Location Matters: The Impact of Surrounding Environmental Condition on CEO Compensation *

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Abstract

Do executives demand a premium for working in polluted environments? We model, hypothesize and show that they do. This is the case even if we exclude polluting firms. 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 captured through CEO power, managerial ability, and outside opportunities. The latter being captured with the staggered passage of the inevitable disclosure doctrine. 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.(Deryugina et al. (2019),Knittel, Miller, and Sanders (2016)) to long-run effect(Isen, Rossin-Slater, and Walker (2017)). Air pollution can not only damage the physical health of human beings(Pope III and Dockery (2006)) but also can cause a series of psychological issues(WHO (2016)) and therefore, decrease their welfare. 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 for older workers. Indeed, CEOs are 54 years old on average, and 25% of CEOs are over 60. Thus, we hypothesis and explore whether CEOs demand greater wages to compensate for working in polluted areas, and what conditions moderate, or amplify, this effect.

We explore the relationship between environmental pollution and CEO compensation. We first develop a theoretical model to demonstrate the link between pollution and CEO compensation. It produces testable implications, including that CEOs will demand compensation for working in more polluted environments. This is especially the case for more powerful CEOs or those with greater bargaining power. It will also be amplified by greater awareness of pollution and/or its impacts.

We analyze whether CEOs who work in more polluted areas demand greater compensation, especially greater cash compensation. We explore this by using 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 (Neidell (2004) and Wen, Balluz, and Mokdad (2009)), economics (Chay and Greenstone (2005) and Deschenes, Greenstone, and Shapiro (2017)) and finance (Heyes, Neidell, and Saberian (2016)). 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 by using the set of firms in the Execucomp universe. When analyzing the relationship between air quality and pollution 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 compensation and cash compensation. When the air pollution level of the county increases from 25th percentile to 75th percentile, CEO's cash compensation increases 13.02% and CEO's total compensation increases 7.64%, on average.

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 operation, 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. The results still survive under these criteria.

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. These represent an exogenous regulatory shock that reduced 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. The results are similar if we look at COOs or CFOs, instead of CEOs. This suggests that non-CEO executives also demand higher 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 also find similar results when using pollution in neighboring counties given that pollution is mobile and pollution in a neighboring county would plausibly influence the focal company.

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, Almeida, and Ferreira (2005),Morse, Nanda, and Seru (2011),Song and Wan (2019)) . Consistent with this, we find that powerful CEOs experience a greater uplift in compensation due to pollution than do other CEOs. Additionally, CEOs with a higher "managerial ability" (see (Rajgopal, Shevlin, and Zamora (2006),Song and Wan (2019),Gabaix and Landier (2008))) are also more able to demand greater compensation for pollution.

CEOs' outside opportunities also impact their ability to demand greater compensation for pollution. 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. We find that for the impacted firms, there was a significant reduction in the relationship between pollution and cash compensation (albeit not total compensation). This tends to imply that the CEO's bargaining power also influences their ability to demand compensation for pollution. The results also help to illustrate that the results behave in an expected way following a regulatory shock, and help to ameliorate identification concerns.

We further explore the impact of environmental consciousness on compensation for pollution. We hypothesize that a greater level of environmental consciousness will amplify such an effect. We capture this both at the governmental level and at the media level. We find that the greater the amount of media coverage the greater the relationship between CEO cash compensation and pollution. Similarly, periods during which government passes more environmental regulations also experience a stronger relationship between cash compensation and pollution. This implies that greater environmental consciousness also encourages CEOs to push for greater compensation for pollution.

The results make a significant contribution both to literature and to policy and practice. We highlight that CEOs demand greater compensation 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 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 Hypotheses and model

In this section, we develop testable hypotheses for how pollution might impact executive compensation. These are premised on the notion that executives aim to maximize their utility. And, pollution is one aspect for which executives might require compensation.

The model is inspired by the notion that pollution is likely to reduce executive productivity and utility. Indeed, prior literature shows that pollution adversely affects productivity. It is widely accepted that air pollution harms health. For example, Knittel, Miller, and Sanders (2016) find that Ambient pollution levels, specifically particulate matter, have large impacts on weekly infant mortality rates. Deryugina et al. (2019) adopt 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, Rossin-Slater, and Walker (2017)). Unsurprisingly, pollution thus manifests in reduced property values (Chay and Greenstone (2005)). Thus, there is a relationship between air quality and investment in pharmaceutical and health-related areas (Deschenes, Greenstone, and Shapiro (2017)).

Pollution further impacts productivity and behavior in highly skilled fields. The World Health Organization argues that air pollution can affect the mood, cognition and mental function (WHO

(2016)). All these biophysical and psychological impact can change the investors' behavior and thus affect the stock returns and volatility. Heyes, Neidell, and Saberian (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 has no relation to stock returns. Levy and Yagil (2011) use the four stock exchange data in US and also finds the similar results. They also argue that it was the air pollution where the investor is located – not where the exchange located – that matters. Such impact of air pollution is not unique in the US. Huang, Xu, and Yu (2020) use private trading account data in China, and find that local air pollution is negatively related to trading performance. Li et al. (2019) find that air pollution significantly increases investors' disposition effects by analysing the trading information from a large Chinese mutual fund family.

With this literature in mind, we develop the following model for how pollution might impact compensation. We discuss the impact of pollution on compensation and which factors might amplify or moderate the impact of that pollution.

2.1 Basic setting

Assume there is a company located in a county with some air pollution. Now the firm is in face of a new project, whose only input is manager's effort. However, the final output also depends on some random shock. To attract the manager, firm's compensation must obtain his or her reservation utility. The detailed settings are as follows:

- e: Effort by manager.
- u_0: Reservation utility of manager in a place with 0 pollution
- P: Local pollution level
- V: This is the final output and is given by $\eta e + \delta$, where e is manager's effort, η is manager's specific productivity factor and δ is a random noise with variance σ_δ
- α, β: The firm provides the manager with linear contract form: $\alpha + \beta V$, where V is the output.
- ρ We assume that manager is risk averse and ρ is the risk aversion coefficient.
- κ inter-period utility discount factor

2.2 Manager's maximization problem

Assume that a CEO's lifelong utility is

$$u_l = \sum_{t=1}^{n} \kappa^t u_t(W_t, e_t, P_t) \tag{1}$$

where subscript t denotes different time period. We assume that whether CEO get sick follows a Poisson distribution with parameter λ. For simplicity, we assume that if CEOs get sick, then they can no longer work in that period. Thus the expected total periods that CEOs cannot work is $n\lambda$, where n denotes the total periods CEOs can work if they are healthy all the time. We assume λ is an increasing function of local pollution level since air pollution has negative impacts on human health(Li et al. (2019)), or we have

$$\lambda(P) > \lambda \tag{2}$$

The expected total periods the CEO can work for in a polluted place thus can be written as

$$m(P) = n(1 - \lambda(P)) < n(1 - \lambda) \tag{3}$$

The according lifelong utility becomes

$$u_l^P = \sum_{t=1}^{m(P)} \kappa^t u_t(W_t, e_t, P), \quad m(P) < n \tag{4}$$

where $m(P)$ is a decreasing function of P as discussed above, implying that the more polluted the location is, the less expected total periods CEO can work for. We assume that the manager's expected compensation is smooth in each year and there is no exogenous shock, shareholders set the compensation in each period as

$$u_t^P > u_t \tag{5}$$

such that the manager is indifferent between two places

$$u_l = u_l^P \tag{6}$$

We set risk averse manager's utility function as

$$u_t = W_t - \frac{1}{2}\rho\beta_t^2\sigma_\delta^2 - F(P_t)e_t^2 \tag{7}$$

where $F(P_t)e_t^2$ denotes manager's disutility from effort. $F(P)$ is an increasing function of P and in a clean place, we have $F(P) = F(0) > 0$. It means that given the same level of effort, the manager suffers more in the polluted place. we assume that in each period, shareholders set the same compensation plan, which is

$$W_t = \alpha_t + \beta_t V_t \tag{8}$$

Substitute it into the utility inequality and drop the subscript we have in each period

$$\alpha + \beta V - \frac{1}{2}\rho\beta^2\sigma_\delta^2 - F(0)e^2 < \alpha^P + (\beta^P)^2 V^P - \frac{1}{2}\rho\beta^P\sigma_\delta^2 - F(P)(e^P)^2 \tag{9}$$

This inequality has 3 possible implications on compensations

- $\alpha > \alpha^P$ and $\beta V < \beta^P V^P$
- $\alpha < \alpha^P$ and $\beta V > \beta^P V^P$
- $\alpha < \alpha^P$ and $\beta V < \beta^P V^P$

However, no matter which case is the real one, the following equation must hold,

$$\alpha + \beta V - \frac{1}{2}\rho\beta^2\sigma_\delta^2 - F(0)e^2 = \theta(\alpha^P + \beta^P V^P - \frac{1}{2}\rho(\beta^P)2\sigma_\delta^2) - F(P)(e^P)^2, \quad \theta < 1 \tag{10}$$

or

$$\sum_{t=1}^{m} \kappa^t(\alpha_t + \beta_t V_t - \frac{1}{2}\rho\beta^2\sigma_\delta^2 - F(0)e^2) = \theta \sum_{t=1}^{m} \kappa^t(\alpha_t^P + \beta_t^P V_t^P - \frac{1}{2}\rho\beta_t^2\sigma_\delta^2 - F(P)(e^P)^2), \quad \theta < 1 \tag{11}$$

then, we have

$$\theta = \frac{\sum_1^{m(P)} \gamma^i(\alpha_i + \beta V_i - \frac{1}{2}\rho\beta\sigma_\delta^2 - F(0)e^2)}{u_l} \tag{12}$$

since m is a decreasing function of air pollution, θ is also a decreasing function of air pollution, or

$$\frac{\partial\theta}{\partial P} < 0 \tag{13}$$

2.3 Setting optimal contract to CEO without perception bias

To obtain a closed form solution to the problem, first we need to specify the form of $F(P)$. We already know that

$$\frac{\partial P}{\partial \theta} < 0 \tag{14}$$

and

$$\frac{\partial F(P)}{\partial P} > 0 \tag{15}$$

Then we have

$$\frac{\partial F(\theta)}{\partial \theta} = \frac{\partial F(P)}{\partial P}\frac{\partial P}{\partial \theta} < 0 \tag{16}$$

Thus, for simplicity we specify $F(\theta)$ as

$$F(\theta) = \frac{1}{2\theta} \tag{17}$$

Given the level of the air pollution or discount factor θ, The manager's utility function is specified as

$$u = \alpha + \beta V - \frac{1}{2}\rho\beta^2\delta_\sigma^2 - \frac{1}{2\theta}e^2 \tag{18}$$

Hence the objective function of CEO is

$$max_e \quad u = \alpha + \beta V - \frac{1}{2}\rho\beta^2\delta_\sigma^2 - \frac{1}{2\theta}e^2 \tag{19}$$

For a given contract $\{\alpha, \beta\}$, the manager's choice of effort:

$$\frac{\partial W}{\partial e} = \beta\eta - \frac{e}{\theta} = 0 \tag{20}$$

Or the optimal level of effort is

$$e^* = \theta\beta\eta \tag{21}$$

Substituting for e^*:

$$u = \alpha + \beta(\eta^2\theta\beta) - \frac{1}{2}\rho\beta^2\sigma_\delta^2 - \frac{1}{2\theta}(\theta\beta\eta)^2 \tag{22}$$

or,

$$u = \alpha + \frac{1}{2}\theta(\beta\eta)^2 - \frac{1}{2}\rho\beta^2\sigma_\delta^2 \tag{23}$$

Given the reservation utility in a clean place as u_0 and discount factor θ, according to our argument we have

$$u(u_0, \theta) = \frac{u_0}{\theta} \tag{24}$$

where u is the reservation utility when pollution level is $P(\theta)$. Optimal choice of β by maximizing $\beta\theta\eta^2$ such that:

$$\frac{u_0}{\theta} + \frac{1}{2}\theta\beta^2\eta^2 + \frac{1}{2}\rho\beta^2\sigma_\delta^2 = W = \alpha + \beta(\eta^2\theta\beta) \tag{25}$$

The firm maximizes the residual firm value, hence the according objective function is

$$\eta^2\theta\beta - W = \eta^2\theta\beta - \frac{1}{\theta}[u_0 + \frac{1}{2}\rho\theta\beta^2\sigma_\delta^2] - \frac{1}{2}\eta^2\theta\beta^2 \tag{26}$$

The first order condition is

$$\eta^2\theta - \rho\beta\sigma_\delta^2 - \theta\eta^2\beta = 0 \tag{27}$$

Then we can get optimal β as

$$\beta^* = \frac{\eta^2\theta}{\rho\sigma_\delta^2 + \eta^2\theta} = 1 - \frac{\rho\sigma_\delta^2}{\rho\sigma_\delta^2 + \eta^2\theta} \tag{28}$$

Similarly, for the cash compensation we have

$$\alpha^* = \frac{1}{\theta}\left[u_0 - \frac{1}{2}\rho\theta\sigma_\delta^2\beta^{*2}(\beta^* - 1)\right] \tag{29}$$

Next, we discuss the relationship between CEO compensation and air quality. It can be written as

Proposition 1. *Given other condition the same, CEO's cash compensation increases as local air quality decreases when*

$$\frac{\rho\sigma_\delta^2}{\rho\sigma_\delta^2 + \eta^2\theta} > 1 - \sqrt{\frac{2}{3}} \tag{30}$$

or

$$\frac{\partial\alpha^*}{\partial\theta} < 0, \quad when \quad \frac{\rho\sigma_\delta^2}{\rho\sigma_\delta^2 + \eta^2\theta} > 1 - \sqrt{\frac{2}{3}} \tag{31}$$

CEO' incentive compensation sensitivity decreases as local air quality decreases, or

$$\frac{\partial\beta^*}{\partial\theta} > 0 \tag{32}$$

Proof. It is straightforward to see that

$$\frac{\partial\beta^*}{\partial\theta} = \frac{\eta^2\rho\sigma_\delta^2}{(\rho\sigma_\delta^2 + \eta^2\theta)^2} > 0 \tag{33}$$

Next we prove the first part of the proposition. We have

$$\frac{\partial\alpha^*}{\partial\theta} = -\frac{u_0}{\theta^2} - \frac{1}{2}\rho\sigma_\delta^2(3\beta^{*2} - 2)\frac{\partial\beta^*}{\partial\theta} \tag{34}$$

The first part of derivative is negative. $\frac{\rho\sigma_\delta^2}{\rho\sigma_\delta^2+\eta^2\theta} > 1 - \sqrt{\frac{2}{3}}$ implies that $\beta^{*2} < \frac{2}{3}$, hence the second part is also negative. As a result, we have

$$\frac{\partial\alpha^*}{\partial\theta} < 0 \tag{35}$$

□

In practice(Jenson and Murphy(1990)), β^* is generally smaller than 1 percent, hence cash compensation always increases as air pollution increases.

Proposition 2. *Given other conditions the same, CEO with higher ability is more compensated from the same level of pollution by incentives when $\rho\sigma_\delta^2 > \theta\eta^2$ or*

$$\frac{\partial^2\beta^*}{\partial\theta\partial\eta} > 0, \quad when \quad \rho\sigma_\delta^2 > \theta\eta^2 \tag{36}$$

Proof. Take the second order cross derivative we have

$$\frac{\partial^2\beta^*}{\partial\theta\partial\eta} = \frac{2\eta\rho\sigma_\delta^2(\rho\sigma_\delta^2 - \theta\eta^2)}{(\rho\sigma_\delta^2 + \eta^2\theta)^3} \tag{37}$$

When $\rho\sigma_\delta^2 > \theta\eta^2$, it is straightforward to see that the second order derivative is positive. □

Next we discuss the implication of this proposition. $\rho\sigma_\delta^2 > \theta\eta^2$ implies that

$$\beta^* = 1 - \frac{\rho\sigma_\delta^2}{\rho\sigma_\delta^2 + \theta\eta^2} < \frac{1}{2} \tag{38}$$

As we mentioned above, in practice, β is quite small and this condition can be easily satisfied.

2.4 Setting optimal contract to CEO when shareholders have perception bias on incentive compensation

Now shareholders believe that they can get some benefits from granting incentive compensations, this benefits is proportional to the output risk, denoted as γ, then the objective function of shareholders becomes

$$\eta^2\theta\beta - W + \gamma\beta\sigma_\delta^2 = \eta^2\theta\beta - \frac{1}{\theta}[u_0 + \frac{1}{2}\rho\theta\beta^2\sigma_\delta^2] - \frac{1}{2}\eta^2\theta\beta^2 + \gamma\beta\sigma_\delta^2 \tag{39}$$

The first order condition becomes

$$\eta^2\theta - \rho\beta\sigma_\delta^2 - \theta\eta^2\beta + \gamma\sigma_\delta^2 = 0 \tag{40}$$

With some algebra, we can get optimal

$$\beta^* = \frac{\eta^2\theta + \gamma\sigma_\delta^2}{\rho\sigma_\delta^2 + \eta^2\theta} = 1 - \frac{(\rho - \gamma)\sigma_{\delta^2}}{\rho\sigma_\delta^2 + \eta^2\theta} \tag{41}$$

Since β^* is smaller than 1, we can get

$$\rho - \gamma > 0 \tag{42}$$

Next, we discuss the relationship between CEO compensation and air quality when shareholders have perception bias, which can be written as

Proposition 3. *Given other condition the same, CEO's cash compensation increases as local air quality decreases when $\beta^{*2} < \frac{2}{3}$; CEO' incentive compensation sensitivity decreases as local air quality decreases, or*

$$\frac{\partial\alpha^*}{\partial\theta} < 0, \quad \frac{\partial\beta^*}{\partial\theta} > 0 \tag{43}$$

Proof. For the second part, take the first derivative, we can find that

$$\frac{\partial\beta^*}{\partial\theta} = \frac{(\rho - \gamma)\eta^2\sigma_\delta^2}{(\eta^2\theta + \rho\sigma_\delta^2)^2} > 0 \tag{44}$$

Next we prove the first part of the proposition. We have

$$\frac{\partial\alpha^*}{\partial\theta} = -\frac{u_0}{\theta^2} - \frac{1}{2}\rho\sigma_\delta^2(3\beta^{*2} - 2)\frac{\partial\beta^*}{\partial\theta} \tag{45}$$

The first part of the derivative is negative. When $\beta^{*2} < \frac{2}{3}$, the second part is also negative. Hence we have

$$\frac{\partial\alpha^*}{\partial\theta} < 0 \tag{46}$$

□

Corollary 1. *Given other conditions the same, the larger the perception bias of the shareholders, the more CEO is compensated from the same pollution level, or*

$$\frac{\partial \beta^*}{\partial \theta \partial \gamma} < 0 \tag{47}$$

Proof. Take the derivative we have

$$\frac{\partial \beta^*}{\partial \theta \partial \gamma} = -\frac{\gamma \eta^2 \sigma_\delta^2}{(\eta^2 \theta + \rho \sigma_\delta^2)^2} < 0 \tag{48}$$

□

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), Nitrogen oxide (NO_X), Ozone, and Particulate pollutants (PM2.5, PM10). Based on the different health concerns brought with air pollution, the quality index is divided into five levels: Good(0∼50), Moderate(51∼100), 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 bigger 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 bigger than 150 scaled by the number of days with a record in that specific year.

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

3.2 CEO related controls and firm characteristic 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. We obtain firms' institutional ownership data 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 of all the electrical power plants in the US from 1950. This includes the location of each plant, which is denoted with its FIPS location code. When merging this data with the air quality data. We do this by determining 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 quartile, 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 (consistent with Humphery-Jenner et al. (2016)). The average CEO age is 55 years old, and the average tenure is nearly six years. CEOs own 1.6% of the companies on average, in this sample. Most of the CEOs are men. Around 68% of the firms' directors are independent. This is unsurprising given that our sample straddles the Sarbanes-Oxley Act of 2002. The other firm-level controls are consistent with prior studies that use the CRSP/Compustat dataset.

4 Empirical results

4.1 Baseline results

We first examine whether the local air pollution where the firms 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 do *not* include polluting firms. 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. The first way we address this is by removing firms that pollute, which are the most plausible to exhibit this issue (we also undertake other causality-orientated tests later in the paper).

We classify direct polluters as firms that are industries that send waste directly to the air. There is no explicit definition of the direct polluter. However, we can identify them based on industry. Sulfur oxide and nitrogen oxide are two main air pollutants, research has shown that 60% of sulfur oxides in the US come from coal power plants. Fossil fuels are rich in sulfur oxide and nitrogen oxide. The EPA has passed regulations to decrease sulfur oxide, nitrogen oxide, and carbon monooxide emissions from power plants. Hence, we define the following SIC 2-digit industries as direct polluters: Coal mining(SIC 12), Crude petroleum(SIC 13), Petroleum refinement(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 more HQ location and pollution ranks are relatively sticky, creating collinearity between the firm effects and pollution measures. Thus, we address causality in subsequent sections by using a natural experiment.

The main results are in Table 4 and are consistent with expectations. Panel A uses the *Bad Ratio* as the measure of pollution and Panel B uses the *Poison Ratio* as the pollution measure. We find that there is a positive and statistically significant relationship between pollution and both cash compensation and total compensation. This result is economically meaningful. A one standard deviation increase in the pollution index is associated with a 3.5% increase in cash compensation and a 2.3% to 3.1% increase in total compensation.

The coefficients on the control variables are consistent with expectations. For example, longer-tenured CEOs tend to be paid more, albeit this concentrates on a greater amount of cash compensation. CEOs that own more equity tend to receive less total compensation and cash compensation, potentially indicating a substitution between incentive-linked 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.

4.2 Impact of regulation changes: the Acid Rain Program

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 Boiler (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 the 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 5 and are consistent with expectations. For brevity, we only report the results when using the *Bad Ratio* pollution measure (but the results are qualitatively the same when using *Poison Ratio*. In these results, pollution continues to be positively and significantly related to compensation. 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.

4.3 Impact of bargaining power

We next explore the impact of CEO bargaining power. We hypothesize that CEO bargaining power will amplify the impact of pollution. We anticipate that bargaining power will enable the CEO to force the corporation to pay them pollution-linked compensation lest they pursue an outside opportunity. We capture this in several ways, which we cover in the following sections.

4.3.1 Impact of CEO power

We anticipate that powerful CEOs will be more able to extract higher pollution-related compensation. Prior literature highlights that powerful CEOs might be able to extract rents from shareholders. (Adams, Almeida, and Ferreira (2005),Morse, Nanda, and Seru (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, Cremers, and Peyer (2011)), proxy CEO power with the CEO's compensation, which would be endogenous with our dependent variable.

The results are in Table 6 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 4.5 – 4.7 % more than other CEOs following a one standard deviation increase in the pollution poison ratio. The results are similar for total compensation. This implies that powerful CEOs are more apt to extract pollution-related compensation than are other CEOs.

4.3.2 Impact of CEO managerial ability

We anticipate that CEOs with greater ability will be more able to demand compensation for pollution. This follows prior literature that higher ability CEOs can generally demand greater compensation (Rajgopal, Shevlin, and Zamora (2006),Song and Wan (2019),Gabaix and Landier (2008)). We expect that higher ability managers will be able to demand higher compensation for pollution for two reasons. First, higher-ability managers will have greater bargaining power due to their relatively higher value to the firm. Second, to the extent that higher ability managers are more productive, they could arguably face a higher personal disutility from pollution increases.

We construct a managerial ability measure following the approach in Demerjian, Lev, and McVay (2012) and find results that are consistent with expectations. This measure asserts that managerial ability is the residual from a regression of firm efficiency onto firm characteristics. The regression results are in Table 7. We find a positive and statistically significant relationship between managerial ability, air pollution, and both cash and total compensation. In our regression, the managerial ability term itself is positively related to total compensation as opposed to cash compensation per se. 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.

4.3.3 Impact of CEOs' outside opportunities

CEOs' bargaining power increases with their outside opportunities. Fewer opportunities imply a lesser ability to negotiate for greater compensation. We capture CEOs' outside opportunities by exploring an exogenous shock to them: the staggered adoption of the Inevitable Disclosure Doctrine (IDD). The IDD prevents 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 move. Not all states adopt the IDD. And different states adopt it at different times. This creates a staggering natural experiment and helps to ensure causality in our results.

We capture outside opportunities by using the staggered difference in difference approach. We create an indicator that equals one if the state does *not* adopt the IDD and equals zero otherwise (i.e., this would be 1 - an *IDD* indicator). We then normalize this indicator by industry size. This is because the impact logically depends on the number of competitors in the CEOs' job market. Thus, we scale the non-IDD indicator by the number of firms in the focal firm's two-digit SIC industry in that year. This gives us the variable *Opportunities.* which captures the CEO's outside opportunities. The results are in Table 8 and are consistent with expectations. Managerial outside opportunities significantly increase the impact of pollution on cash compensation.

4.4 Impact of environmental consciousness

Environmental consciousness is likely to amplify the demand for pollution-linked compensation. Intuitively, if more executives know more about pollutions' harms, more executives will 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.[*] 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 9 and are consistent with expectations. Panel A includes the interaction of the government activism measure pollution, and Panel B the interaction of media activism with pollution. In both panels, pollution continues to be a positive and significant influence on both cash compensation and compensation. Further, both environmental consciousness measures amplify this effect on cash compensation. This implies that greater environmental awareness gives executives greater bargaining power to push for greater compensation in polluted environments.

4.5 Additional 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 tests (i.e., the use of the inevitable disclosure doctrine, and the acid rain project as quasi-exogenous natural experiments, which help to establish causality).

4.5.1 Alternative proxy for air quality

We also explore other proxies for air quality. As discussed above, fossil power plants are one of the main sources of air pollutants. Thus, the number of fossil power plants near firms' headquarter can be a good proxy for air pollution. We calculate the total number of fossil power plants within 40 miles radius of headquarters and use it as the proxy for the local air pollution.[†]. Next, we do the baseline regression again and Table **??** contains the results. Columns 1 and 2 show that the number of power plants is positively and statistically significantly related to the amount of cash compensation and negatively related to the number of incentives. The amount of total compensation does not change in a statistically significant manner. These results are consistent with, and buttress, our prior results about the impact of air quality on CEO compensation.

4.5.2 Controlling for county median house price and alternative county income controls

We further ensure that the regression results are robust to controlling for county-level house prices. 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 can signal a higher cost of living. On the other hand, much like with luxury goods, high prices can generate exclusivity, which might be attractive to CEOs. Nevertheless, we obtain the natural log of the county median house price and take the spline of that value. We control for this in Table 11. Panel A includes the whole sample and Panel B excludes the direct polluter industries. Here, sign, coefficient, and significance of *Poison Ratio* is similar to that in baseline regressions

We also consider per capita GDP as the control for the cost of living. However, this data is only available from 2000. By contrast, per capita income is available from 1969 from county census data. In addition, the correlation between per capita GDP and per capita income is 79.1% in our

[*]Obama's main records on environment protection are attached in appendix

[†]We also calculate the number within 60 miles radius as proxy and regression results are similar but for reason for brevity, we do not show it here

sample. Per capita income also likely better captures the demographic traits of a region than does per capita GDP. Nevertheless, the results are qualitatively similar when we use per capita GDP. These results are unreported for brevity.

4.5.3 Impact of nearby air pollution

We also examine the impact of pollution in nearby counties on executive compensation. Pollution is mobile and pollution in nearby counties could presumably also impact executives. We capture 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 country pollution level combined with the *Near Poison Ratio*: this is simply 0.5 × *Poison Ratio* + 0.5 × Near Poison Ratio.

The results are in Table 12 and are consistent with the baseline regression results. Panel A focuses on the *Near Bad Ratio* and Panel B on the *Regional Bad Ratio*. Both additional pollution measures are positively and statistically significantly related to both cash and total compensation. 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 and excluding types of polluters

The main results exclude firms that are in industries that directly pollute. This helps to mitigate concerns 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 Table 13 and are consistent with the main results: pollution is positively associated with cash compensation, weakly negatively associated with incentives, and positively associated with total compensation. This is consistent with the idea that CEOs do require compensation for working in polluted environments.

We also ensure that the 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. We report these results in Table 14 and are consistent with the main results. Here, pollution is positively and significantly related to cash compensation, negatively related to incentives, and positively related to total compensation. Thus, the results do not appear to merely be a function of the decision to exclude direct polluters from the analysis.

4.5.5 Impact of air pollution on the compensation of other top executives

The main results have focused on CEO compensation. However, a related question is whether non-CEO executives also receive pay increases. Such results also help to determine whether it is merely CEOs – who would normally have the greatest bargaining power – that experience compensation uplifts. We focus on the COO and the CFO. In our data, around 33% of COOs become a CEO, and around 8% of CFOs become a CEO.[‡]

The results are in Table 15 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 looks at

[‡]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"

the impact of pollution on COO cash compensation. Columns 3 and 4 looks at the impact on COO and CFO cash compensation. The main result 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 a 3.8% to 4% increase in cash compensation. When including CFOs this falls from 2.1% to 2.6%. Part of the reason for the COOs exhibiting such a large increase in compensation could be that they are more likely to become CEO, thereby exhibiting similar increases in cash compensation to CEOs. 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 headquarter relocation

Firms seldom relocate their headquarters because of surrounding air pollution. Hence, headquarter relocation can serve as another quasi-natural experiment. In our sample, we identify 107 firms that relocate their headquarters to different counties. To take the difference-in-difference regression, the sample must include financial data three years before and three years after the relocation of these firms. Excluding the firms without enough data, we finally get 80 valid firms. 42 of them move to a more polluted place and 38 of them move to a cleaner place.

The results are in Table 16. *Old poison ratio* is the air pollution around the headquarter before relocation. *Poison ratio diff* is the air pollution level difference between counties of new headquarter and old headquarter after relocation. For the firms without relocation, *Poison ratio diff* is zero. For the firms with relocation, it is also zero before relocation. To explore the impact of relocation on CEO compensation, we should especially focus on the interactive term or the coefficient of *Poison ratio diff*. The Column 1 and 2 focuses on the cash compensation and Column 3 and 4 looks at incentive compensation. The results show that the coefficient of *Poison ratio diff* is significant at 1% level for the cash compensation. However, for the incentive compensation, the sign of the coefficient is as expected but is not significant. One reason is that our relocation sample is rather limited. These results further testify to the causality between air pollution and CEO compensation.

5 Conclusion

There has been an increased focus on environmental issues both in the general public and amongst 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 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 3.5% increase in CEOs' cash compensation and a 2.3% to 3% increase in total compensation. We deploy a quasi-exogenous natural experiment: the acid rain project to assuage identification concerns and ensure causality.

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. We find that overconfident CEOs demand less compensation for pollution, consistent with their potentially overconfident nonchalance towards risks. Conversely, 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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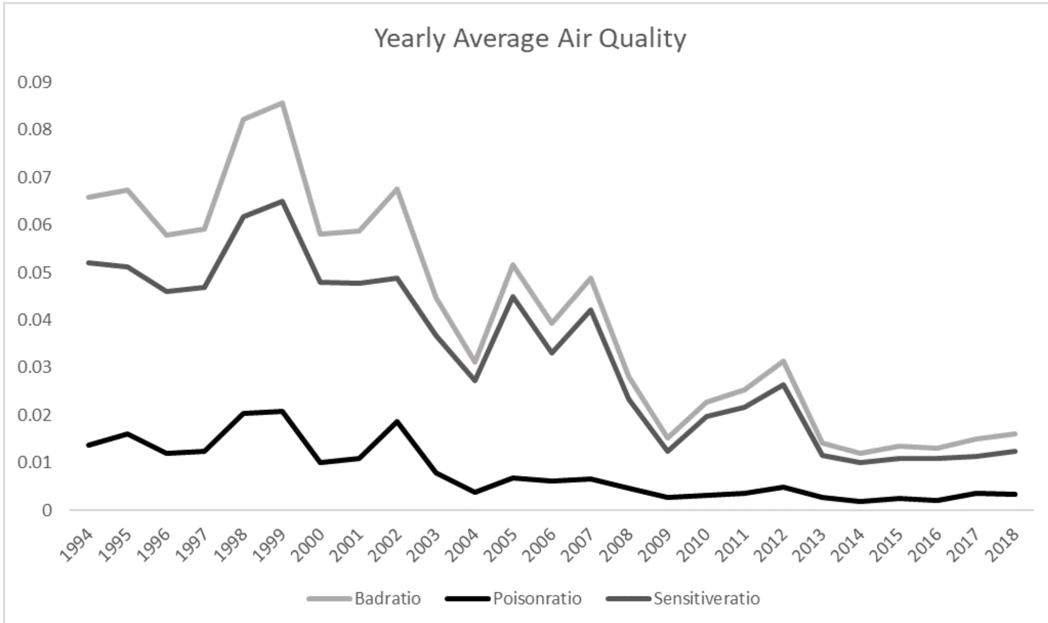
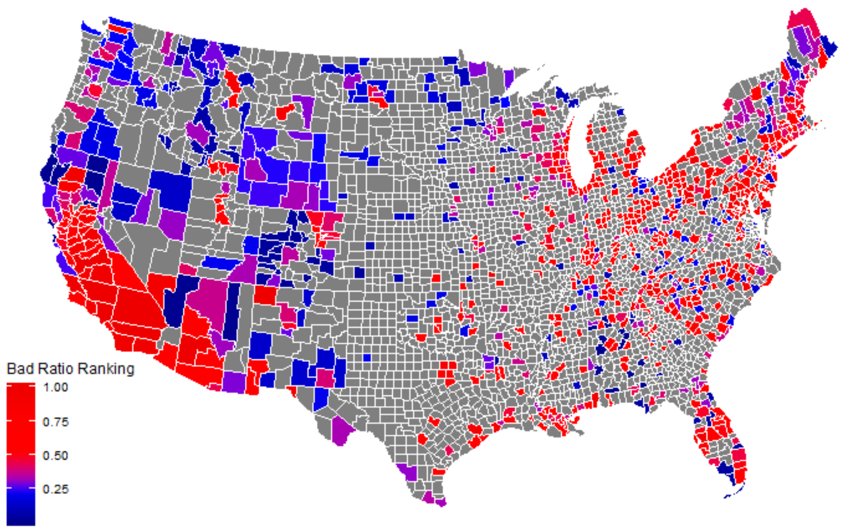
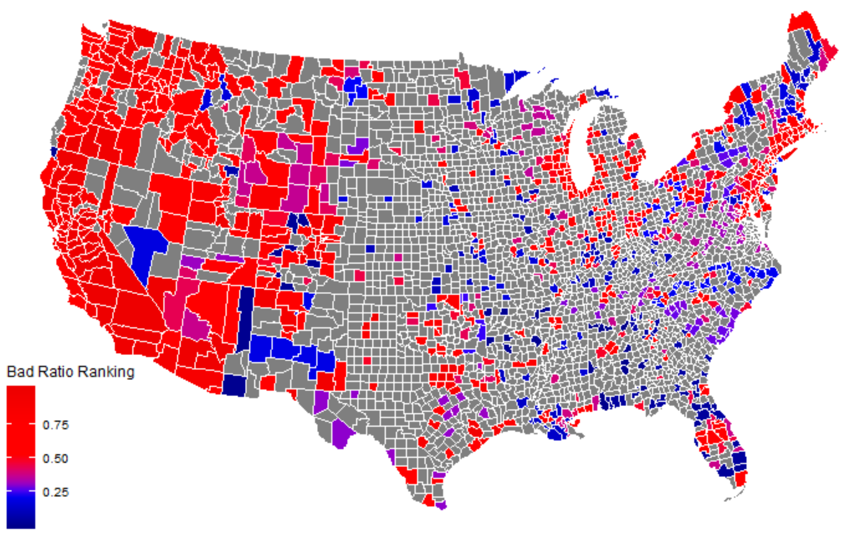


Figure 1: Nationwide yearly average air quality. The figure shows the trend of nationwide air quality from 1994 to 2018. Data comes from EPA website. Poison ratio is defined as the number when air quality index is bigger than 150 scaled by number of days with record. Bad ratio is defined as the number 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



(a)



(b)

Figure 2: (a) Nationwide air pollution ranking in 1998; (b) Nationwide air pollution ranking in 2018. Alaska and Hawaii are excluded since there are no firm headquarters there. The gray-shaded areas are the counties where EPA does not collect any air quality data. Normalized bad ratio ranking is calculated as follows: We first rank the county by bad ratio and then scale the ranking over the total number of county with air quality data record.

Table 1: Yearly nationwide air quality distribution

We define our variables of interest as *Poison ratio* and *Bad ratio*. The *Poison ratio* is the number of days that air quality index(AQI) is higher than 150 over the number of days with record in that specific calendar year. Similarly, the *Bad ratio* as the number of days that air quality index is higher than 100 scaled by the days with record in that calendar year. When air quality index is between 100 and 150, air pollution is harmful only to sensitive group of local residents. *Observations* is the total number of counties with air quality index.

		Bad ratio		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: Univariate test of compensation difference in clean and polluted counties

This table contains the results of univariate test between difference of Total compensation in highly polluted counties and clean counties. A county is defined as highly polluted county if Bad ratio in that county is in the top quartile. Similarly, a county is defined as clean county if its Bad ratio is in the bottom quartile. Superscripts ***, **, and * denote significance at 1%, 5%, and 10% level, respectively.

Period	Observations		Average Ln(Total Compensation)			
Year	Clean	Polluted	Clean	Polluted	Difference	P-value
1993	209	220	6.987	7.241	0.254	0.002
1994	274	273	7.060	7.294	0.234	0.002
1995	292	285	7.068	7.329	0.261	0.001
1996	311	327	7.268	7.485	0.217	0.010
1997	334	322	7.396	7.658	0.261	0.002
1998	399	391	7.510	7.653	0.143	0.065
1999	391	378	7.636	7.696	0.061	0.455
2000	393	390	7.777	7.772	-0.006	0.949
2001	366	374	7.804	7.867	0.063	0.480
2002	367	383	7.830	7.852	0.022	0.811
2003	391	440	7.734	7.805	0.071	0.375
2004	387	403	7.990	7.964	-0.026	0.768
2005	421	384	8.008	8.070	0.063	0.464
2006	426	418	8.061	8.041	-0.020	0.815
2007	519	480	7.782	7.973	0.190	0.012
2008	478	470	7.759	7.933	0.174	0.017
2009	466	474	7.768	7.869	0.101	0.158
2010	496	464	7.866	8.159	0.293	0.000
2011	450	463	7.938	8.151	0.213	0.003
2012	464	449	8.018	8.201	0.183	0.010
2013	454	464	8.305	8.203	-0.102	0.150
2014	444	625	8.143	8.302	0.159	0.026
2015	428	527	8.227	8.290	0.063	0.355
2016	410	433	8.274	8.379	0.105	0.146
2017	489	410	8.333	8.414	0.081	0.254
2018	379	374	8.396	8.492	0.096	0.188
President Spline						
Clinton	2,603	2,586	7.387	7.548	0.161	0.000
Bush II	3,355	3,352	7.869	7.938	0.069	0.018
Obama	3,355	3,352	8.200	8.298	0.097	0.000
Trump	868	784	8.361	8.452	0.091	0.075

Table 3: Summary statistics

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

Variable	N	Mean	Std	P25	P50	P75
Air quality						
Bad ratio	36243	0.075	0.089	0.014	0.044	0.104
Poison ratio	36243	0.017	0.032	0.000	0.003	0.022
Near bad ratio	36243	0.061	0.080	0.013	0.034	0.075
Near poison ratio	36243	0.014	0.029	0.000	0.003	0.014
Region bad ratio	36243	0.068	0.081	0.016	0.041	0.087
Region poison ratio	36243	0.015	0.030	0.000	0.005	0.017
CEO Compensation						
Ln[Cash compensation]	36243	6.726	0.987	6.392	6.770	7.124
Total Compensation	36139	7.993	1.173	7.275	8.062	8.765
Incentive Compensation	36142	6.085	3.167	5.513	7.229	8.225
CEO level controls						
Ln[Age]	36243	4.015	0.135	3.932	4.025	4.111
Gender[Female=1]	36243	0.028	0.166	0.000	0.000	0.000
Ln[Tenure]	36243	1.767	0.873	1.099	1.792	2.398
CEO ownership(%)	36243	1.705	4.016	0.798	0.802	0.851
Managerial ability	26415	0.012	0.145	-0.077	-0.024	0.059
Itmness	29364	0.298	0.275	0.049	0.256	0.484
CEO Power[Powerful=1]	36243	0.227	0.419	0.000	0.000	0.000
firm-level controls						
Ln[Total assets]	36243	7.671	1.780	6.431	7.553	8.796
Leverage	36243	0.205	0.191	0.033	0.175	0.315
EBIT/Assets	36243	0.079	0.109	0.036	0.079	0.128
Intangibles/Assets	36243	0.165	0.187	0.017	0.085	0.259
R&D/Sales	36243	0.059	0.280	0.000	0.000	0.032
Tobin' s Q	36242	1.975	3.058	1.142	1.497	2.174
Institutional ownership	36243	0.757	0.183	0.705	0.768	0.856
Stock return	36243	0.154	0.578	-0.105	0.135	0.300
Volatility	36243	0.108	0.068	0.066	0.097	0.126
Proportion NTD	36243	0.013	0.053	0.008	0.008	0.008
County level controls						
Education level	36243	35.109	10.958	26.900	32.600	42.200
Population density	36243	0.015	0.902	-0.475	0.063	0.615
Ln[Per Capita Income]	36243	10.755	0.399	10.481	10.725	10.966
Metropolitan[Within=1]	36243	0.378	0.485	0.000	0.000	1.000
Longitude	36243	-91.869	16.992	-97.691	-87.436	-77.300
Latitude	36243	37.991	4.776	34.196	39.586	41.760

Table 4: The effect of environmental quality surrounding the corporate headquarter on CEO compensation

This table contains models that depict the relationship between firm-level CEO compensation and the environment quality in the county where the corporate headquarter of the firm is located. The dependent variables are the total Cash compensation, sum of equity and option compensation and Total compensation. Detailed variable definition 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% level, respectively.

Panel A: Poison ratio as proxy for the air pollution

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	0.951***	0.963***	-2.216***	-1.742**	0.389**	0.523***
	(5.73)	(5.99)	(-2.92)	(-2.57)	(2.14)	(3.03)
Ln[Age]	0.167***	0.132***	-1.364***	-1.301***	-0.165***	-0.233***
	(3.52)	(2.88)	(-9.41)	(-9.09)	(-3.78)	(-5.33)
Gender	0.000	0.002	0.079	-0.038	0.042*	0.019
	(0.02)	(0.07)	(0.80)	(-0.37)	(1.69)	(0.71)
Ln[Tenure]	0.055***	0.038***	-0.036	-0.022	0.046***	0.041***
	(8.79)	(6.45)	(-1.59)	(-0.96)	(6.90)	(6.31)
CEO Ownership(%)	-0.008***	-0.004	-0.053***	-0.052***	-0.014***	-0.012***
	(-2.66)	(-1.56)	(-8.30)	(-8.36)	(-5.01)	(-4.58)
CEO Confidence	0.115***	-0.006	0.190**	0.185**	0.264***	0.188***
	(5.43)	(-0.29)	(2.52)	(2.54)	(9.82)	(6.65)
Leverage	-0.056*	-0.032	-0.732***	-0.854***	-0.158***	-0.168***
	(-1.90)	(-1.07)	(-6.58)	(-7.43)	(-5.25)	(-5.21)
Lagged EBIT/Assets	0.170**	0.390***	1.501***	2.072***	0.610***	0.898***
	(2.55)	(5.37)	(6.79)	(8.85)	(7.92)	(10.61)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.19)	(-0.92)	(3.77)	(2.99)	(2.92)	(2.59)
Intangibles	-0.006	0.018	0.087	0.102	0.124***	0.136***
	(-0.18)	(0.56)	(0.76)	(0.86)	(3.59)	(3.92)
R&D/Sales	0.043***	0.084***	0.651***	0.665***	0.224***	0.247***
	(2.69)	(4.52)	(9.68)	(10.60)	(11.62)	(13.11)
Institutional Ownership	0.086***	0.083***	1.504***	1.442***	0.395***	0.394***
	(2.99)	(2.73)	(13.27)	(12.85)	(12.93)	(12.61)
Proportion NTD	0.293**	0.039	-0.621	-1.208***	0.157	-0.044
	(2.50)	(0.50)	(-1.11)	(-3.03)	(0.97)	(-0.38)
Lagged Stock return	0.029***	0.052***	0.077**	0.130***	0.061***	0.091***
	(3.17)	(5.47)	(2.13)	(3.40)	(4.53)	(6.00)
Lagged Volatility	-0.163*	-0.240***	0.663**	0.422	0.455***	0.336***
	(-1.77)	(-2.65)	(2.09)	(1.31)	(4.21)	(3.12)
Education Level	-0.001	-0.002	-0.010**	-0.011***	-0.002**	-0.002**
	(-1.38)	(-1.41)	(-2.49)	(-2.74)	(-2.29)	(-2.24)
Population Density	0.012**	0.020***	0.061**	0.054**	0.037***	0.038***
	(2.08)	(3.11)	(2.21)	(1.98)	(5.73)	(5.36)
Metropolitan	0.003	0.005	-0.023	0.014	-0.028	-0.021
	(0.20)	(0.27)	(-0.37)	(0.22)	(-1.60)	(-1.16)
Longitude	0.010***	0.007*	0.008	0.009	0.003	0.002
	(2.95)	(1.95)	(0.55)	(0.63)	(0.83)	(0.50)
Latitude	-0.011**	-0.012**	0.058***	0.054***	0.014***	0.012**
	(-2.45)	(-2.40)	(3.02)	(2.84)	(2.74)	(2.25)
Constant	2.327**	2.775***	6.952*	6.013	4.921***	4.432***
	(2.12)	(2.64)	(1.65)	(1.58)	(4.24)	(3.93)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	26811	27033	26737	26948	26734	26945
Adj. R-sq	0.325	0.308	0.212	0.206	0.550	0.526

Panel B: Bad ratio as proxy for the air pollution

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Bad Ratio	0.447***	0.454***	-0.754***	-0.565**	0.132*	0.183***
	(7.21)	(7.09)	(-2.65)	(-2.17)	(1.85)	(2.62)
Ln[Age]	0.171***	0.136***	-1.369***	-1.305***	-0.164***	-0.232***
	(3.61)	(2.97)	(-9.43)	(-9.11)	(-3.76)	(-5.29)
Gender	0.001	0.002	0.076	-0.040	0.042*	0.020
	(0.05)	(0.10)	(0.77)	(-0.38)	(1.71)	(0.72)
Ln[Tenure]	0.055***	0.038***	-0.036	-0.022	0.046***	0.041***
	(8.79)	(6.45)	(-1.60)	(-0.97)	(6.90)	(6.32)
CEO Ownership(%)	-0.008***	-0.004	-0.053***	-0.052***	-0.014***	-0.012***
	(-2.65)	(-1.55)	(-8.31)	(-8.38)	(-5.01)	(-4.57)
CEO Confidence	0.115***	-0.006	0.191**	0.186**	0.264***	0.188***
	(5.43)	(-0.30)	(2.52)	(2.55)	(9.82)	(6.64)
Leverage	-0.056*	-0.033	-0.730***	-0.852***	-0.158***	-0.168***
	(-1.90)	(-1.08)	(-6.56)	(-7.41)	(-5.26)	(-5.23)
Lagged EBIT/Assets	0.167**	0.387***	1.504***	2.076***	0.610***	0.897***
	(2.50)	(5.32)	(6.80)	(8.86)	(7.91)	(10.60)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.020***
	(-2.19)	(-0.90)	(3.77)	(2.99)	(2.92)	(2.59)
Intangibles	-0.008	0.016	0.091	0.104	0.124***	0.136***
	(-0.25)	(0.49)	(0.79)	(0.88)	(3.58)	(3.90)
R&D/Sales	0.043***	0.083***	0.651***	0.665***	0.224***	0.247***
	(2.69)	(4.51)	(9.68)	(10.60)	(11.62)	(13.10)
Institutional Ownership	0.086***	0.083***	1.504***	1.441***	0.395***	0.394***
	(2.98)	(2.73)	(13.27)	(12.85)	(12.93)	(12.61)
Proportion NTD	0.293**	0.041	-0.620	-1.210***	0.156	-0.043
	(2.50)	(0.52)	(-1.11)	(-3.03)	(0.97)	(-0.38)
Lagged Stock return	0.029***	0.052***	0.077**	0.130***	0.061***	0.091***
	(3.18)	(5.49)	(2.13)	(3.39)	(4.53)	(6.01)
Lagged Volatility	-0.160*	-0.237***	0.662**	0.419	0.455***	0.336***
	(-1.74)	(-2.61)	(2.08)	(1.30)	(4.21)	(3.13)
Education Level	-0.001	-0.001	-0.010**	-0.011***	-0.002**	-0.002**
	(-1.15)	(-1.16)	(-2.53)	(-2.76)	(-2.24)	(-2.18)
Population Density	0.003	0.010	0.079***	0.070**	0.034***	0.033***
	(0.48)	(1.53)	(2.85)	(2.55)	(5.14)	(4.67)
Metropolitan	0.005	0.007	-0.037	-0.000	-0.026	-0.017
	(0.31)	(0.42)	(-0.60)	(-0.00)	(-1.48)	(-0.96)
Longitude	0.010***	0.007*	0.008	0.009	0.003	0.002
	(2.80)	(1.84)	(0.53)	(0.59)	(0.85)	(0.53)
Latitude	-0.010**	-0.011**	0.060***	0.057***	0.013***	0.012**
	(-2.19)	(-2.18)	(3.15)	(3.00)	(2.70)	(2.17)
Constant	2.053*	2.488**	7.024*	5.967	4.909***	4.417***
	(1.88)	(2.38)	(1.67)	(1.56)	(4.25)	(3.93)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	26811	27033	26737	26948	26734	26945
Adj. R-sq	0.325	0.309	0.212	0.206	0.550	0.526

Table 5: Impact of regulation Acid Rain Project(ARP)

This table contains models that analyze when the government introduces a regulation in 2000 to constrain the emission of SO_x and NO_x of fossil power plant, how CEO's compensation in counties where power capacity is high can be influenced. ARP is a proxy for this regulation. It equals to number of fossil power plant around firm head quarters times by a dummy variable equaling to 1 when it is earlier 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% level, respectively.

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	1.258***	1.343***	-3.743***	-2.928***	0.275	0.562**
	(6.20)	(6.26)	(-3.94)	(-3.16)	(1.09)	(2.26)
ARP × Poison Ratio	-0.157*	-0.188**	1.260***	0.849***	0.154*	0.042
	(-1.71)	(-2.30)	(3.66)	(2.83)	(1.67)	(0.49)
ARP	0.023	0.025	-0.369***	-0.380***	-0.037	-0.032
	(0.97)	(1.11)	(-4.18)	(-4.66)	(-1.42)	(-1.27)
Ln[Age]	0.172***	0.143***	-1.382***	-1.325***	-0.162***	-0.227***
	(3.45)	(2.98)	(-9.06)	(-8.80)	(-3.54)	(-4.93)
Gender	0.001	0.000	0.095	-0.020	0.052**	0.026
	(0.03)	(0.01)	(0.94)	(-0.19)	(2.02)	(0.89)
Ln[Tenure]	0.049***	0.031***	-0.036	-0.025	0.041***	0.037***
	(7.43)	(5.08)	(-1.53)	(-1.06)	(5.78)	(5.38)
CEO Ownership(%)	-0.006**	-0.002	-0.050***	-0.047***	-0.013***	-0.010***
	(-2.05)	(-0.71)	(-7.59)	(-7.30)	(-4.40)	(-3.99)
CEO Confidence	0.118***	-0.005	0.163**	0.180**	0.263***	0.187***
	(5.28)	(-0.23)	(2.03)	(2.37)	(9.21)	(6.26)
Leverage	-0.053*	-0.029	-0.799***	-0.907***	-0.162***	-0.165***
	(-1.72)	(-0.92)	(-6.84)	(-7.56)	(-5.10)	(-4.87)
Lagged EBIT/Assets	0.164**	0.384***	1.623***	2.147***	0.632***	0.912***
	(2.24)	(4.80)	(6.92)	(8.62)	(7.59)	(9.98)
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	-0.016	0.005	0.097	0.134	0.108***	0.125***
	(-0.49)	(0.16)	(0.83)	(1.12)	(3.06)	(3.50)
R&D/Sales	0.040**	0.081***	0.653***	0.662***	0.223***	0.244***
	(2.47)	(4.22)	(9.53)	(10.35)	(11.24)	(12.57)
Institutional Ownership	0.102***	0.084***	1.609***	1.537***	0.409***	0.404***
	(3.30)	(2.71)	(13.50)	(12.98)	(12.56)	(12.25)
Proportion NTD	0.288**	0.030	-0.711	-1.255***	0.119	-0.043
	(2.31)	(0.37)	(-1.23)	(-2.96)	(0.71)	(-0.36)
Lagged Stock return	0.029***	0.051***	0.068*	0.120***	0.059***	0.088***
	(3.14)	(5.27)	(1.86)	(3.09)	(4.27)	(5.68)
Lagged Volatility	-0.174*	-0.251***	0.801**	0.579*	0.457***	0.349***
	(-1.81)	(-2.65)	(2.44)	(1.75)	(4.02)	(3.08)
Education Level	-0.001	-0.001	-0.012***	-0.013***	-0.002*	-0.002
	(-1.18)	(-1.14)	(-2.95)	(-3.20)	(-1.67)	(-1.64)
Population Density	0.011*	0.019***	0.076***	0.069**	0.039***	0.039***
	(1.83)	(2.83)	(2.69)	(2.46)	(5.68)	(5.19)
Metropolitan	0.004	0.005	-0.013	0.032	-0.027	-0.019
	(0.21)	(0.29)	(-0.20)	(0.49)	(-1.44)	(-0.99)
Longitude	0.010***	0.008**	0.009	0.014	0.007*	0.007
	(3.14)	(2.38)	(0.54)	(0.87)	(1.66)	(1.54)
Latitude	-0.010**	-0.010*	0.058***	0.059***	0.018***	0.018***
	(-2.10)	(-1.94)	(2.85)	(2.91)	(3.35)	(3.15)
Constant	2.537**	3.064**	1.296	0.921	5.119***	4.761***
	(2.02)	(2.54)	(0.29)	(0.23)	(3.95)	(3.82)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	26811	27033	26737	26948	26734	26945
Adj. R-sq	0.326	0.311	0.210	0.204	0.541	0.516

Table 6: Impact of CEO power

The results in this table show the impacts of CEO power on relationship between CEO compensation and air quality. *CEO power* is a CEO power dummy variable, which equals to 1 if CEO is also the chairman and president at the same time and equals to 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% level, respectively.

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	0.727***	0.743***	-2.400***	-1.948***	0.242	0.372**
	(4.18)	(4.36)	(-2.98)	(-2.79)	(1.25)	(1.99)
CEO Power × Poison Ratio	0.972***	0.948***	0.614	0.768	0.592*	0.608*
	(4.21)	(3.72)	(0.42)	(0.63)	(1.78)	(1.91)
CEO Power	0.030***	0.027**	0.198***	0.145***	0.065***	0.062***
	(2.63)	(2.29)	(4.42)	(3.21)	(5.74)	(5.15)
Ln[Age]	0.165***	0.131***	-1.372***	-1.307***	-0.168***	-0.236***
	(3.48)	(2.84)	(-9.48)	(-9.13)	(-3.85)	(-5.39)
Gender	0.002	0.003	0.084	-0.036	0.044*	0.020
	(0.08)	(0.12)	(0.85)	(-0.35)	(1.77)	(0.75)
Ln[Tenure]	0.053***	0.036***	-0.045**	-0.029	0.042***	0.038***
	(8.44)	(6.11)	(-2.00)	(-1.27)	(6.39)	(5.84)
CEO Ownership(%)	-0.008***	-0.005	-0.054***	-0.052***	-0.015***	-0.012***
	(-2.70)	(-1.60)	(-8.39)	(-8.43)	(-5.09)	(-4.67)
CEO Confidence	0.115***	-0.006	0.192**	0.185**	0.264***	0.188***
	(5.44)	(-0.30)	(2.53)	(2.54)	(9.84)	(6.65)
Leverage	-0.056*	-0.032	-0.732***	-0.854***	-0.158***	-0.168***
	(-1.90)	(-1.07)	(-6.57)	(-7.41)	(-5.26)	(-5.19)
Lagged EBIT/Assets	0.172***	0.394***	1.513***	2.085***	0.615***	0.903***
	(2.59)	(5.42)	(6.87)	(8.92)	(8.00)	(10.68)
Lagged Market-to-book	-0.004**	-0.001	0.042***	0.042***	0.017***	0.020***
	(-2.16)	(-0.90)	(3.78)	(3.00)	(2.93)	(2.60)
Intangibles	-0.006	0.018	0.089	0.103	0.124***	0.137***
	(-0.20)	(0.54)	(0.77)	(0.87)	(3.59)	(3.93)
R&D/Sales	0.044***	0.084***	0.653***	0.666***	0.225***	0.248***
	(2.73)	(4.50)	(9.72)	(10.63)	(11.65)	(13.11)
Institutional Ownership	0.081***	0.079**	1.490***	1.430***	0.389***	0.388***
	(2.82)	(2.58)	(13.14)	(12.74)	(12.72)	(12.40)
Proportion NTD	0.293**	0.041	-0.618	-1.200***	0.158	-0.040
	(2.49)	(0.53)	(-1.11)	(-3.00)	(0.97)	(-0.35)
Lagged Stock return	0.029***	0.052***	0.076**	0.130***	0.061***	0.091***
	(3.16)	(5.47)	(2.11)	(3.40)	(4.49)	(6.00)
Lagged Volatility	-0.156*	-0.236***	0.692**	0.436	0.465***	0.342***
	(-1.69)	(-2.59)	(2.18)	(1.35)	(4.31)	(3.18)
Education Level	-0.001	-0.001	-0.009**	-0.010**	-0.002*	-0.002*
	(-1.18)	(-1.25)	(-2.23)	(-2.56)	(-1.95)	(-1.95)
Population Density	0.012**	0.019***	0.060**	0.053*	0.037***	0.037***
	(1.98)	(3.01)	(2.19)	(1.95)	(5.67)	(5.30)
Metropolitan	0.003	0.004	-0.023	0.013	-0.029	-0.021
	(0.15)	(0.21)	(-0.37)	(0.21)	(-1.63)	(-1.19)
Longitude	0.010***	0.007**	0.008	0.009	0.003	0.002
	(3.02)	(2.01)	(0.51)	(0.61)	(0.83)	(0.50)
Latitude	-0.011**	-0.012**	0.057***	0.053***	0.014***	0.012**
	(-2.44)	(-2.38)	(2.95)	(2.80)	(2.68)	(2.21)
Constant	2.490**	2.895***	7.399*	6.269	5.114***	4.565***
	(2.27)	(2.76)	(1.76)	(1.64)	(4.42)	(4.05)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	26811	27033	26737	26948	26734	26945
Adj. R-sq	0.326	0.309	0.213	0.207	0.551	0.527

Table 7: Impact of CEO managerial ability

The results in this table show the impacts of CEO's managerial ability on relationship between CEO compensation and air quality. *Managerial Ability(MA)* is the proxy for CEO's managerial ability, of which detailed definition is attached in the Appendix. All models are Ordinary Least Square (OLS) regression 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% level, respectively.

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	0.756***	0.751***	-1.566*	-0.646	0.251	0.383**
	(3.99)	(3.82)	(-1.84)	(-0.91)	(1.19)	(1.97)
MA × Poison Ratio	4.264***	5.242***	-2.897	-1.645	2.180*	2.516*
	(3.74)	(4.86)	(-0.62)	(-0.32)	(1.82)	(1.73)
MA	0.063	-0.018	0.547***	0.643***	0.352***	0.377***
	(1.46)	(-0.34)	(3.19)	(3.67)	(7.07)	(6.55)
Ln[Age]	0.218***	0.203***	-1.368***	-1.241***	-0.161***	-0.186***
	(4.17)	(4.07)	(-8.46)	(-7.81)	(-3.39)	(-3.84)
Gender	0.011	0.028	0.205*	0.113	0.074***	0.067**
	(0.36)	(1.01)	(1.86)	(0.96)	(2.64)	(2.28)
Ln[Tenure]	0.059***	0.040***	-0.057**	-0.039	0.045***	0.039***
	(8.10)	(5.95)	(-2.25)	(-1.58)	(5.80)	(5.31)
CEO Ownership(%)	-0.010***	-0.008***	-0.051***	-0.053***	-0.016***	-0.015***
	(-3.39)	(-2.68)	(-7.44)	(-7.97)	(-6.52)	(-6.27)
CEO Confidence	0.118***	-0.005	0.163*	0.113	0.233***	0.181***
	(4.70)	(-0.21)	(1.80)	(1.30)	(7.63)	(5.70)
Leverage	-0.015	0.003	-0.784***	-0.922***	-0.166***	-0.159***
	(-0.44)	(0.09)	(-6.29)	(-7.28)	(-4.94)	(-4.35)
Lagged EBIT/Assets	0.042	0.281***	1.179***	1.585***	0.362***	0.609***
	(0.57)	(3.40)	(4.66)	(5.95)	(4.35)	(6.59)
Lagged Market-to-book	-0.005**	-0.002*	0.038***	0.036***	0.015***	0.016**
	(-2.29)	(-1.79)	(3.50)	(2.71)	(2.70)	(2.40)
Intangibles	-0.054	-0.015	-0.015	-0.026	0.009	0.035
	(-1.46)	(-0.40)	(-0.11)	(-0.20)	(0.24)	(0.92)
R&D/Sales	0.018	0.068***	0.868***	0.870***	0.268***	0.285***
	(0.90)	(3.31)	(8.52)	(9.64)	(9.21)	(10.19)
Institutional Ownership	0.064*	0.081**	1.396***	1.409***	0.316***	0.347***
	(1.87)	(2.23)	(10.73)	(10.77)	(8.78)	(9.27)
Proportion NTD	0.244*	0.004	-0.704	-1.060**	0.079	-0.090
	(1.85)	(0.04)	(-1.16)	(-2.39)	(0.47)	(-0.69)
Lagged Stock return	0.028***	0.053***	0.071*	0.130***	0.058***	0.088***
	(2.92)	(5.38)	(1.87)	(3.28)	(4.10)	(5.74)
Lagged Volatility	-0.329***	-0.391***	0.466	0.074	0.301***	0.180
	(-3.12)	(-3.96)	(1.34)	(0.21)	(2.67)	(1.61)
Education Level	-0.000	-0.000	-0.010**	-0.011**	-0.002	-0.002
	(-0.25)	(-0.04)	(-2.19)	(-2.44)	(-1.29)	(-1.55)
Population Density	0.009	0.017**	0.024	0.023	0.021***	0.024***
	(1.26)	(2.27)	(0.75)	(0.71)	(2.77)	(2.99)
Metropolitan	0.020	0.026	-0.046	-0.020	-0.008	0.003
	(1.03)	(1.27)	(-0.66)	(-0.30)	(-0.41)	(0.14)
Longitude	0.009**	0.003	0.004	0.005	0.001	0.001
	(2.06)	(0.70)	(0.20)	(0.29)	(0.32)	(0.20)
Latitude	-0.012**	-0.017***	0.028	0.032	0.004	0.003
	(-2.14)	(-2.82)	(1.25)	(1.45)	(0.69)	(0.50)
Constant	2.252*	2.711**	6.553	5.812	5.635***	5.074***
	(1.76)	(2.20)	(1.40)	(1.36)	(4.25)	(3.94)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	21856	22699	21794	22630	21791	22627
Adj. R-sq	0.329	0.307	0.212	0.204	0.550	0.520

Table 8: Impact of CEO outside opportunity

The results in this table show the impacts of CEO outside opportunity on relationship between CEO compensation and air quality. *Opport* is the measurement for the CEO's outside opportunity, whose detailed definition is attached in the Appendix. All models are Ordinary Least Square (OLS) regression 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% level, respectively.

	Ln[Cash]		Ln[Incentives]	
	(1)	(2)	(3)	(4)
	t	t+1	t	t+1
Poison Ratio	1.094***	1.163***	-2.800***	-2.208***
	(5.65)	(5.94)	(-3.24)	(-3.04)
Opport× Poison Ratio	0.511***	0.595***	-1.581	-1.144
	(2.87)	(3.42)	(-1.51)	(-1.49)
Opport	-0.058***	-0.065***	0.089*	0.068
	(-3.80)	(-4.09)	(1.91)	(1.41)
Ln[Age]	0.167***	0.134***	-1.371***	-1.308***
	(3.55)	(2.92)	(-9.43)	(-9.11)
Gender	0.000	0.001	0.079	-0.038
	(0.01)	(0.06)	(0.80)	(-0.36)
Ln[Tenure]	0.056***	0.038***	-0.035	-0.021
	(8.86)	(6.51)	(-1.56)	(-0.95)
CEO Ownership(%)	-0.008***	-0.004	-0.053***	-0.052***
	(-2.63)	(-1.52)	(-8.33)	(-8.39)
CEO Confidence	0.114***	-0.008	0.193**	0.188**
	(5.39)	(-0.38)	(2.55)	(2.58)
Leverage	-0.053*	-0.028	-0.739***	-0.860***
	(-1.79)	(-0.94)	(-6.64)	(-7.48)
Lagged EBIT/Assets	0.170**	0.394***	1.497***	2.066***
	(2.56)	(5.42)	(6.76)	(8.81)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***
	(-2.21)	(-0.93)	(3.77)	(2.99)
Intangibles	0.000	0.024	0.078	0.096
	(0.01)	(0.74)	(0.68)	(0.81)
R&D/Sales	0.044***	0.085***	0.654***	0.665***
	(2.73)	(4.56)	(9.77)	(10.62)
Institutional Ownership	0.088***	0.085***	1.501***	1.439***
	(3.03)	(2.77)	(13.23)	(12.83)
Proportion NTD	0.290**	0.041	-0.615	-1.208***
	(2.46)	(0.53)	(-1.10)	(-3.03)
Lagged Stock return	0.029***	0.052***	0.077**	0.130***
	(3.18)	(5.50)	(2.14)	(3.39)
Lagged Volatility	-0.159*	-0.239***	0.658**	0.422
	(-1.73)	(-2.64)	(2.07)	(1.30)
Education Level	-0.001	-0.001	-0.010**	-0.011***
	(-1.26)	(-1.28)	(-2.55)	(-2.78)
Population Density	0.012**	0.020***	0.061**	0.054**
	(2.05)	(3.08)	(2.21)	(1.98)
Metropolitan	0.004	0.005	-0.020	0.016
	(0.22)	(0.27)	(-0.32)	(0.26)
Longitude	0.008**	0.005	0.012	0.012
	(2.47)	(1.46)	(0.79)	(0.81)
Latitude	-0.011**	-0.011**	0.056***	0.053***
	(-2.32)	(-2.25)	(2.96)	(2.78)
Constant	2.284**	2.728***	6.963*	6.027
	(2.09)	(2.61)	(1.66)	(1.58)
Size Spline	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES
Observations	26811	27033	26737	26948
Adj. R-sq	0.326	0.309	0.212	0.206

Table 9: Impact of environmental consciousness

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 the Obama's second term when many environment protection laws are passed and enacted. *Media Activism(MA)* denotes the total number of articles discussing the relationship between health and environmental issues published in mainstream newspapers scaled by number of articles related to 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% level, respectively.

Panel A: Political Activism as proxy for environmental consciousness

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	0.855***	0.858***	-2.246***	-1.718**	0.366**	0.496***
	(5.13)	(5.35)	(-2.89)	(-2.49)	(1.98)	(2.86)
PA × Poison Ratio	1.715***	2.274***	0.535	-0.521	0.414	0.584
	(3.11)	(3.82)	(0.22)	(-0.23)	(0.76)	(1.03)
Ln[Age]	0.167***	0.133***	-1.364***	-1.301***	-0.165***	-0.233***
	(3.53)	(2.89)	(-9.40)	(-9.09)	(-3.78)	(-5.32)
Gender	0.000	0.002	0.079	-0.038	0.042*	0.019
	(0.02)	(0.08)	(0.80)	(-0.37)	(1.69)	(0.71)
Ln[Tenure]	0.055***	0.038***	-0.036	-0.021	0.046***	0.041***
	(8.76)	(6.39)	(-1.59)	(-0.96)	(6.89)	(6.30)
CEO Ownership(%)	-0.008***	-0.004	-0.053***	-0.052***	-0.014***	-0.012***
	(-2.66)	(-1.56)	(-8.30)	(-8.36)	(-5.01)	(-4.58)
CEO Confidence	0.115***	-0.006	0.190**	0.185**	0.264***	0.188***
	(5.44)	(-0.29)	(2.52)	(2.54)	(9.82)	(6.65)
Leverage	-0.055*	-0.030	-0.732***	-0.855***	-0.158***	-0.167***
	(-1.84)	(-1.00)	(-6.57)	(-7.43)	(-5.24)	(-5.19)
Lagged EBIT/Assets	0.169**	0.389***	1.500***	2.073***	0.610***	0.897***
	(2.54)	(5.36)	(6.79)	(8.85)	(7.91)	(10.61)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.020***
	(-2.20)	(-0.92)	(3.77)	(2.99)	(2.92)	(2.59)
Intangibles	-0.006	0.018	0.087	0.102	0.124***	0.136***
	(-0.20)	(0.54)	(0.76)	(0.86)	(3.59)	(3.92)
R&D/Sales	0.042***	0.082***	0.651***	0.665***	0.224***	0.247***
	(2.62)	(4.45)	(9.64)	(10.60)	(11.61)	(13.11)
Institutional Ownership	0.087***	0.084***	1.504***	1.441***	0.395***	0.394***
	(3.01)	(2.76)	(13.27)	(12.84)	(12.94)	(12.62)
Proportion NTD	0.294**	0.040	-0.621	-1.208***	0.157	-0.044
	(2.51)	(0.51)	(-1.11)	(-3.03)	(0.97)	(-0.38)
Lagged Stock return	0.029***	0.052***	0.077**	0.130***	0.061***	0.091***
	(3.17)	(5.47)	(2.13)	(3.40)	(4.53)	(6.00)
Lagged Volatility	-0.164*	-0.242***	0.663**	0.422	0.454***	0.335***
	(-1.78)	(-2.66)	(2.09)	(1.31)	(4.20)	(3.12)
Education Level	-0.001	-0.001	-0.010**	-0.011***	-0.002**	-0.002**
	(-1.13)	(-1.09)	(-2.45)	(-2.74)	(-2.22)	(-2.16)
Population Density	0.011*	0.019***	0.060**	0.055**	0.037***	0.038***
	(1.92)	(2.92)	(2.19)	(1.98)	(5.68)	(5.30)
Metropolitan	0.002	0.002	-0.023	0.014	-0.029	-0.021
	(0.10)	(0.14)	(-0.38)	(0.23)	(-1.63)	(-1.19)
Longitude	0.010***	0.007*	0.008	0.009	0.003	0.002
	(2.90)	(1.88)	(0.55)	(0.64)	(0.82)	(0.49)
Latitude	-0.011**	-0.012**	0.058***	0.054***	0.014***	0.012**
	(-2.43)	(-2.38)	(3.02)	(2.84)	(2.74)	(2.26)
Constant	2.340**	2.807***	6.956*	6.006	4.925***	4.440***
	(2.14)	(2.68)	(1.65)	(1.58)	(4.25)	(3.94)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	26811	27033	26737	26948	26734	26945
Adj. R-sq	0.325	0.309	0.212	0.206	0.550	0.526

Panel B: Media Activism as proxy for environmental consciousness

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	0.878***	0.779***	-1.759**	-1.321*	0.421**	0.552***
	(4.79)	(4.51)	(-2.15)	(-1.84)	(2.14)	(3.05)
MA × Poison Ratio	0.377	1.080***	-2.341	-2.463	-0.160	-0.170
	(1.04)	(2.96)	(-1.37)	(-1.57)	(-0.41)	(-0.44)
Ln[Age]	0.168***	0.134***	-1.367***	-1.305***	-0.165***	-0.234***
	(3.53)	(2.91)	(-9.42)	(-9.10)	(-3.79)	(-5.33)
Gender	0.000	0.002	0.079	-0.038	0.042*	0.019
	(0.01)	(0.07)	(0.80)	(-0.36)	(1.69)	(0.71)
Ln[Tenure]	0.055***	0.038***	-0.035	-0.021	0.046***	0.041***
	(8.79)	(6.41)	(-1.56)	(-0.93)	(6.90)	(6.32)
CEO Ownership(%)	-0.008***	-0.004	-0.053***	-0.052***	-0.014***	-0.012***
	(-2.66)	(-1.56)	(-8.30)	(-8.36)	(-5.01)	(-4.58)
CEO Confidence	0.115***	-0.007	0.191**	0.186**	0.264***	0.188***
	(5.42)	(-0.31)	(2.53)	(2.56)	(9.82)	(6.65)
Leverage	-0.055*	-0.030	-0.737***	-0.860***	-0.158***	-0.168***
	(-1.87)	(-0.99)	(-6.61)	(-7.47)	(-5.26)	(-5.22)
Lagged EBIT/Assets	0.169**	0.389***	1.502***	2.076***	0.611***	0.898***
	(2.54)	(5.35)	(6.80)	(8.86)	(7.92)	(10.62)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.020***
	(-2.20)	(-0.92)	(3.77)	(2.99)	(2.92)	(2.59)
Intangibles	-0.006	0.018	0.089	0.104	0.124***	0.136***
	(-0.19)	(0.54)	(0.77)	(0.88)	(3.59)	(3.92)
R&D/Sales	0.043***	0.082***	0.654***	0.668***	0.225***	0.247***
	(2.67)	(4.46)	(9.70)	(10.62)	(11.65)	(13.14)
Institutional Ownership	0.087***	0.085***	1.502***	1.439***	0.395***	0.394***
	(3.00)	(2.77)	(13.26)	(12.83)	(12.93)	(12.62)
Proportion NTD	0.292**	0.038	-0.620	-1.206***	0.157	-0.044
	(2.49)	(0.49)	(-1.11)	(-3.02)	(0.97)	(-0.38)
Lagged Stock return	0.029***	0.052***	0.076**	0.130***	0.061***	0.091***
	(3.18)	(5.47)	(2.13)	(3.40)	(4.53)	(6.00)
Lagged Volatility	-0.163*	-0.243***	0.668**	0.428	0.455***	0.336***
	(-1.77)	(-2.67)	(2.10)	(1.32)	(4.21)	(3.13)
Education Level	-0.001	-0.001	-0.010***	-0.012***	-0.002**	-0.003**
	(-1.28)	(-1.10)	(-2.65)	(-2.92)	(-2.32)	(-2.28)
Population Density	0.012**	0.018***	0.064**	0.058**	0.038***	0.038***
	(1.99)	(2.87)	(2.32)	(2.10)	(5.75)	(5.37)
Metropolitan	0.003	0.003	-0.020	0.017	-0.028	-0.020
	(0.17)	(0.18)	(-0.32)	(0.28)	(-1.59)	(-1.14)
Longitude	0.010***	0.007*	0.009	0.010	0.003	0.002
	(2.91)	(1.86)	(0.59)	(0.68)	(0.84)	(0.51)
Latitude	-0.011**	-0.012**	0.057***	0.053***	0.014***	0.012**
	(-2.44)	(-2.36)	(3.01)	(2.81)	(2.73)	(2.24)
Constant	2.338**	2.820***	6.882	5.905	4.917***	4.424***
	(2.13)	(2.69)	(1.64)	(1.55)	(4.24)	(3.93)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	26811	27033	26737	26948	26734	26945
Adj. R-sq	0.325	0.309	0.212	0.206	0.550	0.526

Table 10: Alternative proxy for the 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' headquarter 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% level, respectively.

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Power Plant Number	0.024***	0.033***	-0.096**	-0.095**	0.004	0.011
	(2.59)	(3.39)	(-2.19)	(-2.19)	(0.34)	(0.95)
Ln[Age]	0.167***	0.137***	-1.364***	-1.306***	-0.162***	-0.229***
	(3.34)	(2.85)	(-8.94)	(-8.68)	(-3.55)	(-4.96)
Gender	0.004	0.004	0.089	-0.023	0.054**	0.028
	(0.16)	(0.15)	(0.88)	(-0.21)	(2.08)	(0.96)
Ln[Tenure]	0.050***	0.032***	-0.038	-0.027	0.041***	0.037***
	(7.54)	(5.22)	(-1.61)	(-1.13)	(5.81)	(5.44)
CEO Ownership(%)	-0.006**	-0.002	-0.050***	-0.047***	-0.013***	-0.010***
	(-2.05)	(-0.68)	(-7.62)	(-7.36)	(-4.40)	(-3.98)
CEO Confidence	0.119***	-0.005	0.157*	0.178**	0.262***	0.186***
	(5.31)	(-0.24)	(1.96)	(2.34)	(9.19)	(6.25)
Leverage	-0.057*	-0.035	-0.791***	-0.902***	-0.165***	-0.168***
	(-1.86)	(-1.08)	(-6.77)	(-7.50)	(-5.17)	(-4.97)
Lagged EBIT/Assets	0.168**	0.389***	1.624***	2.156***	0.635***	0.916***
	(2.30)	(4.86)	(6.92)	(8.67)	(7.64)	(10.04)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.041***	0.017***	0.019***
	(-2.19)	(-1.08)	(3.71)	(2.92)	(2.99)	(2.63)
Intangibles	-0.015	0.007	0.094	0.131	0.109***	0.126***
	(-0.46)	(0.22)	(0.81)	(1.09)	(3.07)	(3.53)
R&D/Sales	0.042**	0.083***	0.650***	0.662***	0.223***	0.245***
	(2.54)	(4.28)	(9.49)	(10.35)	(11.26)	(12.64)
Institutional Ownership	0.100***	0.082***	1.613***	1.538***	0.408***	0.403***
	(3.23)	(2.64)	(13.49)	(12.98)	(12.55)	(12.23)
Proportion NTD	0.288**	0.030	-0.712	-1.260***	0.119	-0.044
	(2.29)	(0.37)	(-1.22)	(-2.96)	(0.72)	(-0.36)
Lagged Stock return	0.029***	0.051***	0.068*	0.118***	0.059***	0.088***
	(3.15)	(5.33)	(1.84)	(3.03)	(4.26)	(5.68)
Lagged Volatility	-0.183*	-0.258***	0.830**	0.604*	0.455***	0.347***
	(-1.89)	(-2.72)	(2.51)	(1.81)	(4.01)	(3.07)
Education Level	-0.002	-0.002	-0.011***	-0.012***	-0.002*	-0.002*
	(-1.43)	(-1.34)	(-2.63)	(-2.92)	(-1.65)	(-1.65)
Population Density	0.003	0.009	0.094***	0.084***	0.035***	0.033***
	(0.49)	(1.30)	(3.26)	(2.97)	(4.95)	(4.29)
Metropolitan	0.018	0.019	-0.048	-0.002	-0.022	-0.012
	(0.99)	(1.06)	(-0.74)	(-0.03)	(-1.15)	(-0.60)
Longitude	0.011***	0.008**	0.006	0.011	0.007	0.007
	(3.12)	(2.23)	(0.40)	(0.72)	(1.59)	(1.43)
Latitude	-0.018***	-0.019***	0.074***	0.072***	0.014***	0.013**
	(-3.90)	(-3.84)	(3.80)	(3.79)	(2.80)	(2.36)
Constant	2.703**	3.267***	5.402	4.655	5.995***	5.580***
	(2.33)	(2.93)	(1.24)	(1.17)	(4.92)	(4.70)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	26811	27033	26737	26948	26734	26945
Adj. R-sq	0.325	0.311	0.209	0.203	0.540	0.516

Table 11: Local median house value as county-level controls

In this table instead of local per capita income, we use local median house value as a control for living cost and other potential omitted county level controls. 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% level, respectively.

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	1.011***	0.999***	-2.339***	-1.898***	0.433**	0.527***
	(5.92)	(6.05)	(-2.93)	(-2.64)	(2.27)	(2.92)
Ln[Age]	0.164***	0.129***	-1.367***	-1.308***	-0.167***	-0.237***
	(3.47)	(2.83)	(-9.45)	(-9.13)	(-3.85)	(-5.41)
Gender	-0.001	0.000	0.078	-0.041	0.040	0.017
	(-0.04)	(0.00)	(0.79)	(-0.39)	(1.63)	(0.64)
Ln[Tenure]	0.056***	0.038***	-0.034	-0.019	0.046***	0.042***
	(8.81)	(6.47)	(-1.52)	(-0.87)	(7.01)	(6.46)
CEO Ownership(%)	-0.008***	-0.005	-0.053***	-0.051***	-0.014***	-0.012***
	(-2.68)	(-1.58)	(-8.26)	(-8.34)	(-4.99)	(-4.56)
CEO Confidence	0.115***	-0.006	0.191**	0.187**	0.265***	0.189***
	(5.47)	(-0.29)	(2.53)	(2.57)	(9.83)	(6.66)
Leverage	-0.055*	-0.032	-0.730***	-0.855***	-0.156***	-0.167***
	(-1.86)	(-1.06)	(-6.55)	(-7.42)	(-5.17)	(-5.17)
Lagged EBIT/Assets	0.170**	0.391***	1.497***	2.072***	0.608***	0.897***
	(2.55)	(5.37)	(6.78)	(8.85)	(7.90)	(10.61)
Lagged Market-to-book	-0.004**	-0.001	0.042***	0.043***	0.017***	0.020***
	(-2.20)	(-0.93)	(3.77)	(3.01)	(2.92)	(2.60)
Intangibles	-0.007	0.018	0.093	0.111	0.126***	0.139***
	(-0.21)	(0.54)	(0.81)	(0.94)	(3.65)	(3.99)
R&D/Sales	0.044***	0.085***	0.654***	0.669***	0.226***	0.249***
	(2.77)	(4.57)	(9.71)	(10.67)	(11.71)	(13.21)
Institutional Ownership	0.086***	0.083***	1.513***	1.452***	0.397***	0.397***
	(2.97)	(2.73)	(13.35)	(12.94)	(13.03)	(12.72)
Proportion NTD	0.291**	0.037	-0.610	-1.196***	0.162	-0.040
	(2.47)	(0.47)	(-1.09)	(-3.00)	(1.01)	(-0.35)
Lagged Stock return	0.029***	0.052***	0.077**	0.130***	0.061***	0.091***
	(3.17)	(5.47)	(2.13)	(3.41)	(4.54)	(6.02)
Lagged Volatility	-0.161*	-0.239***	0.660**	0.423	0.452***	0.336***
	(-1.75)	(-2.63)	(2.07)	(1.31)	(4.17)	(3.12)
Ln[Median house value]	0.103***	0.079***	-0.001	0.025	0.069***	0.064***
	(3.85)	(2.81)	(0.67)	(0.54)	(4.34)	(3.19)
Education Level	-0.002***	-0.002***	-0.003	-0.003	-0.000	0.000
	(-2.75)	(-2.60)	(-0.86)	(-0.84)	(-0.32)	(0.30)
Population Density	0.018***	0.025***	0.064**	0.061**	0.040***	0.042***
	(3.10)	(3.99)	(2.37)	(2.24)	(6.31)	(6.14)
Metropolitan	-0.009	-0.006	-0.018	0.014	-0.037**	-0.027
	(-0.52)	(-0.32)	(-0.27)	(0.22)	(-1.99)	(-1.46)
Longitude	0.010***	0.007**	0.009	0.011	0.004	0.003
	(3.01)	(2.05)	(0.59)	(0.73)	(0.90)	(0.64)
Latitude	-0.010**	-0.011**	0.054***	0.052***	0.014***	0.012**
	(-2.17)	(-2.17)	(2.84)	(2.71)	(2.69)	(2.18)
Constant	5.567***	5.439***	3.352**	3.772***	4.658***	4.940***
	(17.16)	(16.16)	(2.31)	(2.63)	(11.27)	(11.69)
Size Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	26811	27033	26737	26948	26734	26945
Adj. R-sq	0.325	0.308	0.212	0.206	0.550	0.526

Table 12: Robustness regression: Impact of nearby air pollution on CEO Compensation

This table depicts the impact of nearby counties' air pollution on CEO's compensation. In Panel A we use the average bad ratio of the 5 counties nearest to the county where the firm's headquarter is located. We denote it as *Near bad ratio.* In Panel B we use the weighted average bad ratio of both local and nearest-five-counties Bad ratio as the proxy for the regional air quality, which is denoted as *Regional bad 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% level, respectively.

Panel A: Nearby poison ratio as proxy for the local air pollution

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Near Poison Ratio	1.228***	1.277***	-1.859**	-1.655**	0.575***	0.705***
	(6.22)	(6.84)	(-2.12)	(-2.11)	(2.63)	(3.50)
Ln[Age]	0.184***	0.152***	-1.349***	-1.288***	-0.145***	-0.213***
	(3.68)	(3.17)	(-8.89)	(-8.59)	(-3.17)	(-4.61)
Gender	-0.001	-0.001	0.088	-0.032	0.049*	0.022
	(-0.02)	(-0.05)	(0.87)	(-0.30)	(1.93)	(0.77)
Ln[Tenure]	0.050***	0.032***	-0.042*	-0.030	0.041***	0.037***
	(7.63)	(5.27)	(-1.79)	(-1.28)	(5.88)	(5.50)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.048***	-0.013***	-0.010***
	(-1.95)	(-0.53)	(-7.51)	(-7.43)	(-4.37)	(-3.95)
CEO Confidence	0.117***	-0.007	0.169**	0.180**	0.262***	0.185***
	(5.26)	(-0.31)	(2.12)	(2.37)	(9.23)	(6.22)
Leverage	-0.054*	-0.030	-0.801***	-0.906***	-0.166***	-0.166***
	(-1.76)	(-0.94)	(-6.87)	(-7.57)	(-5.20)	(-4.91)
Lagged EBIT/Assets	0.162**	0.384***	1.618***	2.167***	0.629***	0.915***
	(2.25)	(4.90)	(6.92)	(8.74)	(7.64)	(10.11)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.14)	(-0.96)	(3.69)	(2.91)	(2.99)	(2.63)
Intangibles	-0.016	0.007	0.100	0.127	0.109***	0.124***
	(-0.49)	(0.20)	(0.86)	(1.06)	(3.08)	(3.48)
R&D/Sales	0.042***	0.083***	0.658***	0.672***	0.224***	0.247***
	(2.61)	(4.36)	(9.62)	(10.51)	(11.42)	(12.78)
Institutional Ownership	0.098***	0.081***	1.611***	1.545***	0.409***	0.405***
	(3.20)	(2.63)	(13.55)	(13.08)	(12.57)	(12.30)
Proportion NTD	0.275**	0.028	-0.712	-1.262***	0.111	-0.045
	(2.20)	(0.34)	(-1.23)	(-2.97)	(0.66)	(-0.37)
Lagged Stock return	0.029***	0.052***	0.070*	0.121***	0.060***	0.089***
	(3.18)	(5.34)	(1.90)	(3.12)	(4.30)	(5.73)
Lagged Volatility	-0.172*	-0.245***	0.846***	0.607*	0.461***	0.349***
	(-1.80)	(-2.61)	(2.58)	(1.84)	(4.08)	(3.11)
Education Level	-0.002*	-0.002*	-0.010**	-0.011***	-0.002*	-0.002*
	(-1.74)	(-1.72)	(-2.42)	(-2.70)	(-1.80)	(-1.86)
Population Density	0.015**	0.024***	0.063**	0.054*	0.039***	0.039***
	(2.48)	(3.56)	(2.23)	(1.92)	(5.74)	(5.30)
Metropolitan	0.002	0.004	-0.046	-0.003	-0.033*	-0.024
	(0.13)	(0.22)	(-0.73)	(-0.04)	(-1.78)	(-1.30)
Longitude	0.006	0.002	0.009	0.015	0.004	0.003
	(1.57)	(0.58)	(0.56)	(0.97)	(0.90)	(0.62)
Latitude	-0.012**	-0.012**	0.063***	0.062***	0.017***	0.017***
	(-2.40)	(-2.34)	(3.18)	(3.16)	(3.28)	(2.90)
Constant	1.539	1.858*	7.656*	6.829*	5.309***	4.744***
	(1.32)	(1.66)	(1.74)	(1.70)	(4.33)	(3.99)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	27003	27224	26928	27138	26925	27135
Adj. R-sq	0.326	0.312	0.210	0.204	0.542	0.517

Panel B: Regional poison ratio as proxy for the local air pollution

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Region Poison Ratio	1.268***	1.285***	-2.270***	-1.887**	0.577***	0.728***
	(6.41)	(6.83)	(-2.59)	(-2.39)	(2.62)	(3.57)
Ln[Age]	0.185***	0.153***	-1.351***	-1.289***	-0.145***	-0.212***
	(3.70)	(3.19)	(-8.90)	(-8.60)	(-3.16)	(-4.60)
Gender	-0.000	-0.001	0.089	-0.032	0.050*	0.022
	(-0.00)	(-0.02)	(0.88)	(-0.30)	(1.94)	(0.78)
Ln[Tenure]	0.050***	0.032***	-0.042*	-0.030	0.041***	0.037***
	(7.62)	(5.27)	(-1.79)	(-1.28)	(5.88)	(5.50)
CEO Ownership(%)	-0.006*	-0.001	-0.050***	-0.048***	-0.013***	-0.010***
	(-1.95)	(-0.54)	(-7.51)	(-7.42)	(-4.37)	(-3.95)
CEO Confidence	0.117***	-0.006	0.169**	0.179**	0.262***	0.185***
	(5.28)	(-0.29)	(2.11)	(2.36)	(9.24)	(6.23)
Leverage	-0.054*	-0.030	-0.803***	-0.906***	-0.166***	-0.166***
	(-1.76)	(-0.95)	(-6.89)	(-7.58)	(-5.21)	(-4.91)
Lagged EBIT/Assets	0.162**	0.385***	1.619***	2.166***	0.629***	0.915***
	(2.25)	(4.91)	(6.92)	(8.74)	(7.64)	(10.11)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.15)	(-0.95)	(3.70)	(2.91)	(2.98)	(2.63)
Intangibles	-0.015	0.008	0.099	0.126	0.109***	0.125***
	(-0.46)	(0.25)	(0.85)	(1.05)	(3.10)	(3.51)
R&D/Sales	0.043***	0.084***	0.658***	0.671***	0.225***	0.247***
	(2.64)	(4.39)	(9.61)	(10.50)	(11.43)	(12.80)
Institutional Ownership	0.098***	0.082***	1.610***	1.544***	0.409***	0.405***
	(3.21)	(2.64)	(13.55)	(13.08)	(12.58)	(12.31)
Proportion NTD	0.277**	0.028	-0.714	-1.263***	0.112	-0.045
	(2.22)	(0.35)	(-1.23)	(-2.97)	(0.67)	(-0.37)
Lagged Stock return	0.029***	0.052***	0.070*	0.122***	0.060***	0.089***
	(3.18)	(5.34)	(1.90)	(3.12)	(4.30)	(5.73)
Lagged Volatility	-0.174*	-0.246***	0.846***	0.607*	0.460***	0.349***
	(-1.82)	(-2.62)	(2.58)	(1.84)	(4.07)	(3.10)
Education Level	-0.002	-0.002	-0.010**	-0.011***	-0.002*	-0.002*
	(-1.53)	(-1.53)	(-2.52)	(-2.78)	(-1.71)	(-1.75)
Population Density	0.015**	0.024***	0.062**	0.053*	0.039***	0.039***
	(2.48)	(3.54)	(2.18)	(1.89)	(5.74)	(5.32)
Metropolitan	-0.000	0.001	-0.037	0.004	-0.034*	-0.026
	(-0.02)	(0.07)	(-0.57)	(0.07)	(-1.84)	(-1.40)
Longitude	0.007*	0.003	0.009	0.015	0.004	0.003
	(1.82)	(0.86)	(0.53)	(0.93)	(1.01)	(0.75)
Latitude	-0.010**	-0.011**	0.059***	0.059***	0.018***	0.018***
	(-2.06)	(-2.03)	(2.92)	(2.94)	(3.35)	(3.03)
Constant	1.565	1.934*	7.839*	6.902*	5.331***	4.769***
	(1.35)	(1.73)	(1.78)	(1.72)	(4.35)	(4.01)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	27003	27224	26928	27138	26925	27135
Adj. R-sq	0.326	0.312	0.210	0.204	0.542	0.517

Table 13: Robustness regression: Exclude both direct polluters and indirect polluters

This table shows the regression results excluding both direct and indirect polluter industry. 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% level, respectively.

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
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)
Gender	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	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 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)
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)
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)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	15335	15528	15284	15472	15282	15470
Adj. R-sq	0.305	0.294	0.193	0.187	0.510	0.493

Table 14: Robustness regression: Include direct polluter industries

This table shows the regression results *include* both direct and indirect polluters. The direct polluters are those in Coal mining(SIC 12), Crude petroleum(SIC 13), Petroleum refinement(SIC 29) and Electricity service(SIC 49). The indirect polluters are those in the EPA's toxic release inventory reporting 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% level, respectively.

	Ln[Cash]		Ln[Incentives]		Ln[Total Compensation]	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	0.951***	0.963***	-2.216***	-1.742**	0.389**	0.523***
	(5.73)	(5.99)	(-2.92)	(-2.57)	(2.14)	(3.03)
Ln[Age]	0.167***	0.132***	-1.364***	-1.301***	-0.165***	-0.233***
	(3.52)	(2.88)	(-9.41)	(-9.09)	(-3.78)	(-5.33)
Gender	0.000	0.002	0.079	-0.038	0.042*	0.019
	(0.02)	(0.07)	(0.80)	(-0.37)	(1.69)	(0.71)
Ln[Tenure]	0.055***	0.038***	-0.036	-0.022	0.046***	0.041***
	(8.79)	(6.45)	(-1.59)	(-0.96)	(6.90)	(6.31)
CEO Ownership(%)	-0.008***	-0.004	-0.053***	-0.052***	-0.014***	-0.012***
	(-2.66)	(-1.56)	(-8.30)	(-8.36)	(-5.01)	(-4.58)
CEO Confidence	0.115***	-0.006	0.190**	0.185**	0.264***	0.188***
	(5.43)	(-0.29)	(2.52)	(2.54)	(9.82)	(6.65)
Leverage	-0.056*	-0.032	-0.732***	-0.854***	-0.158***	-0.168***
	(-1.90)	(-1.07)	(-6.58)	(-7.43)	(-5.25)	(-5.21)
Lagged EBIT/Assets	0.170**	0.390***	1.501***	2.072***	0.610***	0.898***
	(2.55)	(5.37)	(6.79)	(8.85)	(7.92)	(10.61)
Lagged Market-to-book	-0.004**	-0.001	0.041***	0.042***	0.017***	0.019***
	(-2.19)	(-0.92)	(3.77)	(2.99)	(2.92)	(2.59)
Intangibles	-0.006	0.018	0.087	0.102	0.124***	0.136***
	(-0.18)	(0.56)	(0.76)	(0.86)	(3.59)	(3.92)
R&D/Sales	0.043***	0.084***	0.651***	0.665***	0.224***	0.247***
	(2.69)	(4.52)	(9.68)	(10.60)	(11.62)	(13.11)
Institutional Ownership	0.086***	0.083***	1.504***	1.442***	0.395***	0.394***
	(2.99)	(2.73)	(13.27)	(12.85)	(12.93)	(12.61)
Proportion NTD	0.293**	0.039	-0.621	-1.208***	0.157	-0.044
	(2.50)	(0.50)	(-1.11)	(-3.03)	(0.97)	(-0.38)
Lagged Stock return	0.029***	0.052***	0.077**	0.130***	0.061***	0.091***
	(3.17)	(5.47)	(2.13)	(3.40)	(4.53)	(6.00)
Lagged Volatility	-0.163*	-0.240***	0.663**	0.422	0.455***	0.336***
	(-1.77)	(-2.65)	(2.09)	(1.31)	(4.21)	(3.12)
Education Level	-0.001	-0.002	-0.010**	-0.011***	-0.002**	-0.002**
	(-1.38)	(-1.41)	(-2.49)	(-2.74)	(-2.29)	(-2.24)
Population Density	0.012**	0.020***	0.061**	0.054**	0.037***	0.038***
	(2.08)	(3.11)	(2.21)	(1.98)	(5.73)	(5.36)
Metropolitan	0.003	0.005	-0.023	0.014	-0.028	-0.021
	(0.20)	(0.27)	(-0.37)	(0.22)	(-1.60)	(-1.16)
Longitude	0.010***	0.007*	0.008	0.009	0.003	0.002
	(2.95)	(1.95)	(0.55)	(0.63)	(0.83)	(0.50)
Latitude	-0.011**	-0.012**	0.058***	0.054***	0.014***	0.012**
	(-2.45)	(-2.40)	(3.02)	(2.84)	(2.74)	(2.25)
Constant	2.327**	2.775***	6.952*	6.013	4.921***	4.432***
	(2.12)	(2.64)	(1.65)	(1.58)	(4.24)	(3.93)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	29271	29502	29191	29412	29188	29409
Adj. R-sq	0.325	0.308	0.212	0.206	0.550	0.526

Table 15: Robustness regression: Impact of air pollution on the compensation of COO and other top executives

In this table, we examine the relationship between air pollution and compensation of COO and other top executives. In Panel B dependent variable and executive level control variables are the average value of top executives except for 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% level, respectively.

Panel A: Impact of air pollution on COO Compensation

	Cash Compensation		Incentive Compensation		Total Compensation	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	0.518***	0.537***	-0.987**	-0.802	-0.032	0.045
	(5.11)	(4.25)	(-2.27)	(-1.44)	(-0.26)	(0.32)
Ln[Age]	0.335***	0.305***	-1.258***	-1.356***	-0.132*	-0.231***
	(5.47)	(3.96)	(-5.18)	(-4.35)	(-1.89)	(-2.60)
Gender	0.063*	0.072*	-0.384**	-0.529***	0.027	0.000
	(1.85)	(1.67)	(-2.38)	(-2.60)	(0.61)	(0.01)
Ln[Tenure]	0.125***	0.055***	-0.158***	-0.029	0.100***	0.102***
	(8.69)	(3.09)	(-2.68)	(-0.40)	(6.19)	(5.46)
CEO ownership(%)	0.032***	0.030***	-0.063***	-0.018	0.033***	0.037***
	(6.21)	(5.33)	(-3.60)	(-0.77)	(5.37)	(5.67)
Leverage	-0.027	-0.032	-0.847***	-1.123***	-0.269***	-0.353***
	(-0.49)	(-0.46)	(-4.54)	(-4.78)	(-4.85)	(-5.43)
Lagged EBIT/Assets	0.814***	0.736***	1.988***	3.066***	1.248***	1.456***
	(8.61)	(6.32)	(5.37)	(6.45)	(10.52)	(9.89)
Lagged Market-to-book	-0.004**	-0.003	0.041***	0.042***	0.017***	0.020***
	(-2.20)	(-0.95)	(3.77)	(2.99)	(2.92)	(2.59)
Intangibles	-0.022	-0.033	0.492***	0.300	0.052	-0.037
	(-0.46)	(-0.56)	(2.58)	(1.25)	(0.97)	(-0.57)
R&D/Sales	0.176***	0.184***	0.693***	0.901***	0.370***	0.412***
	(6.40)	(5.96)	(5.09)	(6.29)	(10.35)	(9.37)
Institutional ownership	0.026	-0.011	1.519***	1.698***	0.259***	0.329***
	(0.63)	(-0.23)	(8.41)	(7.60)	(5.27)	(5.79)
Proportion NTD	0.148	-0.079	-1.578***	-0.799	0.001	-0.026
	(1.40)	(-0.71)	(-2.83)	(-1.27)	(0.01)	(-0.16)
Lagged Stock return	0.074***	0.064***	0.156**	0.354***	0.117***	0.190***
	(4.34)	(3.05)	(2.55)	(4.62)	(5.52)	(7.89)
Lagged Volatility	-0.076	-0.041	2.098***	1.378*	0.959***	0.694***
	(-0.55)	(-0.23)	(3.43)	(1.90)	(4.74)	(3.11)
Education level	0.002	0.003	-0.008	0.001	-0.001	-0.000
	(0.95)	(0.85)	(-1.04)	(0.09)	(-0.34)	(-0.15)
Population density	0.065***	0.063***	0.031	-0.024	0.062***	0.051***
	(4.38)	(3.30)	(0.68)	(-0.41)	(4.24)	(2.76)
Metropolitan	-0.026	-0.027	-0.128	-0.060	-0.071***	-0.061*
	(-1.19)	(-1.00)	(-1.25)	(-0.46)	(-2.58)	(-1.88)
Longitude	0.010*	0.011	0.030	0.011	0.019***	0.018**
	(1.83)	(1.53)	(1.19)	(0.34)	(2.74)	(2.21)
Latitude	0.009	0.002	0.014	-0.024	0.030***	0.023**
	(1.33)	(0.31)	(0.47)	(-0.64)	(3.49)	(2.26)
Constant	0.337	0.257	0.383	3.819	1.677	2.121
	(0.26)	(0.16)	(0.06)	(0.50)	(0.94)	(1.00)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	10931	7763	10931	7763	10931	7763
Adj. R-sq	0.405	0.397	0.190	0.187	0.502	0.509

Panel B: Impact of air pollution on compensation of other executives

	Cash Compensation		Incentive Compensation		Total Compensation	
	(1)	(2)	(3)	(4)	(5)	(6)
	t	t+1	t	t+1	t	t+1
Poison Ratio	0.336***	0.310***	-0.301*	-0.396**	0.031	-0.001
	(8.43)	(7.43)	(-1.74)	(-2.31)	(0.59)	(-0.02)
Ln[Age]	0.455***	0.435***	-1.429***	-1.745***	-0.133**	-0.282***
	(7.30)	(6.81)	(-8.45)	(-10.08)	(-2.39)	(-4.97)
Ln[Tenure]	0.108***	0.045***	-0.209***	-0.136***	0.038***	0.030***
	(9.78)	(3.94)	(-6.24)	(-3.82)	(3.72)	(2.77)
Ownership(%)	0.017**	0.020**	-0.108***	-0.088***	-0.004	-0.007
	(2.10)	(2.23)	(-4.77)	(-3.89)	(-0.50)	(-0.78)
Leverage	-0.012	-0.010	-0.551***	-0.630***	-0.140***	-0.162***
	(-0.56)	(-0.44)	(-7.18)	(-7.70)	(-5.91)	(-6.75)
Lagged EBIT/Assets	0.501***	0.392***	2.053***	2.501***	1.129***	1.092***
	(15.17)	(11.36)	(14.13)	(16.53)	(26.25)	(23.84)
Lagged Market-to-book	-0.004**	-0.003	0.041***	0.042***	0.017***	0.020***
	(-2.20)	(-0.95)	(3.77)	(2.99)	(2.92)	(2.59)
Intangibles	-0.019	-0.011	0.410***	0.316***	0.106***	0.082***
	(-1.19)	(-0.64)	(5.92)	(4.30)	(5.22)	(3.75)
R&D/Sales	0.062	0.007	-1.227***	-0.875***	0.098	0.048
	(1.06)	(0.14)	(-4.72)	(-3.31)	(1.50)	(0.74)
Institutional ownership	0.086***	0.082***	1.411***	1.351***	0.306***	0.304***
	(4.38)	(4.28)	(19.28)	(17.80)	(14.51)	(14.38)
Proportion NTD	0.112***	0.101***	0.813***	0.867***	0.306***	0.299***
	(12.20)	(10.11)	(16.71)	(19.57)	(21.17)	(21.34)
Lagged Stock return	0.037***	0.040***	-0.013	0.160***	0.045***	0.101***
	(6.25)	(7.08)	(-0.55)	(6.39)	(5.65)	(9.48)
Lagged Volatility	0.040	0.001	1.674***	1.039***	0.638***	0.432***
	(0.73)	(0.02)	(7.19)	(4.56)	(8.56)	(5.33)
Education level	-0.002**	-0.002**	-0.001	-0.000	-0.002**	-0.002**
	(-2.41)	(-2.25)	(-0.53)	(-0.08)	(-2.43)	(-2.56)
Population density	0.043***	0.042***	0.077***	0.081***	0.063***	0.061***
	(7.74)	(7.31)	(4.30)	(4.43)	(11.93)	(11.29)
Metropolitan	-0.025***	-0.019**	-0.124***	-0.137***	-0.047***	-0.050***
	(-2.72)	(-2.03)	(-3.07)	(-3.35)	(-3.91)	(-3.96)
Longitude	0.002	0.000	-0.004	-0.002	0.001	0.001
	(0.86)	(0.10)	(-0.36)	(-0.22)	(0.32)	(0.22)
Latitude	0.007***	0.004	0.079***	0.077***	0.029***	0.028***
	(2.66)	(1.47)	(6.08)	(5.80)	(7.79)	(7.25)
Constant	-0.144	-0.393	0.244	1.169	1.922**	1.648**
	(-0.22)	(-0.58)	(0.09)	(0.44)	(2.49)	(2.02)
Size Spline	YES	YES	YES	YES	YES	YES
PCI Spline	YES	YES	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES	YES	YES
State × Year FE	YES	YES	YES	YES	YES	YES
Observations	35694	33073	35693	33072	35694	33073
Adj. R-sq	0.451	0.444	0.293	0.292	0.626	0.619

Table 16: Impact of Firm Headquarter Relocation on the relationship between air pollution and CEO compensation

In this table, we use the firm headquarter relocation as an exogenous shock to test the impact of air pollution change on CEO compensation. *Old Poison Ratio* is the poison ratio before headquarter relocation. *Poison Ratio Diff* is the poison ratio difference between new headquarter location and 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% level, respectively.

	Ln[Cash Compensation]		Ln[Incentive Compensation]	
	(1)	(2)	(3)	(4)
	Current	Lead 1	Current	Lead 1
Old Poison Ratio	0.971***	1.024***	-2.907***	-2.389***
	(6.36)	(5.86)	(-4.23)	(-3.29)
Poison Ratio Diff	5.838***	6.000***	-0.289	-0.566
	(4.76)	(4.77)	(-0.14)	(-0.25)
Age	0.142***	0.128***	-1.368***	-1.304***
	(3.16)	(2.76)	(-9.17)	(-8.69)
Gender	0.015	0.002	0.038	-0.040
	(0.63)	(0.09)	(0.38)	(-0.37)
Tenure	0.057***	0.033***	-0.033	-0.033
	(9.30)	(5.43)	(-1.47)	(-1.39)
CEO Ownership	-0.004	-0.001	-0.049***	-0.048***
	(-1.53)	(-0.42)	(-7.50)	(-7.46)
CEO Confidence	0.047**	-0.004	0.123*	0.250***
	(2.36)	(-0.19)	(1.70)	(3.37)
Leverage	-0.020	-0.027	-0.802***	-0.864***
	(-0.67)	(-0.86)	(-6.91)	(-7.01)
Lagged EBIT/Assets	0.487***	0.398***	1.999***	2.295***
	(7.12)	(5.09)	(8.83)	(9.37)
Lagged Market-to-book	0.395***	0.377***	1.129***	1.092***
	(2.53)	(2.46)	(2.66)	(2.61)
Intangibles/Asset	-0.014	0.001	0.189*	0.076
	(-0.43)	(0.05)	(1.66)	(0.63)
No Trading Days Ratio	0.114	0.007	-1.023**	-1.216***
	(1.46)	(0.08)	(-2.41)	(-2.81)
Institutional Ownership	0.068**	0.069**	1.584***	1.527***
	(2.41)	(2.23)	(14.04)	(12.96)
R&D/Sales	0.071***	0.074***	0.713***	0.708***
	(3.70)	(3.79)	(10.24)	(10.98)
Lagged Stock Return	0.049***	0.050***	0.047	0.140***
	(6.23)	(5.28)	(1.30)	(3.62)
Lagged Stock Volatility	-0.312***	-0.252***	1.355***	0.577*
	(-3.61)	(-2.72)	(4.25)	(1.71)
Education level	-0.003***	-0.003***	-0.010**	-0.009**
	(-3.12)	(-2.93)	(-2.44)	(-2.16)
Population Density	0.021***	0.024***	0.048*	0.049*
	(3.27)	(3.41)	(1.84)	(1.83)
Per Capita Income	0.096***	0.085**	0.332**	0.309**
	(3.06)	(2.54)	(2.47)	(2.22)
Longitude	0.011***	0.011***	-0.007	-0.006
	(4.96)	(4.48)	(-1.25)	(-1.10)
Latitude	0.003	0.004	0.019	0.025*
	(0.64)	(0.86)	(1.33)	(1.70)
Constant	4.288***	4.292***	0.385	0.500
	(10.86)	(10.09)	(0.23)	(0.28)
State × Year FE	YES	YES	YES	YES
Industry × Year FE	YES	YES	YES	YES
Size Spline	YES	YES	YES	YES
N	28756	26907	28659	26821
Adj. R-sq	0.339	0.320	0.208	0.203

Table 17: Definition of air quality index

In this table we give the detailed definition of different level of air quality based on its influence to health. 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 record. All the data from 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 18: 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	Stimulas 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 19: 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	Number of poisonious days(AQI is bigger than 150) scaled by the number of days with AQI record in the specific county.
Bad ratio	Number of bad days(AQI is bigger than 100) scaled by the number of days with AQI record in the specific county.
Near bad ratio	The average Bad ratio of the 5 counties that nearest(within 60 miles) to the county where the firm's headquarter located
Regional Bad ratio	The weighted average Bad 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)
Euqity	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)
Gender	Dummy variable equals to 1 if the CEO is female and 0 otherwise. CEO's gender(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	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
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
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 that equals to 1 if the state rejects the inevitable disclosure doctrine in year t and after
Tsic/Max_tsic	Total number of firms in the specific SIC 2-digits industry scaled by the total firms in the largest SIC 2-digits industry in the specific fiscal year
Opport	A measurement for the CEO outside opportunity. It is defined as IDD*(Tsic/Max_tsci)
Managerial ability	The Demerjian, Lev, and McVay(2012) managerial ability
CEO Confidence	Banerjee, Jenner, and Nanda(2015) CEO confidence measurement