7.34)	(7.36)
Institutional Ownership (%)	0.035	-0.013	1.534***	1.662***	0.267***	0.322***
	(0.79)	(-0.28)	(8.01)	(7.41)	(4.92)	(5.67)
NTD Proportion	0.062	-0.039	-2.391***	-0.916	-0.052	-0.032
	(0.48)	(-0.36)	(-2.61)	(-1.48)	(-0.25)	(-0.20)
Lagged Stock Return	0.056**	0.063***	0.194***	0.294***	0.113***	0.156***
	(2.41)	(3.03)	(2.83)	(3.85)	(4.04)	(6.39)
Lagged Stock Return Volatility	-0.121	-0.055	1.245**	1.058	0.606***	0.547**
	(-0.72)	(-0.30)	(2.05)	(1.46)	(3.05)	(2.46)
County Education Level	0.003	0.003	-0.005	0.002	0.001	0.001
	(1.15)	(0.94)	(-0.68)	(0.19)	(0.38)	(0.41)
County Crime Ratio	-0.416	-0.764	-0.632	-1.315	-0.354	-0.567
	(-0.81)	(-1.26)	(-0.30)	(-0.54)	(-0.58)	(-0.80)
County Population Density	0.070***	0.072***	0.050	0.002	0.063***	0.055***
	(3.82)	(3.21)	(0.92)	(0.04)	(3.61)	(2.66)
Metropolitan	-0.024	-0.033	-0.130	-0.101	-0.067**	-0.058*
	(-0.98)	(-1.16)	(-1.20)	(-0.76)	(-2.36)	(-1.79)
Longitude	0.007	0.007	0.027	0.007	0.017**	0.014*
	(1.11)	(0.92)	(0.97)	(0.20)	(2.26)	(1.66)
Latitude	0.011	0.004	0.037	-0.016	0.040***	0.028***
	(1.53)	(0.48)	(1.17)	(-0.42)	(4.44)	(2.76)
Constant	3.780***	3.838***	7.325***	5.375	5.878***	5.769***
	(5.58)	(4.79)	(2.68)	(1.63)	(7.28)	(6.39)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	10007	7713	10007	7713	10007	7713
Adj. R-sq	0.395	0.398	0.193	0.191	0.507	0.519

Panel B: Impact of Local Air Pollution on compensation of Other Top Executives

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Poison Ratio	0.328***	0.340***	-2.602***	-2.203***	-0.668***	-0.641***
	(3.28)	(3.53)	(-5.69)	(-5.18)	(-4.65)	(-4.73)
Ln[Age]	0.159***	0.141***	-1.061***	-1.459***	-0.319***	-0.474***
	(3.65)	(3.38)	(-5.67)	(-7.85)	(-5.93)	(-8.51)
Ln[Tenure]	0.130***	0.061***	-0.241***	-0.072*	0.052***	0.054***
	(14.82)	(7.00)	(-6.31)	(-1.90)	(4.80)	(5.10)
Ownership(%)	0.023***	0.027***	-0.137***	-0.126***	-0.006	-0.011
	(3.29)	(3.98)	(-4.80)	(-4.63)	(-0.80)	(-1.51)
Leverage	-0.102***	-0.077***	-0.689***	-0.802***	-0.222***	-0.231***
	(-5.81)	(-4.48)	(-8.56)	(-9.63)	(-9.63)	(-9.78)
Lagged EBIT/ASSET	0.161***	0.337***	1.433***	1.962***	0.587***	0.850***
	(4.39)	(8.38)	(8.46)	(10.38)	(10.72)	(12.83)
Lagged Market-to-book	0.001	0.002	0.042***	0.039**	0.016**	0.017*
	(0.94)	(1.40)	(2.62)	(2.10)	(2.22)	(1.94)
Intangibles/Assets	-0.029	-0.021	0.216***	0.218***	0.072***	0.059**
	(-1.54)	(-1.12)	(2.79)	(2.70)	(2.97)	(2.31)
R&D/Sales	0.056***	0.089***	0.652***	0.714***	0.213***	0.248***
	(5.73)	(8.32)	(13.20)	(15.09)	(14.20)	(15.47)
Institutional Ownership (%)	0.038*	0.023	1.117***	1.077***	0.236***	0.239***
	(1.95)	(1.29)	(14.09)	(13.41)	(10.60)	(10.62)
NTD Proportion	-0.014	0.053	-1.478***	-0.725**	-0.197	0.030
	(-0.18)	(0.99)	(-2.66)	(-2.35)	(-1.03)	(0.42)
Lagged Stock Return	0.012**	0.032***	0.064***	0.098***	0.040***	0.065***
	(2.32)	(5.71)	(2.70)	(3.82)	(4.93)	(6.76)
Lagged Stock Return Volatility	0.138**	0.035	1.186***	1.174***	0.584***	0.494***
	(2.32)	(0.61)	(5.04)	(4.99)	(6.81)	(5.81)
County Education Level	-0.001	-0.001*	0.002	0.001	-0.000	-0.001
	(-1.16)	(-1.92)	(0.61)	(0.38)	(-0.51)	(-0.74)
County Crime Ratio	0.603***	0.541***	1.142	1.437*	0.781***	0.868***
	(2.96)	(2.76)	(1.27)	(1.66)	(2.92)	(3.30)
County Population Density	0.027***	0.029***	0.024	0.025	0.033***	0.033***
	(6.35)	(6.72)	(1.17)	(1.19)	(5.96)	(5.84)
Metropolitan	-0.026***	-0.026***	-0.048	-0.042	-0.022*	-0.025*
	(-2.91)	(-2.84)	(-1.10)	(-0.99)	(-1.68)	(-1.96)
Longitude	0.006**	0.004*	-0.011	-0.009	0.003	0.003
	(2.41)	(1.80)	(-0.99)	(-0.77)	(0.94)	(1.03)
Latitude	0.005*	0.004	0.052***	0.052***	0.030***	0.029***
	(1.89)	(1.44)	(3.55)	(3.58)	(7.12)	(6.79)
Constant	4.055***	4.105***	3.424***	5.023***	5.494***	6.210***
	(14.32)	(14.88)	(2.65)	(3.90)	(15.31)	(16.78)
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
Number of Observations	26894	27113	26893	27113	26894	27113
Adj. R-sq	0.563	0.545	0.312	0.304	0.672	0.656

Table R5: Changes in Local Air Pollution due to Firm's Headquarter Relocation and CEO compensation: Relocated Firms Only

In this table, we use the firm headquarters relocation as an exogenous shock to test the impact of air pollution change on CEO compensation. *Old Poison Ratio* is the poison ratio before headquarters relocation. *Poison Ratio Diff* is the poison ratio difference between the new headquarters location and the old location after relocation. All models are Ordinary Least Square (OLS) regressions that include industry (2-digit SIC), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	Ln[Cash Compensation]		Ln[Incentive Compensation]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	Current	Lead	Current	Lead	Current	Lead
Old Poison Ratio	11.294***	10.809***	-25.458**	-16.939*	5.426**	4.714
	(4.20)	(2.75)	(-2.19)	(-1.76)	(2.03)	(1.40)
Poison Ratio Diff	7.134***	8.004***	-20.064**	-11.570	3.455	3.177
	(4.07)	(2.98)	(-2.51)	(-1.55)	(1.62)	(1.19)
Ln[Age]	-0.773	0.474	-3.179**	-1.419	-0.895*	-0.139
	(-1.33)	(0.73)	(-2.49)	(-1.02)	(-1.91)	(-0.19)
Female CEO	-0.331	-0.307	-0.973	0.158	-0.329	0.041
	(-1.42)	(-1.13)	(-0.72)	(0.10)	(-0.75)	(0.08)
Ln[Tenure]	0.138	-0.032	0.086	0.162	0.022	-0.003
	(1.30)	(-0.48)	(0.32)	(0.69)	(0.38)	(-0.03)
CEO Ownership(%)	0.115**	0.122***	-0.088	-0.200	0.087**	0.064
	(2.44)	(3.05)	(-0.39)	(-0.95)	(2.36)	(1.26)
CEO Confidence	0.216	0.046	-0.774	-0.630	0.221	-0.022
	(1.55)	(0.23)	(-0.87)	(-0.79)	(0.79)	(-0.12)
Leverage	0.601**	0.502**	-0.830	-1.696	0.048	-0.282
	(2.32)	(2.39)	(-0.74)	(-1.17)	(0.16)	(-0.79)
Lagged EBIT/ASSET	-0.832*	0.231	5.239**	5.033**	0.313	0.512
	(-1.92)	(0.48)	(2.59)	(2.31)	(0.75)	(0.74)
Lagged Market-to-book	0.000	-0.000	0.045***	0.032**	0.011***	0.011***
	(0.00)	(-0.05)	(7.24)	(2.34)	(5.84)	(3.79)
Intangibles/Assets	-0.023	-0.129	-2.521**	-1.750	-0.150	-0.140
	(-0.07)	(-0.43)	(-2.34)	(-1.39)	(-0.46)	(-0.42)
R&D/Sales	0.046	0.077	1.081***	0.503*	0.154***	0.099
	(0.63)	(1.20)	(5.75)	(1.76)	(2.97)	(1.40)
Institutional Ownership (%)	0.441	-0.000	0.756	-0.629	0.098	-0.293
	(0.99)	(-0.00)	(0.52)	(-0.43)	(0.25)	(-0.66)
NTD Proportion	3.219*	0.573	3.849	1.961	2.201**	0.610
	(1.94)	(0.86)	(0.96)	(0.66)	(2.05)	(0.77)
Lagged Stock Return	-0.008	0.054	-0.520	-0.317	-0.008	0.062
	(-0.12)	(0.65)	(-1.49)	(-1.04)	(-0.10)	(0.56)
Lagged Stock Return Volatility	0.591	0.710	1.835	-0.125	1.073**	0.350
	(1.17)	(1.08)	(0.95)	(-0.04)	(2.12)	(0.46)
County Education Level	-0.018	-0.006	0.037	0.010	-0.038*	-0.042**
	(-0.95)	(-0.35)	(0.55)	(0.21)	(-1.90)	(-2.33)
County Crime Ratio	-1.157	-4.056	-19.921	-18.952	-2.889	-4.890
	(-0.52)	(-1.48)	(-1.06)	(-1.40)	(-0.68)	(-1.18)
County Population Density	0.167	0.242**	-0.158	0.038	0.044	0.115
	(1.53)	(2.25)	(-0.40)	(0.11)	(0.35)	(0.89)
Metropolitan	0.050	0.133	-0.395	0.214	0.174	0.463**
	(0.25)	(0.59)	(-0.47)	(0.31)	(0.97)	(2.23)
Longitude	-0.156*	-0.182*	-0.486	-0.298	-0.246**	-0.195
	(-1.69)	(-1.93)	(-1.07)	(-0.72)	(-2.48)	(-1.43)
Latitude	-0.092	-0.109	-0.343	-0.237	-0.129*	-0.107
	(-1.21)	(-1.36)	(-1.19)	(-0.78)	(-1.70)	(-1.18)
Constant	-1.683	-3.893	-16.418	-31.416	-23.389	-24.095*
	(-0.16)	(-0.42)	(-0.25)	(-0.72)	(-1.37)	(-1.78)
Cubic Size Spline	YES	YES	YES	YES	YES	YES
Cubic PCI Spline	YES	YES	YES	YES	YES	YES
State×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES	YES	YES	YES
Number of Observations	644	642	642	640	642	640
Adj. R-sq	0.522	0.389	0.375	0.336	0.731	0.586

Table R6: Endogenous Corrective Strategy: Impact of Local Air Quality on Firm's Environmental CSR Score

In this table, we use the firm headquarters relocation as an exogenous shock to test the impact of air pollution change on CEO compensation. *Polluters* denotes the director polluter industries. *Strength Score* denotes firms' positive CSR performance on environment, and *Concern Score* denotes firms' negative CSR performance on environment. *Net Score* denotes the difference between *Strength Score* and *Concern Score*. *Polluters* denotes the direct polluting industries:Coal mining(SIC 12), Crude petroleum(SIC 13), Petroleum refinement(SIC 29), and Electricity service(SIC 49). All models are Ordinary Least Square (OLS) regressions that include industry (2-digit SIC), year, and state fixed effects. We use robust standard errors double clustered by county and fiscal year. The parentheses contain t-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	CSR Socre on Environment Dimension		
	(1)	(2)	(3)
	Strength Score	Concern Score	Net Score
Poison Ratio	0.994***	0.261	0.733***
	(4.57)	(1.33)	(2.81)
Poison Ratio x Polluters	-2.711***	-2.072**	-0.638
	(-4.46)	(-2.19)	(-0.61)
Polluters	0.070	0.458***	-0.388***
	(1.35)	(8.21)	(-5.18)
Ln[Age]	-0.053	-0.045	-0.008
	(-0.84)	(-1.16)	(-0.11)
Female CEO	0.059	0.003	0.056
	(1.00)	(0.14)	(0.87)
Ln[Tenure]	-0.030***	-0.017***	-0.013
	(-3.15)	(-2.99)	(-1.17)
CEO Ownership(%)	-0.006***	0.003**	-0.009***
	(-3.32)	(2.37)	(-4.33)
CEO Confidence	-0.090***	-0.054***	-0.036
	(-2.92)	(-2.82)	(-1.01)
Leverage	-0.024	0.003	-0.027
	(-0.44)	(0.11)	(-0.46)
Lagged EBIT/ASSET	0.208**	-0.019	0.227**
	(2.21)	(-0.31)	(2.27)
Lagged Market-to-book	-0.001	-0.006	0.005
	(-0.08)	(-1.56)	(1.13)
Intangibles/Assets	-0.178***	-0.152***	-0.026
	(-3.67)	(-5.96)	(-0.50)
R&D/Sales	-0.035	-0.109***	0.074**
	(-1.28)	(-3.61)	(2.13)
Institutional Ownership (%)	-0.214***	-0.037	-0.177***
	(-4.53)	(-1.22)	(-3.33)
NTD Proportion	0.276	0.490*	-0.214
	(0.80)	(1.86)	(-0.78)
Lagged Stock Return	0.039**	0.017	0.022
	(2.54)	(1.64)	(1.18)
Lagged Stock Return Volatility	-0.300**	0.169	-0.469***
	(-2.23)	(1.64)	(-2.94)
County Education Level	-0.001	-0.003***	0.002
	(-0.61)	(-2.73)	(0.89)
County Crime Ratio	0.028**	-0.004	0.031**
	(2.33)	(-0.40)	(2.24)
County Population Density	0.024	-0.039***	0.063**
	(0.95)	(-2.62)	(2.30)
Metropolitan	-0.017***	0.011**	-0.027***
	(-2.84)	(2.17)	(-3.65)
Longitude	-0.013	0.030***	-0.043***
	(-1.52)	(5.39)	(-4.28)
Latitude	-0.988*	1.153***	-2.141***
	(-1.91)	(2.96)	(-3.52)
Constant	2.263***	1.637***	0.626
	(3.71)	(3.34)	(0.82)
State×Year Fixed Effect	YES	YES	YES
Industry×Year Fixed Effect	YES	YES	YES
Cubic Size Spline	YES	YES	YES
Cubic PCI Spline	YES	YES	YES
Number of Observations	17902	17902	17902
Adj. R-sq	0.969	0.715	0.964

Table R7: Definition of air quality index

This table gives a detailed definition of different air quality levels based on their influence on health. The *Poison ratio* in this paper is defined as the number of days when AQI is bigger than 150 scaled by the number of days with AQI record. *Bad ratio* is defined as the number of days when AQI is bigger than 100 scaled by the number of days with the record. All the data is from the EPA website.

Air Quality Index Level	Numerical	Meaning
Good	0 to 50	Air quality is considered satisfactory and air pollution poses little or no risk.
Moderate	51 to 100	Air quality is acceptable; however for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151 to 200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201 to 300	Health alert: everyone may experience more serious health effects.
Hazardous	301 to 500	Health warnings of emergency conditions. The entire population is more likely to be affected.

Table R8: Records on environment protection during Obama presidential terms

In this table we list Obama's main records on environment protection during his first and second presidential terms

Year	Records
2009	Stimulus on environment protection The stimulus provided $90 billion dollars for a bevy of green initiatives, including $29 billion for improving energy efficiency, $21 billion for renewable energy generation, $10 billion for the grid, $18 billion for rail, and several smaller initiatives.
2009	Enter the international mercury agreement
2011	Cross-State Air Pollution Rule is enacted
2011	Mercury and Air Toxics Standards to control the mercury pollution in power plant
2013	Stricter air quality standards
2013	Curb the mountain top mining
2014	Plan to control greenhouse gas emission by vehicles
2015	Coal ash prevention
2015	Issue standard governing commercial air conditioners and furnaces to increase the efficiency and decrease the pollution
2015	Newrules to regulate the fracking to protect against groundwater pollution
2016	Furhter curb the mountain top mining

Table R9: Variable definition

This table contains the variable description. All the continuous variables are winsorized at 1% level unless otherwise specified

Variable	Definition
Air quality measurement	
Poison ratio	The number of poisonous days(AQI is bigger than 150) scaled by the number of days with AQI records in the specific county.
Bad ratio	The number of bad days(AQI is bigger than 100) scaled by the number of days with AQI record in the specific county.
Nearby poison ratio	The average poison ratio of the 5 counties that nearest(within 60 miles) to the county where the firm's headquarter located
Regional poison ratio	The weighted average poison ratio of the county where the firm's headquarter located and its 5 nearest counties(within 60 miles)
CEO compensation	
Cash compensation	CEO's Cash compensation, the sum of salary and bonus. (Execucomp: total_curr)
Total compensation	CEO' s total payment, the sum of Cash compensation, incentive payment and other compensation. (Execucomp: tdc1)
Equity	CEO' s equity awards. (Execucomp: rstkgrnt before 2006 and stock_awards_fv after 2006)
Option	CEO' s option awards. (Execucomp: option_awards_blk_value before 2006 and option_awards_fv after 2006)
Cash intensity	Cash compensation/Total compensation
Incentive intensity	(Equity+Option)/Total compensation
Control variables	
Age	CEO's age as reported in the annual proxy statement. (Execucomp: age)
Tenure	CEO's tenure as CEO. We use the specific fiscal year minus the year when the executive became CEO(Execucomp: becameceo). For missing data we use the specific fiscal year minus the first year when the executive first enter the database as CEO in the specific company
Share % Ownership	Percentage of total share owned by the CEO as reported in the statement proxy(Execucomp: shrown_tot_pct)
Female CEO	Dummy variable equals to 1 if the CEO is female and 0 otherwise. CEO's Female CEO(Execucomp: gender)
Ln[Assets]	The natural log of the firm's total book assets(Compustat: at)
Leverage	The firm's long-term debt(Compustat: dltt) scaled by its total book assets(Compustat: at)
CAPEX/Assets	The firm's total capital expenditure(Compustat: capx) scaled by its total book assets
Intangibles/Assets	The firm's intangible assets(Compustat: intan) scaled by its total book assets(Compustat: at)

R&D/Sales	The firm's reseach and development expenses(Compustat: xrd) scaled by its total sales(Compustat: sale)
Tobin' s Q	The firm's Tobin' s Q ratio, defined in CRSP/Compustat code as: (prccf*csho+lt)/(ceq+lt)
Proportion NTD	The ratio of firm's non trading days, defined in CRSP as number of days without trading scaled by the total of trading days in the specific fiscal year
Institutional Ownership (%)	The percentage of firm's total stocks owned by the institutions
Stock return	The firm's yearly Stock return rate
Volatility	The firm's Stock return standard deviation in fiscal year t
County Education Level	The ratio of residents who have bachelor degree in the specific county
Population density	The natural log of the total number of residents scaled by the land area of the county
Ln[Per capita income]	The natural log of the per capita income of the specific county
Ln[House median value]	The natural log of the house median value of the specific county
County Crime Ratio	The total number of crimes scaled by the local population. Data is from FBI Uniform Crime Reporting (UCR) Database.
Ln[Government Spending]	The natural log of local government yearly aggregate fiscal spending
Metropolitan	Dummy variable that equals to 1 if the county contains one of the ten largest city of US or if the county is within 60 miles of one of the ten largest cities of US
Latitude	The latitude of the specific county
Longitude	The longitude of the specific county
IDD	Dummy variable measures the competitiveness within the industry. It equals 1 in year t before the state adopts inevitable disclosure doctrine(IDD); It equals 0 in year t when and after the state adopts IDD, but before the state rejects it; It equals 2 the year when and after the state rejects IDD. Hence, higher IDD denotes CEOs have more outside opportunities. We get the IDD adoption and rejection data from Ke Na(2020)
Managerial ability	The Demerjian, Lev, and McVay(2012) managerial ability
CEO Confidence	Banerjee, Jenner, and Nanda(2015) CEO confidence measurement