TOXIC EMISSIONS AND EXECUTIVE DEPARTURES

Ross Levine, Chen Lin, and Zigan Wang*

June 2023

Abstract

We evaluate the impact of toxic-emitting plant openings on executive departures from neighboring firms and the stock prices of those firms, shedding light on the determinants and consequences of executive turnover and the external effects of pollution by polluting firms on other companies and their stakeholders. After creating a unique database on the career paths of executives at S&P 1500 firms, we discover that toxic-emitting plant openings increase executive departures from neighboring firms from an average annual separation rate of about 12% to a 16% separation rate and decrease their stock prices by over 10%. The impact is especially pronounced when plants and firms are geographically close, executives have more general human capital, and they spend more time at the treated firms. Our findings suggest that pollution by one set of firms can substantially affect neighboring firms by inducing incumbent executives to relocate to firms in cleaner environments.

JEL Classification: G3, Q51, Q52, Q53, J61, J63, R32

Keywords: Pollution costs; Tiebout model; Spatial labor mobility; Executive turnover

* Levine: Haas School of Business at the University of California, Berkeley and the NBER, rosslevine@berkeley.edu; Lin: Faculty of Business and Economics, the University of Hong Kong, Hong Kong, chenlin1@hku.hk. Wang: Faculty of Business and Economics, the University of Hong Kong, wangzg@hku.hk. We are grateful for the comments of participants at the 31st Australasian Finance and Banking Conference, Karel Hrazdil, Lucas Davis, Adair Morse, Philip Strahan, and Reed Walker. We thank Yan Li, Luping Yu, and Po-Yu Liu for excellent assistance. Lin acknowledges the financial support from the Seed Funding for Strategic Interdisciplinary Research at HKU and the Center of Financial Innovation and Development of HKU.

1. Introduction

Corporate executives may comprise a small percentage of the workforce, but their influence on companies' investment decisions, operational strategies, and financial performance is disproportionately large (e.g., Bertrand and Schoar, 2003; Kaplan, Klebanov and Sorensen, 2012; Pan, Wang, and Weisbach, 2015; 2016; Pan, 2017). As a result, researchers have studied several factors contributing to executive departures, such as operating and stock performance (e.g., Warner, Watts, and Wruck, 1988; Gilson, 1989; Kato and Long, 2006; Andrus et al., 2019), and the impact of those departures on corporate performance (e.g., Murphy and Zimmerman, 1993; Kang and Shivdasani, 1995; Messersmith, Lee, Guthrie, and Ji, 2014). However, little is known about the potential impact of environmental factors on executive separations. Given the well-established link between pollution and adverse health effects, executives with suitable alternatives may relocate in response to environmental factors, potentially harming the firms they leave behind.[1] This paper examines the relationship between environmental factors and executive separations and assesses the potential consequences for firms and their stakeholders.

Our research is also motivated by the "environmental-Tiebout effect," which suggests that individuals will "vote with their feet" and relocate in response to environmental policies and conditions, potentially exerting large externalities on others. Consistent with this effect, previous research discovers reductions in local property values and populations following the opening of toxic-emitting plans (e.g., Banzhaf and Walsh, 2008; Currie et al., 2015; Agarwal, Deng, and Li, 2019). However, these analyses examine communities as a whole rather than examining the experiences and choices of individuals over time. Thus, these studies can neither condition on individual effects nor evaluate how different individuals respond to pollution. By examining the career paths of corporate executives over time and across corporations, we assess the differential response of executives, including different executives within the same firm, to the opening of toxic-emitting plants. In this way, we provide more granular estimates of the environmental-

[1] Extensive research documents the adverse health effects of air pollutants (e.g., Landrigan et al., 2017; World Health Organization, 2016; American Lung Association, 2019).

Tiebout view and offer additional evidence on the external effects of pollution by examining how pollution from one set of firms can adversely affect other firms by inducing executives to migrate.

To evaluate the impact of the opening of toxic-emitting plants on the migration of corporate executives from neighboring firms and the potential ramifications of these departures on the companies left behind, we have compiled a unique database on the career paths of executives and combined it with several datasets on toxic emissions and corporate performance. First, we assemble data on the career paths for all executives at S&P 1500 firms from 2000 to 2014, derived from BoardEx and ExecuComp. Thus, we know where executives work (i.e., the firm and the location of its headquarters), when they depart, and to which firms they migrate. Second, we identify plants that emit airborne toxic pollutants using the Environmental Protection Agency's (EPA's) Toxic Release Inventory (TRI) program. Since 1986, the Emergency Planning and Community Right-to-Know Act requires that plants in particular industries that use specific toxic chemicals in sufficient quantities and have ten or more full-time equivalent employees report their emissions of TRI-listed toxins. Third, we match data from the EPA's TRI program with National Establishment Time-Series (NETS) data, which contains information on the universe of U.S. establishments (over 58.8 million) during the past two decades, to obtain precise information on the opening dates and location of TRI plants. The matched sample yields data on 48,317 TRI plants. Fourth, we use data from EPA outdoor monitors on the concentration of airborne pollutants. Critically, we show that TRI plant openings trigger a material increase in airborne pollutants close to those new plants.

We begin our firm-level analyses by examining the impact of TRI plant openings on the percentage of executives leaving geographically close firms. In these analyses, the dependent variable is the percentage of executives separating from an S&P 1500 firm one or two years after the TRI plant opening. The primary explanatory variable measures the degree to which the S&P 1500 firm is exposed to TRI plant openings. We measure exposure by whether a TRI plant opens within one (or two) miles of an S&P 1500 firm. Critically, the regressions control for city-year effects. We are comparing S&P 1500 firms within the same city and year differentially exposed to

TRI plant openings due to their distance from the plant. The regressions also control for (a) industry-year fixed effects since industries might concentrate geographically and have distinct pollution and executive migration tendencies, (b) firm fixed effects to focus on changes in a firm's executive separation rate before and after the TRI plant treatment, and (c) time-varying firm traits that measure firm size, growth, leverage, profitability, and risk.

We discover that exposure to TRI plant openings is associated with a sharp increase in executives leaving neighboring S&P 1500 firms. The estimates indicate that if one TRI plant opens within one mile of an S&P 1500 firm, the proportion of executives who leave next year rises by 4.8 percentage points. This estimate represents a nearly 40% increase in the executive separation rate for the average, in which only 12.7% of executives leave during the average year. Although these analyses control for city-year fixed effects and other controls, we were concerned that there might be time-varying, within-city local factors that trigger executive separations and TRI plant openings. Consequently, we extend the analyses.

Building on these firm-level analyses, we employ eight strategies to identify better the impact of exposure to air pollution on executives' decisions to migrate. First, the relationship between TRI plant openings and executive separations from firms becomes stronger when the plant and firm are geographically closer. This result is consistent with (a) the observation that air pollution density dissipates with distance (Currie et al. 2015) and (b) pollution density increases the rate of executive migration. Second, we implement a placebo test and show that corporate leaders not physically based at the treated firm do not experience an increase in separation rates. This finding suggests that physical exposure to toxic air pollutants triggers executive migration. Third, we implement a different placebo test and show that non-TRI plant openings do not increase the rate of executive migration from neighboring firms. Again, the evidence suggests that exposure to pollution drives executive migration, not the opening of neighboring plants. Fourth, the performance of S&P 1500 firms does not shape the relationship between TRI plant openings and executive separation rates. We were concerned that (a) TRI plants might be more likely to open around failing S&P 1500 firms and (b) failing firms are more likely to fire executives. However, the evidence contradicts the view that firm performance accounts for the findings. Fifth, we employ a nearest-neighbor matching algorithm to identify and estimate the impact of TRI plant openings on executive separation rates at neighboring firms. The results confirm that TRI plant openings increase the rate at which executives leave treated firms. Sixth, we find evidence consistent with the assumptions that (a) the TRI plant openings are unexpected and (b) the treated and untreated firms have parallel trends. Specifically, we find (a) no relationship between executive separations from firms and *future* TRI plant openings and (b) the dynamic relationship between TRI plant openings and executive migration is consistent with the validity of the parallel trends assumption. Seventh, we implement a placebo test by randomly assigning treatment values based on the sample distribution of treatment values. The results indicate no relationship between randomly assigned treatment values and executive separation rates. Eighth, to mitigate concerns that the results hold only for a particular selection of control variables, we conduct a p-hacking test. The results hold for every combination of control variables.

The second part of our analysis focuses on individual executives. Instead of testing whether TRI plant openings increase the percentage of executives who leave geographically close firms, we assess whether an executive is more likely to separate from a firm with greater exposure to TRI plant openings. We use a linear probability model. The dependent variable equals one if the executive leaves the firm during the next year (or two) and zero otherwise. The primary explanatory variable is again a measure of firm exposure to TRI plant openings. Besides including all of the control variables employed in the firm-year analyses, these individual-level analyses control for individual fixed effects and the executive's age and tenure with the firm.

These individual-level analyses confirm the firm-level findings: Executives are more likely to leave their firms when a TRI plant opens close to them. The estimated effects are large. Suppose one TRI plant opens within one mile of an executive's firm. In that case, our estimates indicate that this increases the probability that the executive leaves the firm by about five percentage points during the following year. This estimate is large, as only about 13% of executives leave firms over the average year.

We bolster these individual-level analyses by differentiating among executives within the same firm. We differentiate by the degree to which executives have general human capital skills, skills valued by other firms. Suppose exposure to toxic air pollutants drives the results. In that case, we expect executives with more appealing outside employment options in less-polluted areas—executives with more general human capital skills—will separate from treated firms at higher rates than executives with more firm-specific human capital skills. To test this view, we use Custodio, Ferreira, and Matos's (2013) measure of the degree to which an executive's skills transfer across firms and industries. We find that exposure to TRI plant openings is associated with a larger increase in the probability of separating from a firm among executives with more general human capital skills. By examining whether executives with different skills within the same firm respond differently to the same TRI plant openings, we reduce concerns that an omitted variable biases our results. Any such variable would also have to account for this differential response.

Finally, we extend the analyses to assess additional implications of the view that TRI plant openings expose executives at neighboring firms to more toxic pollutants, increasing the degree to which they voluntarily separate from those firms. The first implication is that executive departures from firms exposed to TRI plant openings will reduce stock prices, and such departures will reduce stock prices more than executive separations unassociated with TRI plant openings. This implication builds on the following premises: (a) executive separations following TRI plant opening are voluntary, i.e., they are due to pollution, not poor executive performance, (b) voluntary executive separations have adverse effects on stock prices, and (c) the adverse stock market effects of voluntary separations are larger than those induced by forced departures associated with poor executive performance (e.g., Warner, Watts, and Wruck, 1988; Denis and Denis, 1995; and Gabaix and Landier, 2008). Consistent with this view, firms' cumulative abnormal returns (CARs) fall when executives announce their departures following TRI plant openings. Furthermore, the drop in CARs associated with executive departures following TRI plant openings is much greater than that of executive departures from firms unexposed to TRI plant openings. This finding is consistent with the view that voluntary separations (from greater pollution) have more adverse effects on stock prices than forced departures, which will compose a larger proportion of executive departures from firms unexposed to TRI plant openings.

The view that TRI plant openings expose executives at neighboring firms to more pollutants and increase executive separations from those firms also offers testable implications about where those departing executives go and their compensation in those new jobs. First, suppose executives leave firms because of pollution. We would then expect them to move to firms in less polluted areas (e.g., Deng and Gao 2013). Second, suppose executives leave firms because of pollution, not because they receive higher-paying jobs elsewhere. In that case, we expect those executives will accept lower-paying jobs in less polluted areas, i.e., there is a pollution premium. We confirm these implications. Executives choosing to leave S&P 1500 firms after TRI plant openings systematically (a) move to firms in less polluted locals and (b) accept lower-paying jobs.

Our findings contribute to research on how people "vote with their feet." For example, Moretti and Wilson (2017) show that U.S. state corporate taxes shape star scientists' migration patterns. Giroud and Rauh (2019) explore how U.S. state corporate and individual taxes affect the reallocation of workers and businesses. Kleven, Landais, and Saez (2013), Kleven et al. (2014), and Akcigit, Baslandze, and Stantcheva (2016) examine the international migration of highly skilled individuals in response to differences in personal income tax rates. Banzhaf and Walsh (2008) use community-level data to examine the influence of toxic-emitting TRI plants on population changes. In our paper, we use individual-level data to quantify (a) the sensitivity of the migration of corporate executives to TRI plant openings that emit toxic air pollutants, (b) how that sensitivity varies by individual traits, and (c) the impact of these executive departures on corporate valuations.

By documenting the uncovering connections between pollution, executive migration, and corporate valuation, our research related to server lines of research. Specifically, our work adds to research on why executives voluntarily leave firms (e.g., Andrus et al., 2019), why firms adopt environmental management practices beyond regulatory requirements (e.g., Delmas and Toffel, 2004; 2008; Reid and Toffel, 2009), and the impact of executive departures on corporate strategies (e.g., Warner, Watts, and Wruck, 1988; Weisbach, 1995; Connelly et al., 2020). Our findings on corporate valuations also relate to research on pollution's broader connections with economic growth and the operation of financial markets (e.g., Hanlon 2020; Krüger, Sautner, and Starks, 2020; Bolton and Kacperczyk, 2021; Brown, Gustafson, and Ivanov, 2021; Brown Martinsson, and Thomann, 2022; Hsu, Li, and Tsou, 2022). Finally, our work contributes to research on the political economy of environmental regulations. This research examines how competition among interest groups shapes environmental policies (e.g., Baumol and Oates 1988; Oates and Portney, 2003; Durrmeyer, 2022) and the externality effects of executive decisions concerning toxic emissions (e.g., Greenstone 2003; Kolstad and Toman 2005). Our results indicate that corporations exposed to the toxic emissions of other plants experience costs in terms of the migration of high human capital individuals and stock price reductions. These costs could factor into cost-benefit assessments of environmental regulations and the formation of corporate interest groups favoring stricter environmental laws.

2. Data, Variable Construction, and Descriptive Analyses

2.1 Toxics Release Inventory Plants, Monitors, and NETS Data

The EPA's Toxic Release Inventory (TRI) program mandates that all U.S. plants that meet specific criteria report how much of each toxic chemical they release into the air, water, or soil each year. The EPA mandates that any plant that (1) manufactures, processes, or otherwise uses a TRI-listed chemical in quantities above threshold levels in a given year, (2) has ten or more full-time equivalent employees, and (3) is in the mining, utility, manufacturing, publishing, hazardous waste, or federal industry must report the emissions of each TRI-listed toxic chemical. The TRI program makes this information publicly available, along with the latitude and longitude of each TRI plant.

We augment the EPA's data to determine the year when a TRI plant opened. A plant enters the TRI database in the year it meets all three criteria mentioned above. However, a plant could be emitting toxic pollutants before it enters the TRI database but only enters the TRI database, for example, after it has ten employees. We merge the EPA's TRI database with the National Establishment Time-Series (NETS) data to establish the year when the TRI plant began operations. NETS provides data on U.S. plants and their parent companies, including the year when each plant was established, the geographic location of each plant, and data on sales, the number of employees, ownership, etc. The NETS dataset contains over 58.8 million U.S. establishment-year observations during the past two decades. The matched TRI-NETS dataset allows us to infer the opening year of each TRI plant.[2] Given the other data in our analyses, we use data on the opening of TRI plants from 2000 through 2014.

The EPA also provides annual data on pollutant density as recorded by each air monitor. A single air monitor records the density of multiple pollutants at a fixed location every hour. We compute the average hourly density of each pollutant at each monitor over each year. These monitors can record 894 different pollutants, but every monitor does not record every pollutant every year. Therefore, we examine the most heavily monitored pollutants. Specifically, we sort the pollutants by how often they are monitored across all monitor-year observations and select the top 10 pollutants: PM10 Total 0-10um STP (STP: standard temperature and pressure), Suspended Particulate (TSP: total suspended particulates), Carbon monoxide, Ozone, Lead (TSP) STP, Sulfur dioxide, Benzene, Toluene, PM10 – LC (LC: local conditions), and Ethylbenzene. The EPA provides the latitude and longitude of each monitor.

2.2 S&P 1500 Firms

We follow the career paths of all executives at S&P 1500 firms between 2000 and 2014. We obtain annual data on executives from BoardEx and ExecuComp. By comparing the lists in successive years, we identify those executives who leave and join firms. We also collect information on each executive over time, including age, experience, tenure in each firm, and

[2] There might be concerns that a plant was operating for several years and only started emitting toxic pollutants in the year that it entered the TRI program. In this case, it would be inappropriate to use the date from NETS when the plant started. Consequently, we have conducted all the analyses using the date when a plant first appears in the TRI database and obtain very similar parameter estimates and p-values.

position in the firm (CEO, chair of the board, etc.). In this way, we trace out the career paths of each executive.

We assemble detailed data on all S&P 1500 firms from different data sources. We chose these data based on prior studies of the determinants of executive turnover.[3] This research focuses (a) firm performance, including return on assets, sales growth, and accounting returns, (b) firm volatility and fragility, including the volatility of cash flows, the volatility of cumulative abnormal returns (CARs), leverage, and liquidity, and (c) and the age of the executives. In particular, we use the Compustat database to construct the following variables: *Accounting Return* (income before extraordinary items / total assets), *Total Assets, Leverage* (liabilities/total assets)*, Operating Cash Flow / Total Assets, Sales Growth*, *Cash Flow Volatility* (standard deviation of cash flows during the last five years), *ROA* (net income / total assets), *Retirement* (percentage of executives whose ages are greater than or equal to 60), *CAR* (excess stock return over the SP500 index in the past 24 months), and *Stock CAR Volatility* (standard deviation of CAR). We identify the historical address of each firm's headquarters as follows. We start from the database compiled by McDonald and Yun. Using 10-K forms (available on the SEC's EDGAR website), they determine the precise historical location of each listed firm's headquarters.[4] Then, for firms not in the McDonald and Yun database, we use the Compustat Snapshot database and WRDS SEC Analytics Suite to determine historical locations. Our sample starts in May of 1996 when the SEC began requiring electronic filings containing the addresses of each corporation's headquarters. From the addresses, we compute longitudinal and latitudinal coordinates.

2.3 TRI Plant Openings Near S&P Firms

We construct and examine two time-varying measures of the exposure of S&P 1500 firms to toxins emitted by the opening of TRI plants. First, *TRI Open within 1 Mile*$_{f,t}$ equals one if at least one TRI plant opens within one mile of S&P1500 firm f in year t and zero otherwise, where

[3] The literature on executie turnover is enormous, e.g., Dasgupta, Li, and Wang (2018), Huson, Parrino, and Starks (2001), and Parrino, Sias, and Starks (2003.

[4] https://www3.nd.edu/~mcdonald/10-K_Headers/10-K_Headers.html

S&P1500 firm f does not own the TRI plant. Second, *TRI Open within 2 Miles*$_{f,t}$ equals one if at least one TRI plant opens within two miles of S&P1500 firm f in year t and zero otherwise, where S&P1500 firm f does not own the TRI plant. Besides these two measures, we assess the robustness of the results by using alternative measures of the geographic proximity of TRI plant openings to S&P 1500 firms. In particular, we confirm the paper's findings when using either (a) the number of TRI plant openings within a specific radius of an S&P1500 firm or (b) the distance-weighted number of TRI plant openings within a specific radius of an S&P1500 firm, where the weights equal the inverse of the distance between the TRI plant and the S&P 1500 firm.

2.4 Descriptive Information

Figure 1 illustrates the distribution of TRI plants across the United States for plants that opened after 1996. The New York, Boston, Chicago, and Detroit metropolitan areas have a high concentration of TRI plants. Other areas with a high density of TRI plants include Atlanta, Charlotte, Minneapolis, Salt Lake City, Phoenix, Denver, Houston, Dallas, Seattle, Portland, San Francisco, Los Angeles, Tampa, and Orlando. There are approximately 2,000 – 4,000 openings and closings each year. The total number of plants remains relatively stable, with no clear trend. Table 1 provides detailed variable definitions, while Table 2 gives summary statistics.

3. Empirical Results: Firm-level Analyses

3.1 Effect of TRI Plant Openings on Major Pollutants

Before assessing the impact of TRI plant openings on the separation of executives from geographically close S&P 1500 firms, we first establish that TRI plant openings are associated with increases in air pollution near those plants. To conduct this examination, we construct time-series measures of the density (in nanograms/m3) of different air pollutants at air monitors close to each TRI plant. For each monitor in each year, we identify all TRI plant locations within one or two miles. For each of these monitor-plant pairs each year, we assign the density of the pollutants recorded by the relevant air monitor. As a result, we have multiple observations for each TRI plant in a year when there is more than one monitor within one or two miles of the plant. If two TRI plants are within one or two miles of the same monitor, we assign each of these monitor-plant pairs the same pollutant density. Thus, we define $p_{m,l,t}$ as the density of pollutant p measured at monitor m within one or two miles of plant l in year t.

Given these data, we estimate the following regression,

$$p_{m,l,t} = \alpha + \beta Dummy(Plant\ is\ Operating)_{l,t} + \delta_t + \delta_{m,l} + \varepsilon_{m,l,t}, \quad (1)$$

where α is a constant. The main explanatory variable, *Dummy (Plant is Operating)*, is a dummy variable that equals zero in the years before a TRI plant opens and one otherwise. The regression controls for year fixed effects (δ_t) and monitor-plant fixed effects ($\delta_{m,l}$). The error term is. The estimated value of β provides information on the impact of a TRI plant opening on pollution levels at monitors within one or two miles of the plant. Table 3 reports the results of ten regressions, one for each pollutant.

Table 3 shows that TRI plant openings induce a statistically significant and economically large increase in pollution. The TRI plant openings trigger an increase in each of the specific air pollutants, as measured by air pollution monitors within one or two miles of the plant, except for lead. The last column of Table 3 provides information on the economic magnitudes of the estimated coefficient on *Dummy (Plant is Operating)* for each pollutant by computing the estimated change in the pollutant as a percentage of the pollutant's average across all monitors in the country. For example, when examining the toxin *Benzene* within two miles of a plant, the estimated coefficients indicate that a TRI plant opening is associated with an increase of 9.69 nanograms/m^3 of lead in the air, which is 18.3% of the mean density of lead recorded by an average monitor.

3.2 TRI Plant Openings and Executives Migration: Firm-year Analyses

We next examine the relationship between TRI plant openings and the percentage of executives who leave neighboring S&P 1500 firms. These TRI plant openings do not include plants owned by the neighboring S&P 1500 firm. For brevity, we refer to S&P 1500 firms as "firms" and use the designator "*f*." The dependent variable in these firm-year regressions is either (1) $E^1_{f,t}$: the percentage of executives who leave firm *f* during year *t*, (i.e., the number of executives who leave the S&P 1500 firm between the end of year *t-1* and the end of year *t* divided by the total number of executives in that firm, *f*, at the end of year *t-1*) or (2) $E^2_{f,t}$: the percentage of executives who leave firm *f* during years *t* and *t+1* (i.e., the number of executives who leave the firm during the two years between the end of *t-1* and the end of *t+1* divided by the total number of executives in *f* at the end of year *t-1*).

Thus, we estimate the following regression:

$$E^z_{f,t} = \alpha + \gamma TRI\ Open_{f,t} + \theta \boldsymbol{X}_{f,t} + \delta_{c,t} + \delta_{k,t} + \delta_f + \epsilon_{f,t}. \quad (2)$$

The dependent variable is either $E^1_{f,t}$ or $E^2_{f,t}$, and $TRI\ Open_{f,t}$ is one of the two time-varying measures of the exposure of S&P1500 firms to toxins emitted by the opening of TRI plants: $TRI\ Open\ within\ 1\ Mile_{f,t}$ or $TRI\ Open\ within\ 2\ Miles_{f,t.}$ The vector, $\boldsymbol{X}_{f,t}$, represents the following characteristics of S&P 1500 firm *f* in year *t*: *Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*. We show that the results are robust to excluding or including these time-varying firm traits. All regressions also control for city-year ($\delta_{c,t}$), industry-year ($\delta_{k,t}$), and firm δ_f fixed effects. To construct these fixed effects, we use the cityI) in which firm *f* has its headquarters and firm *f*'s primary industry (*k*).[5] Standard errors are double clustered at the city and year levels.[6]

This specification addresses three potential concerns with identifying the impact of TRI plant openings on the proportion of executives who depart from firms geographically close to the toxic emitters. First, there might be concerns that (a) businesses are more likely to open toxic emitting plants in economically depressed localities and (b) executives are more likely to separate from firms in economically declining areas. From this perspective, the relationship between TRI

[5] All of the results hold when using Metropolitan Statistical Area-year fixed effects instead of city-year effects. The city-year analyses are more granular, as the average city is only 25 square miles. There are 552 cities with at least one S&P 1500 headquarters, 226 cities with two or more headquarters, and 69 with five or more.

plant openings and executive migration might reflect local economic conditions, not the impact of pollution on executive separations. Thus, we control for city-year fixed effects. By including city-year effects, we compare S&P 1500 firms within the same city and year that are differentially exposed to TRI plant openings. That said, there might be concerns that omitted within-city factors account both for where businesses open toxic emitting plants and executive migration from firms. We address this concern below by differentiating among executives within the same firm.

Second, there might be concerns that time-varying industry characteristics explain executive turnover and pollution. Suppose particular industries congregate geographically and have distinct pollution and executive turnover patterns. This would impede the ability to draw sharp inferences about the impact of TRI plant openings on executive migration. Although city-year fixed effects will help address this concern, industries might congregate geographically, even within cities. Thus, we control for industry-year fixed effects to reduce concerns that time-varying industry characteristics create a spurious correlation between TRI plant openings and executive migration.

Third, firm-specific characteristics might affect the self-selection of executives out of particular geographical areas. We control for firm fixed effects to condition out all time-invariant firm traits. Below, we address additional identification concerns.

Panel A of Table 4 shows that TRI plant openings are associated with an economically large and statistically significant increase in the percentage of executives who leave S&P 1500 firms close to the new TRI plants. Across all specifications, the TRI plant opening indicators enter positively and significantly. This result holds when the dependent variable is either the proportion of executives who leave the firm during year t ($E^1_{f,t}$) or the proportion of executives who leave during years t and $t+1$ ($E^2_{f,t}$). The results are robust to excluding or including the time-varying firm characteristics. Furthermore, the estimated coefficients on the TRI plant opening indicators change little when altering the conditioning variables. Moreover, the estimated coefficients are economically meaningful. For example, consider the situation in which one TRI plant opens within one mile of an average S&P 1500 firm. The estimated coefficients from regression (4) indicate that the proportion of executives who leave during the next year rises from the average annual departure rate of 11.9% to about 16.1% i.e., an increase of 4.2 percentage points.

3.3 Additional Firm-Level Analyses

This subsection presents eight additional firm-level analyses that address several identification concerns. These analyses test the robustness of the interpretation of the core results reported in Table 4 that exposure to toxic pollutants from TRI plant openings induces executives to separate from neighboring firms. In particular, we assess whether (1) the core results are stronger among firms geographically closer to TRI plant openings, (2) the core results are stronger among a firm's executives that spend more time physically at the treated firm, (3) the rate of executive separates does not increase following non-TRI plant openings, (4) the core results are not driven by poorly-performing firms but are instead driven by TRI plant openings, (5) the core results hold when using a neighbor-matching algorithm to evaluate the effect of TRI plant openings on executive migration, (6) there is no relationship between executives separations from firms and future TRI plant openings, and the dynamic relationship between TRI plant openings and executive migration is consistent with the validity of the parallel trends assumption underlying the analyses in Table 4, (7) there is no relationship between randomly assigned treatment values and executive separations, and (8) the core results hold for every combination of control variables, as suggested by Brodeur, Cook, and Heyes (2020). As we show in this subsection, the results from each of these analyses are consistent with the view that TRI plant openings expose neighboring firms to toxic pollutants that increase the rate of executive separations from those firms. In subsequent sections, we move to individual-level analyses that compare executives within the same firm to address additional identification challenges.

3.3.1 Differentiate Firms by Distances to TRI Plant Openings

One interpretation of the results is that exposure to toxic pollutants from TRI plant openings causes executives to separate from neighboring firms. If this interpretation is correct, the impact of new toxic-emitting TRI plants on executive migration should be larger for firms closer to the new TRI plants. To evaluate this hypothesis, we differentiate firms by their distances to TRI plant openings. Specifically, we use the same specification as in equation (2) except that the explanatory variable is either (a) a dummy variable that equals one if a TRI plant opened within one mile of the firm (*TRI Open Within 1 Mile*), (b) a dummy variable that equals one if a TRI plant opened *between* 1 and 2 miles of the firm (*TRI Open Between 1 and 2 Miles*), or (c) a dummy variable that equals one if a TRI plant opened *between* 2 and 5 miles of the firm (*TRI Open Between 2 and 5 Miles*). Since the density of pollution dissipates with distance (see Currie et al. 2015), we test whether the relationship between TRI plant openings and executive migration falls as the distance between the TRI plant and the firm grows.

As shown in Panel B of Table 4, the results are consistent with the view that physical exposure to pollution induces executives to leave. The results show that the estimated relationship between TRI plant openings and the rate of executive migration from S&P 1500 firms falls when the distance between the plant and firm is larger. Indeed, when examining firms between two and five miles from the TRI plant, we find (1) no significant increase in the rate of executive departures following TRI plant openings, i.e., the coefficient on *TRI Open Between 2 and 5 Miles* enters insignificantly. Furthermore, the absolute value of the estimated coefficient on *TRI Open Between 1 and 2 Miles* is much smaller than that on *TRI Open Within 1 Mile*. For example, the estimated coefficient on *TRI Open Between 1 and 2 Miles* is only about one-third of the coefficient estimate on *TRI Open Within 1 mile* when considering the regression in which (a) the dependent variable is $E^{1}_{f,t}$ and (b) there is a complete set of firm controls.

3.3.2 Leaders Physically Absent from Headquarters

If exposure to pollutants from TRI plant openings induces executives to leave neighboring firms, we should only observe such separations among executives who physically work at the firm. We should not observe an increase in separations following TRI plant openings among executives who spend little time at corporate headquarters. To conduct this placebo test, we examine non-executive directors who do not regularly work at the firm's headquarters and evaluate the impact of TRI plant openings on the rate of non-executive director departures. We define the rate of non-executive director migration as the percentage of non-executive directors who leave firm *f* during year *t* (or during years *t* and *t+1*), divided by the total number of non-executive directors in that firm, *f*, at the end of year *t-1*).

As shown in Panel C of Table 4, the results of the placebo test are consistent with the interpretation that physical exposure to pollution drives executive migration. For non-executive directors—those who are less likely to be physically present at their S&P 1500 firms, we find no relationship between TRI plant openings and migration.

3.3.3 Non-TRI Plant Openings and TRI Plant Closings

The view that toxic emissions from TRI plant openings induce executives to separate from neighboring firms has an additional testable implication: Non-TRI plant openings should not trigger executive migration from geographically close firms. To assess this prediction, we examine the impact of non-TRI plant openings on the rate of executive migration from neighboring S&P 1500 firms. To conduct this placebo test, we use the NETS data and identify all non-TRI plant openings during the same sample period and perform the same analyses as those reported in Table 4 Panel A.

As shown in Panel D of Table 4, the results are consistent with the view that it is the opening of toxic-emitting TRI plants—and not the opening of plants in general—that drives executive migration. Consistent with the placebo hypothesis, there is no evidence that the opening of non-TRI plants close to S&P 1500 firms induces executive migration from those firms.

We implement an additional placebo-type test by examining TRI plant closings. Under the assumption that executives who are more sensitive to pollution select out of firms close to TRI plants and avoid joining such firms, the closing of TRI plants should not have much of an effect on executive separation rates from neighboring firms. Put differently, the pollution-sensitive executives self-selected out of firms geographically close to toxic emitting TRI plants so the closure of those plants should not alter separation rates. This is what we find. As reported in Online

Appendix Table OA1, TRI plant closings are not significantly related to executive separation rates from neighboring firms.

3.3.4 Excluding Firms with Poor Performance

We next address the concern that poorly performing S&P1500 firms could cause both executive separations and new TRI plants to open nearby, inducing a spurious correlation between TRI plant openings and executive migration. Specifically, suppose TRI plant openings are more likely to occur around failing S&P 1500 firms, and failing firms are more likely to fire executives. In that case, the results in Table 4 could reflect the impact of poor firm performance on executive separations and TRI plant opening, not the effect of pollution on executive migration. To address this concern, we eliminate S&P 1500 firms performing poorly during the year before TRI plants opened close to those firms. In particular, we conduct the same analyses as those in Panel A except that we exclude firms that experienced over a 10% reduction in their stock prices in the year before TRI plant openings. If poor firm performance drove the earlier results, the results should dissipate when excluding poorly-performing firms. In contrast, if executive exposure to the toxic emissions from new TRI plants caused the earlier results, eliminating the poorly-performing firms should not materially alter the results.

As shown in Panel E of Table 4, we continue to find a strong impact of TRI plant openings on executive migration after excluding poorly-performing firms. In unreported robustness tests, we find that these results hold when using other stock price reduction cutoffs besides 10%. The results in Tables 3 and 4 are consistent with the view that TRI plant openings increase pollution around geographically close S&P 1500 firms, and executives working in those firms have higher probabilities of leaving those exposed firms, regardless of the firm's stock price performance before the TRI plant opening.[7]

[7] We were also concerned that the results might differ by the power or prestige of the firm. Thus, we conducted the analyses while splitting the sample between S&P 500 and other firms. The results hold in both groups, and the estimated coefficients are of similar magnitudes.

3.3.5 Matched Sample

We implement the nearest neighbor-matching (NNM) algorithm to identify and estimate the impact of toxic emissions on executive migration. We match each "treated" firm with otherwise similar control firms and compare the frequency of executive separations in the treated and control groups. To match each firm, we search the entire COMPUSTAT database for five control firms with the smallest Euclidean distance using ten time-varying firm characteristics (i.e., *Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR,* and *Stock CAR Volatility*). We restrict the treated and control firms to those that did not experience geographically close TRI plant openings in the past three years. As is standard in NNM algorithms, we might match the same control firm-year observation to more than one treated firm-year observation. In our analyses, the number of control firms is roughly four times that of treated firms. The regression analyses include treated and control firms.

As shown in Table 4 Panel F, the earlier results hold when using the NNM algorithm: TRI plant openings materially increase the rate at which executives leave treated firms. When examining executive departures from firms one or two years after treatment and examining TRI plants opening within one or two miles of the firms, the results hold across all specifications when employing the NNM technique. By comparing similar treatment and control firms, these analyses reduce concerns that an omitted variable biased the earlier findings.

3.3.6 Potential Influence of Pre-trends and Pretreatment Analysis

We were concerned that pre-trends could interfere with our ability to identify the impact of exposure to toxic pollutants from TRI plant openings on executive separations from neighboring firms. We implement two tests. First, we use a simple placebo test to address this concern. Rather than examining the relationship between the opening of a toxic-emitting TRI plant and the subsequent migration of executives at neighboring firms, we examine the relationship between TRI plant openings and the rate of executive migration ***before*** the TRI plant opened. Suppose the opening of a TRI plant triggers an increase in the rate of executive migration at nearby plants. In that case, we should not observe an increase in the rate of executives separating from neighboring firms one or two years before the plant starts releasing toxic air pollutants. We examine the rate of executive migrations (1) during the year before TRI plant openings and (2) during the two years before TRI plant openings.

As shown in Panel G of Table 4, the results pass the placebo test: TRI plant openings are unassociated with executive migration during the year before TRI plant openings or during the two years before TRI plant openings. Instead, TRI plant openings are associated with a sharp increase in executive separations at neighboring firms ***after*** TRI plant openings. These findings are consistent with the view that unexpected increases in air pollution induce executives to separate more rapidly from their firms.

Second, we conduct an additional pre-trend analysis by examining the dynamic relationship between TRI plant openings and executive migration. For example, consider the regression analyses examining *TRI Open within 1 Mile*. We augment the analyses and include seven, instead of one, indicator variables: *TRI Open within 1 Mile (t+x*), where x = -3, -2, -1, 0, +1, +2, and +3. Thus, *TRI Open within 1 Mile (t-1)* equals one if it is one year *before* the TRI plant opens and zero otherwise. This specification allows us to trace the pre- and post-treatment relationship between TRI plant openings and executive separations. We implement an analogous strategy when examining *TRI Open within 2 Miles*. We then re-estimate an augmented version of equation (2) that includes these seven indicator variables. We conduct these examinations when the dependent variable is the percentage of executives that leave the firm within one year and two years of the treatment (the TRI plant opening). We include the same time-varying firm-year controls, as well as city-year, industry-year, and firm fixed effects. By examining the coefficient estimates on *TRI Open within 1 Mile (t-x)* (and *TRI Open within 2 Miles (t-x)*) for $x < 0$, we test whether there are changes in executive separations before the treatment.

As shown in Table 5, the coefficient estimates on *TRI Open within 1 Mile (t+x)* and *TRI Open within 2 Miles (t+x)* for all $x < 0$ are insignificantly different from zero. We cannot reject the hypothesis of no change in the rate of executive separations before the treatment. This result is consistent with the validity of the parallel trends assumption. As with the earlier analyses, the coefficients on *TRI Open within 1 Mile* or *TRI Open within 2 Miles* are significant for all columns, indicating that executives react quickly to TRI openings. We also notice that post-event indicators are insignificant for all columns. This finding suggests that executives who decide to stay after the treatment do not exhibit a higher probability of separating in future years.

3.3.7 Random Assignment of Explanatory Variable

An additional strategy for assessing the effect of TRI plant openings on executive separations from geographically close firms is to randomly assign different values of the treatment variable, i.e., the TRI plant opening indicator. If TRI plant openings trigger executive separations, we should not observe a significant systematic relationship between executive separations and randomly assigned treatment values. To implement this additional placebo test, we begin with the baseline regressions in Panel A of Table 4 that include the complete set of controls and fixed effects. For each firm-year combination, we randomly assign a value of *TRI Open within 1 Mile* based on the distribution of values across firms. We re-estimate the relevant regressions and save the coefficient estimates on the variable *TRI Open within 1 Mile*. We repeat this procedure 3,000 times and plot the histogram of estimates. We repeat this procedure using *TRI Open within 2 Miles* as the treatment variable. Graphs A and C of Figure 2 show the distribution of the coefficient estimates when the dependent variable is *Percentage of Executives Who Left the Companies in One Year*. Graphs B and D show the distribution of the coefficient estimates when the dependent variable is *Percentage of Executives Who Left the Companies in Two Years*. The independent variable is *TRI Open within 1 Mile* in Graphs A and B and *TRI Open within 2 Miles* in Graphs C and D.

The results from the random assignment analyses pass the placebo test. Specifically, the coefficient estimates from using the measured treatment values from Table 4 lie far to the right of the distribution of coefficient estimates from randomly assigning treatment values. These results are consistent with the view that the treatment is associated systematically—not randomly—with an increase in executive separations.

3.3.7 P-hacking Tests

There might be concerns that the results hold only for particular sets of control variables. To address this concern, we report the t-statistics from regressions using every combination of control variables following Brodeur, Cook, and Heyes (2020). We re-estimate the regressions in Table 4 Panel A that include the full array of controls and fixed effects. Figure 3 presents the box plots of the t-statistics from those regressions, organized by the number of control variables. Graphs A and C show the distribution of the t-statistics when the dependent variable is *Percentage of Executives Who Left the Companies in One Year*. Graphs B and D show the distribution of the t-statistics when the dependent variable is *Percentage of Executives Who Left the Companies in Two Years*. The independent variable is *TRI Open within 1 Mile* in Graphs A and B and *TRI Open within 2 Miles* in Graphs C and D.

The core results are robust to changes in the control variables. As shown in Figure 3, all t-statistics are above conventional thresholds on each combination of control variables. These findings highlight the robustness of the findings reported in Table 4.

4. Individual-Level Analyses of TRI Plant Openings and Executive Migration

4.1 Individual-year Analyses

To provide more information on the relationship between TRI plant openings and executive departures from neighboring firms and address additional identification concerns, we turn our focus from the proportion of executives leaving firms and instead trace the decisions of individual executives over time. In these individual-year analyses, we evaluate the change in the probability that an executive leaves an S&P 1500 firm when a TRI plant opens nearby. By studying individuals rather than the group of executives at firms, we control for all time-invariant and several time-varying traits of each executive.

In these regressions, the dependent variable is either $L^1_{i,f,t}$, which equals one if executIve *i* leaves firm *f* in year *t*, and zero otherwise, or $L^2_{i,f,t}$, which equals one if execuIive *i* leaves firm *f* during year *t* or *t+1*, and zero otherwise. As above, we separately examine the exposure of firm *f* to TRI plants in year *t* using *TRI Open within 1 Mile*$_{f,t}$ or *TRI Open within 2 Miles*$_{f,t}$. Furthermore, the regressions control for the time-varying S&P 1500 firm characteristics discussed above ($\boldsymbol{X}_{f,t}$), as well as two characteristics of each executive ($\boldsymbol{C}_{i,f,t}$), *Tenure* and *Age*, which might independently influence the rate of separation between the executive and firm. We provide the results with and without $\boldsymbol{X}_{f,t}$ and $\boldsymbol{C}_{i,f,t}$.

Thus, we estimate the following linear probability models:

$$L^z_{i,f,t}, = \alpha + \gamma Dummy(TRI\ Plant\ Open)_{f,t} + \theta \boldsymbol{X}_{f,t} + \lambda \boldsymbol{C}_{i,f,t} + \delta_{c,t} + \delta_{k,t} + \delta_{i,f} + \epsilon_{i,f,t}, \qquad (3)$$

where the dependent variable is $L^1_{i,f,t}$ or $L^2_{i,f,t}$. All regressions include city-year ($\delta_{c,t}$), industry-year ($\delta_{k,t}$), and individual-firm ($\delta_{i,f}$) fixed effects, where we use the city and industry (*k*) of the S&P 1500 firm (*f*) in which indivIdual *i* is an executive.[8] Thus, we are comparing the different responses of executives within the same firm while controlling for individual, city-year, and industry-year effects and a large array of time-varying firm and individual characteristics. The regressions are estimated using OLS, and standard errors are double clustered at both the city and year levels.

Consistent with the firm-level analyses, the results from the individual-level analyses reported in Table 6 indicate that executives are more likely to leave their firms when a TRI plant opens close to them. Each of the three measures of *TRI Open* enters positively and significantly. These results hold when examining either the indicator of whether the executive leaves during the year that the TRI plant opens or the indicator of whether the executive leaves in the two years

[8] We can include individual by firm fixed effects ($\delta_{i,f}$) because some individuals are executives in more than one firm during the sample period.

following the TRI plant opening. Concerning the economic sizes of the estimated coefficients, consider the impact of one TRI plant opening within one mile of an executive's firm. Furthermore, consider an average firm in which 12.7% of executives leave the firm in the average year. The results reported in regression (3) indicate that such a TRI plant opening is associated with an increase in the separation rate from 12.7% to about 17.5%, an almost 40% increase.

4.2 Differentiating by Generalist and Specialist Executives

We next assess whether executives with different human capital skills respond differently to TRI plant openings. We hypothesize that when TRI plant openings increase toxic air pollutants, executives at nearby firms with skills that are in stronger demand at other firms will be more likely to relocate than executives with more firm-specific skills. This hypothesis predicts that when executives are "treated" with air pollution, the executives with more general human capital will be more likely to leave the firm than executives with more firm-specific human capital.

To evaluate this hypothesis, we examine the degree to which CEOs have general human capital skills, i.e., skills highly valued at other firms. We use Custodio, Ferreira, and Matos's (2013) *Generalist CEO Index* that gauges the extent to which a CEO's skills are transferrable across firms and industries. The *Generalist CEO Index* varies over time for each individual. It reflects information on the numbers of past positions, firms, and industries and whether the executive was a CEO in the past, and the complexity of the organizations in which the CEO was employed.[9] We then test whether there is a larger increase in the rate of departures of CEOs with more general human capital skills when a TRI plant opens nearby.

The regression specification and estimation procedures are the sIme as in equation (3), except that we add an interaction term between *TRI Open* and *Generalist CEO Index*. Specifically, we estimate the following equation:

[9] The *Index* can, in some cases, vary over time while an individual is a CEO at one firm, as individuals occasionally take simultaneous positions at other firms. We conducted all of the analyses using the value of *Generalist CEO Index* for individual *i* in firm *f* during the first year that the individual is a CEO at firm *f*, eliminating any time variation in *Generalist CEO Index* for individual *i* at firm *f*. All of the results hold.

$$L^{z}_{i,f,t'} = \alpha + \beta TRI\ Open_{f,t} * Generalist\ CEO\ Index_{i,t} + \phi Generalist\ CEO\ Index_{i,t} + \gamma TRI\ Open_{f,t} + \theta \boldsymbol{X}_{f,t} + \lambda \boldsymbol{C}_{i,f,t} + \delta_{c,t} + \delta_{k,t} + \delta_{i,f} + \epsilon_{i,f,t'}, \quad (4)$$

where the variables are defined as above. If $\beta > 0$, then this would suggest that CEO departures are more likely in response to a TRI plant opening when the CEO has more general, and hence more transferable, skills.

As shown in Table 7, the evidence is consistent with the view that when firms are exposed to air pollution from the opening of a TRI plant, executives with more general human capital skills leave firms more frequently during the following years than executives with more firm-specific skills. These results are reported in regressions (5) – (8) of Table 7. The estimated coefficient on the interaction term between *TRI Open* and *Generalist CEO Index* enters positively and significantly for each of the three *TRI Open* measures. These findings are robust to including or excluding the time-varying firm and individual controls. The estimated economic effects are large. For example, compare two CEOs running the same S&P 1500 firm, one at the 25th percentile of the distribution of the *Generalist CEO Index* (-0.71) and the other at the 75th percentile of distribution (0.54). The results from regression (8) indicate that the opening of a TRI plant within two miles of these CEOs would increase the probability of the CEO at the 75th percentile of leaving the firm by 32% more than the CEO at the 25th percentile of the *Generalist CEO Index* distribution, i.e., 32% = 0.257*(0.46 – (-0.79)). By differentiating executives by human capital and showing that they respond in a theoretically predictable manner to the same pollution shock, we reduce concerns that the findings on executive migration are driven by an omitted factor that simultaneously increases pollution and executive migration in a city.

5. Extensions

We now extend the results by examining two additional implications of the view that TRI plant openings increase toxic emissions that induce executives at neighboring firms to leave. We explain each implication and then provide an empirical evaluation.

5.1 Stock Returns and Executives' Turnover Announcements

One additional implication of the view that pollution triggers executive departures involves stock returns. Research suggests that when otherwise sound executives leave firms, such departures adversely affect the firm (e.g., Warner, Watts, and Wruck 1988), Denis and Denis 1995, and Gabaix and Landier 2008). When applied to TRI plant openings, this work suggests that if air pollution triggers the departure of executives in general, and not only the departure of poorly-performing executives, then air pollution-induced migration should reduce stock prices. We showed in Table 4 that TRI plant openings trigger the departure of executives in general, not the departure of executives from poorly performing firms in particular. We now assess what happens to the stock prices of S&P 1500 firms when executives announce their departures. We examine departures associated with TRI plant openings and those unassociated with such openings.

We examine the relationship between the announcement date of executive departures and their firm's cumulative abnormal returns (CARs). ExecuComp provides some information on the announcement dates of executive departures. In particular, using the announcement dates from ExecuComp, our sample is 1,772. To augment these data, we hand-collect information from Factiva news and 8-K filings, which increases our sample to 4,365. We report the results with our larger sample and note that the results hold with the smaller, ExecuComp-only sample.

To compute the CARs, we use security prices from the Center for Research in Security Prices (CRSP) database. We examine CARs over the 5-day window from two days before until two days after the announcement day. Setting the announcement day as day 0, we indicate the CAR window as (-2, +2). We use three standard models to compute abnormal returns. The 1-factor abnormal return equals the firm's return minus the market index return. Following Brown and

Warner (1985), we define 3-factor and 4-factor abnormal returns using the difference between actual and projected returns. To compute projected returns, we (1) regress the firm's daily return on the value-weighted returns on the CRSP equally weighted market portfolio over the 200 days from the 210th trading day through the 11th trading day before the announcement date of each deal and (2) use the estimated parameters to compute the projected returns during the 5-day event window (-2, +2). For the 3-factor model, we use the Fama-French benchmark factors of Rm-Rf, SMB, and HML as regressors, where Rm-Rf is the value-weighted market return minus the one-month Treasury bill rate, SMB (Small Minus Big) is the average return on three small portfolios minus the average return on three big portfolios, and HML (High Minus Low) is the average return on two value portfolios minus the average return on two growth portfolios. Kenneth R. French provides these numbers on his website. The 4-factor model adds the Fama-French momentum factor, constructed from six value-weighted portfolios formed using independent sorts on size and prior returns of NYSE, AMEX, and NASDAQ stocks.[10] We report the results in Table 8 using the 4-factor model. All of the results hold using either the 1- or 3-factor models to construct 5-day CARs around the announcement date.

Table 8 provides regression results where the dependent variable is the 5-day CARs around the announced departure dates of executives from S&P 1500 firms. The primary explanatory variable is a dummy variable that equals one if a TRI plant opened close to the S&P 1500 firm. In particular, the main explanatory variable is either *TRI Open within 1 Mile* or *TRI Open within 2 Miles*. All regressions include firm and year dummy variables. As indicated, we also provide regressions conditioning on time-varying Firm Controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR,* and *Stock CAR Volatility*) and time-varying Individual controls (*Tenure* and *Age*). Thus, Table 8 provides the results of tests of whether there are significant differences

[10] The momentum factor equals 1/2 (Small High + Big High) - 1/2 (Small Low + Big Low), http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_mom_factor_daily.html.

between the CARs around announced departures of executives from (1) firms exposed to TRI plant offerings and (2) firms unexposed to such openings.

As shown, when executives announce their departures from S&P 1500 firms exposed to TRI plant openings, the CARs of those firms fall significantly more than when executives depart from unexposed firms.[11] This is consistent with the following view: (1) the toxic releases from TRI plant openings induce some otherwise well-performing executives at neighboring firms to separate from those firms; (2) such pollution-induced separations involve a higher proportion of voluntary separations than executive departures from firms unexposed to TRI plant openings; and (3) voluntary executive departures have a larger adverse influence on stock prices than executive departures for other reasons, including poor firm performance or expected poor performance. These findings suggest that TRI plant openings have material effects on the executives and shareholders of neighboring firms.

We extend these stock return analyses by examining how returns change over longer horizons in response to TRI plant openings. Specifically, instead of examining the 5-day event window around executive turnover announcements, we study firms' CARs during the year of a TRI plant opening or the following year. We define these annual CARs as the buy-and-hold return over the market index return. Thus, we replace the dependent variable of equation (2) with either CARs during the year of the plant opening or CARs during the following year. Firm-year controls, fixed effects, and standard error clustering are all the same as in Table 4.

As shown in Table 9, CARs fall appreciably during the year of a TRI plant opening. For example, the estimates indicate that (1) a one standard deviation increase in *TRI Open within 1 Mile* (0.18) is associated with a 25-35% decrease in CARs and (2) a one standard deviation increase in *TRI Open within 2 Miles* (0.3) is associated with a 10-13% decrease in CARs.[12] However,

---

[11] Besides finding that the CARs of firms with executive departures following TRI-plant openings fall more than the CARs of firms with executive departures unexposed to TRI-plants, we also find that the CARs of firms with executive departures following TRI-plant openings fall. These results are consistent with the extensive literature on executive departures in general and are available on request.
[12] We calculate the economic magnitude as the standard deviation*coefficient/mean of Cumulative Abnormal Return in Current Year (%).

during the second year—the year after the plant opening year—CARs are not lower than before the TRI plant opening. There is not a significant relationship between the TRI plant opening indicators and CARs in the year following the plant opening. This result implies that the negative impact on stock performance is temporary.

5.2 Comparing Pollutant Density and Executive Income: New and Old Firms

The view that pollution triggers executive migration provides predictions about where those departing executives go and their compensation at new firms. First, if executives leave S&P 1500 firms because of pollution, we should observe these executives moving to firms in less polluted areas. To assess whether this holds, we first identify the location of the executive's new firm through BoardEx and ExecuComp. We then compute the pollutant levels in the first year after the executive moves to the new firm using EPA monitor data. Specifically, for each pollutant, we calculate the pollutant's level at the executive's "old firm" and its level at the new firm, where the monitor nearest to the firm measures the pollutant level. Since not all executives who leave S&P 1500 firms following TRI plant closings migrate to other S&P 1500 firms, these analyses materially reduce the sample size. Thus, we provide the results for executives leaving S&P 1500 firms after a TRI plant opens within two miles of the firm.

As shown in Table 10, executives who leave S&P 1500 firms after a TRI plant opens nearby tend to move to firms in less polluted parts of the country. These findings are not surprising given that (a) TRI plants increase pollution and (b) executives have a higher propensity to migrate following the opening of TRI plants close their firms. Nevertheless, it is valuable to confirm that when executives leave a firm following a TRI plant opening, they tend to find new executive positions in firms located in less polluted areas.

Second, we examine changes in the compensation of executives who separate from firms neighboring new TRI plants and move to other firms. To the extent executives leave their firms because of pollution, they may accept lower-paying positions at other firms. We test this hypothesis by obtaining data on total income, including salaries and bonuses, in the original and new S&P 1500 firms from BoardEx and ExecuComp. We compare total income in year *t-1* and year *t+1* for executives who voluntarily resign from the original firm in year *t*. We examine income in year *t-1* because income in year *t* may include deferred bonuses and other payments. Furthermore, we exclude involuntary separations because income may consist of severance payments.

We find that when executives leave firms "treated" by a TRI plant opening and move to other firms, their incomes tend to fall. As shown in the last row of Table 11, the average total income is 22.2% (25.4%) lower in the new firm than in the original firm. Executives are apparently willing to accept lower income to work in areas with cleaner air. As noted above, these analyses comparing pollution density and executive incomes at new and old firms involve a limited sample, and we view them cautiously. However, the emergent patterns are consistent with the view that the toxic emissions from TRI plant openings induce a significant number of executives at neighboring firms to separate from those firms to avoid the increase in pollution.

6. Conclusion

In this paper, we examined the impact of toxic emissions on the migration of corporate executives from neighboring firms and the corresponding repercussions on corporate profitability. We create a new dataset on the year-by-year career paths of executives at all S&P 1500 firms and merge these data with information on TRI plant openings—plants that emit toxic air pollutants. We then ask: When a plant starts emitting harmful pollutants, does this induce the migration of corporate executives from neighboring firms, how does the response depend on the individual traits of executives, and are such migrations associated with a drop in the CARs of those firms?

We discover that opening toxic emitting plants increases the rate at which executives leave geographically close firms. These findings are especially pronounced among executives with more general human capital skills and are not driven by executives at firms experiencing poor stock price performance. We also show that increases in executive migration following the opening of geographically close toxic emitting plants hold for executives who are most likely to work regularly and physically at the firm. Indeed, the findings do not hold for non-executive directors, who are unlikely to be physically present at the firm regularly and therefore, less likely to be affected by the TRI plant-induced increase in air pollution. In addition, we show stock returns fall when executives announce their departures following the opening of toxic-emitting plants. These analyses suggest that an additional, costly externality of air pollution is the migration of executives from geographically close firms.

References

Agarwal, S., Deng, Y. and Li, T., 2019. Environmental regulation as a double-edged sword for housing markets: Evidence from the NOx Budget Trading Program. *Journal of Environmental Economics and Management*, *96*, pp.286-309.

Akcigit, U., Baslandze, S. and Stantcheva, S., 2016. Taxation and the international mobility of inventors. *The American Economic Review*, *106*(10), pp.2930-2981.

American Lung Association, 2019. *State of the Air 2019*. American Lung Association: Chicago, IL.

Andrus, J.L., Withers, M.C., Courtright, S.H. and Boivie, S., 2019. Go your own way: Exploring the causes of top executive turnover. *Strategic Management Journal*, *40*(7), pp.1151-1168.

Banzhaf, H.S. and Walsh, R.P., 2008. Do people vote with their feet? An empirical test of Tiebout's mechanism. *American Economic Review*, 98(3), pp. 843-863.

Baumol, W.J. and Oates, W.E., 1988. *The Theory of Environmental Policy*. Cambridge university press.

Becker, R. and Henderson, V., 2000. Effects of air quality regulations on polluting industries. *Journal of Political Economy*, *108*(2), pp.379-421.

Bertrand, M. and Schoar, A., 2003. Managing with style: The effect of managers on firm policies. *The Quarterly Journal of Economics*, *118*(4), pp.1169-1208.

Bolton, P. and Kacperczyk, M., 2021. Do investors care about carbon risk?. *Journal of financial economics*, *142*(2), pp.517-549.

Brodeur, A., Cook, N., & Heyes, A. (2020, May). A Proposed Specification Check for p-Hacking. *AEA Papers and Proceedings* (Vol. 110, pp. 66-69).

Brown, J.R., Gustafson, M.T. and Ivanov, I.T., 2021. Weathering cash flow shocks. *The Journal of Finance*, *76*(4), pp.1731-1772.

Brown, J.R., Martinsson, G. and Thomann, C., 2022. Can environmental policy encourage technical change? Emissions taxes and R&D investment in polluting firms. *The Review of Financial Studies*, *35*(10), pp.4518-4560.

Brown, S.J. and Warner, J.B., 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics*, *14*(1), pp.3-31.

Connelly, B.L., Li, Q.J., Shi, W. and Lee, K., 2020, CEO dismissal: Consequences for the strategic risk taking of competitor CEOs. *Strategic Management Journal 41*(11), pp.2091-2125

Currie, J., Davis, L., Greenstone, M., and Walker, W.R., 2015. Environmental Health Risks and Housing Values: Evidence from 1600 Toxic Plant Openings and Closings, *American Economic Review*, 105(2): 678-709.

Custódio, C., Ferreira, M.A. and Matos, P., 2013. Generalists versus specialists: Lifetime work experience and chief executive officer pay. *Journal of Financial Economics*, *108*(2), pp.471-492.

Dasgupta, S., Li, X., & Wang, A. Y. (2018). Product market competition shocks, firm performance, and forced CEO turnover. *The Review of Financial Studies*, *31*(11), 4187-4231.

Delmas, M. and Toffel, M.W., 2004. Stakeholders and environmental management practices: an institutional framework. *Business strategy and the Environment*, *13*(4), pp. 209-222.

Delmas, M.A. and Toffel, M.W., 2008. Organizational responses to environmental demands: Opening the black box. *Strategic Management Journal*, *29*(10), pp.1027-1055.

Deng, X. and Gao, H., 2013. Nonmonetary benefits, quality of life, and executive compensation. *Journal of Financial and Quantitative Analysis*, *48*(1), pp.197-218.

Denis, D.J. and Denis, D.K., 1995. Performance changes following top management dismissals. *The Journal of Finance*, *50*(4), pp.1029-1057.

Dominici F., Peng R.D., Bell M.L., et al. 2006, Fine particulate air pollution and hospital admission for cardiovascular and respiratory diseases. *Journal of the American Medical Association*, 295(10), pp. 1127–1134.

Durrmeyer, I., 2022. Winners and losers: The distributional effects of the French Feebate on the automobile market. *The Economic Journal*, *132*(644), pp.1414-1448.

Gabaix, X. and Landier, A., 2008. Why has CEO pay increased so much? *The Quarterly Journal of Economics*, *123*(1), pp.49-100.

Garg, S., Li, Q., & Shaw, J. D. (2018). Undervaluation of directors in the board hierarchy: Impact on turnover of directors (and CEOs) in newly public firms. *Strategic Management Journal*, *39*(2), 429-457.

Gilson, S. C. (1989). Management turnover and financial distress. *Journal of Financial Economics*, 25(2), 241-262.

Giroud, X. and Rauh, J., 2019. State Taxation and the Reallocation of Business Activity: Evidence from Establishment-level Data. *Journal of Political Economy*, 127(3), 1262-1316.

Godthelp, M., & Glunk, U. (2003). Turnover at the Top:: Demographic Diversity as a Determinant of Executive Turnover in The Netherlands. *European Management Journal*, 21(5), 614-625.

Hanlon, W.W., 2020. Coal smoke, city growth, and the costs of the industrial revolution. *The Economic Journal*, *130*(626), pp.462-488.

Hsu, P.H., Li, K. and Tsou, C.Y., 2023. The pollution premium. *The Journal of Finance*, *78*(3), pp.1343-1392.

Huson, M. R., Parrino, R., & Starks, L. T. (2001). Internal monitoring mechanisms and CEO turnover: A long‐term perspective. *the Journal of Finance*, *56*(6), 2265-2297.

Kang, J. K., & Shivdasani, A. (1995). Firm performance, corporate governance, and top executive turnover in Japan. *Journal of Financial Economics*, 38(1), 29-58.

Kaplan, S.N., Klebanov, M.M. and Sorensen, M., 2012. Which CEO characteristics and abilities matter?. *The Journal of Finance*, *67*(3), pp.973-1007.

Kato, T., & Long, C. (2006). Executive turnover and firm performance in China. *American Economic Review*, 96(2), 363-367.

Kleven, H.J., Landais, C., and Saez, E., 2013. Taxation and International Migration of Superstars: Evidence from the European Football Market. *American Economic Review*, 103(5), pp. 1892-1924.

Kleven, H.J., Landais, C., Saez, E., and Schultz, E., 2014. Migration and wage effects of taxing top earners: Evidence from the foreigners' tax scheme in Denmark. *The Quarterly Journal of Economics*, *129*(1), pp.333-378.

Krüger, P., Sautner, Z. and T Starks, L.T. 2020, The importance of climate risks for institutional investors, *Review of Financial Studies* 33, 1067–1111.

Landrigan, P.J., Fuller, R., Acosta, N.J., Adeyi, O., Arnold, R., Baldé, A.B., Bertollini, R., Bose-O'Reilly, S., Boufford, J.I., Breysse, P.N. and Chiles, T., 2017. The Lancet Commission on pollution and health. *The Lancet*.

Messersmith, J. G., Lee, J. Y., Guthrie, J. P., & Ji, Y. Y. (2014). Turnover at the top: Executive team departures and firm performance. *Organization Science*, 25(3), 776-793.

Moretti, E., and Wilson, D., 2017. The Effect of State Taxes on the Geographical Location of Top Earners: Evidence from Star Scientists. *American Economic Review*, 107(7), pp. 1858-1903.

Murphy, K. J., & Zimmerman, J. L. (1993). Financial performance surrounding CEO turnover. *Journal of Accounting and Economics*, 16(1-3), 273-315.

Oates, W.E. and Portney, P.R., 2003. The political economy of environmental policy. *Handbook of Environmental Economics*, *1*, pp.325-354.

Pan, Y., 2015. The determinants and impact of executive-firm matches. *Management Science*, *63*(1), pp. 185-200.

Pan, Y., Wang, T.Y. and Weisbach, M.S., 2015. Learning about CEO ability and stock return volatility. *The Review of Financial Studies*, *28*(6), pp. 1623-1666.

Pan, Y., Wang, T.Y. and Weisbach, M.S., 2016. CEO investment cycles. *The Review of Financial Studies*, *29*(11), pp. 2955-2999.

Parrino, R., Sias, R. W., & Starks, L. T. (2003). Voting with their feet: Institutional ownership changes around forced CEO turnover. *Journal of Financial Economics*, *68*(1), 3-46.

Reid, E.M. and Toffel, M.W., 2009. Responding to public and private politics: Corporate disclosure of climate change strategies. *Strategic Management Journal*, *30*(11), pp.1157-1178.

Tiebout, C.M., 1956. A pure theory of local expenditures. *Journal of Political Economy*, *64*(5), pp.416-424.

Volpin, P.F., 2002. Governance with poor investor protection: Evidence from top executive turnover in Italy. *Journal of Financial Economics*, *64*(1), pp.61-90.

Warner, J.B., Watts, R.L. and Wruck, K.H., 1988. Stock prices and top management changes. *Journal of Financial Economics*, *20*, pp.461-492.

Weisbach, M.S., 1995. CEO turnover and the firm's investment decisions, *Journal of Financial Economics*, 37, pp.159-188.

World Health Organization, 2016. Ambient Air Pollution: A Global Assessment of Exposure and Burdent of Disease. *World Health Organization*: Geneva, Switzerland.

Figure 1: Locations that Had Toxic Release Inventory (TRI) Plants Between 1996 and 2014
Notes: This figure maps the location of the 58,094 TRI plants that operated between 1996 and 2014. Each dot represents a TRI plant location.

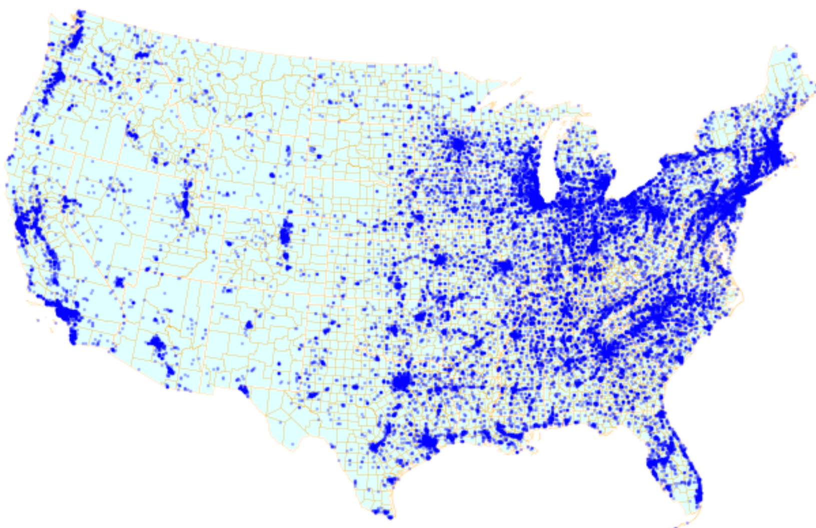

Figure 2: Random Assignment of Explanatory Variable

Notes: This placebo test of baseline regression results about the TRI opening-executives leaving relationship presents the histograms of the coefficient estimates on the variables *TRI Open within 1 Mile* or *TRI Open within 2 Miles* from 3,000 simulations of the baseline model. For each firm-year combination, we randomly assign a pseudo value of the variables *TRI Open within 1 Mile* or *TRI Open within 2 Miles* by randomly picking the value of the variable from other firms. We re-estimate all regressions in Table 4 Panel A Columns 3, 4, 7, and 8, and save the coefficient estimates on the variable *TRI Open within 1 Mile* or *TRI Open within 2 Miles*. We repeat this procedure 3,000 times and plot the histograms of these estimates. For the regressions in each graph, the dependent variable is the Percentage of Executives Who Left the Companies in *1* or *2* years; the independent variable is TRI Open within *1* or *2* miles. Upper left: 1 year, 1 mile; upper right: 2 years, 1 mile; lower left: 1 year, 2 miles; lower right: 2 years, 2 miles.

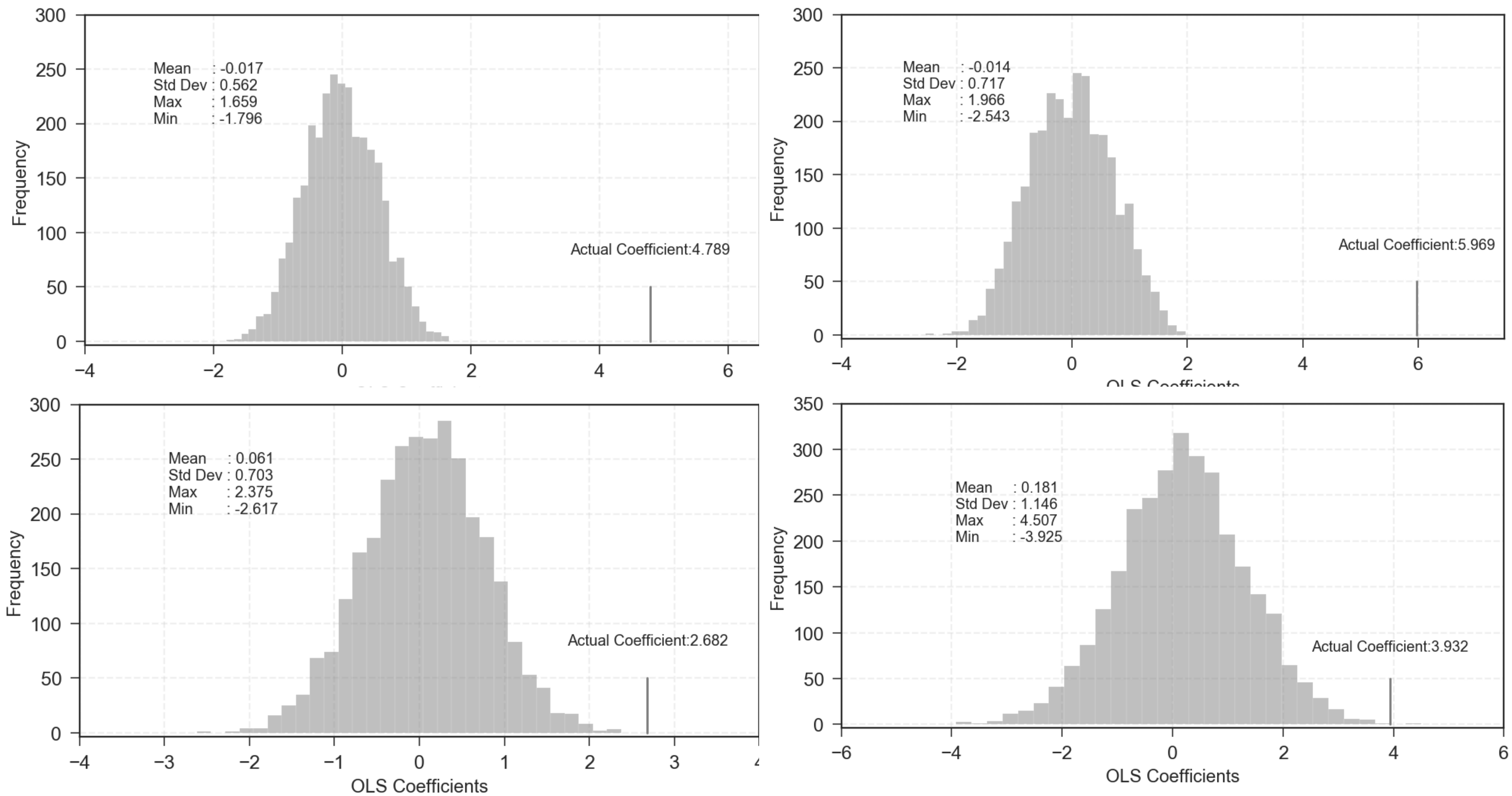

Figure 3: P-hacking Tests

This figure present p-hacking tests following Brodeur, Cook, and Heyes (2020). We re-estimate the regressions in Table 4 Panel A Columns (3), (4), (7) and (8) by including different controls, and present the box plots of the t-statistics by the number of controls for our main independent variables of interest, *TRI Open within 1 Mile* or *TRI Open within 2 Miles*. For the regressions in each graph, the dependent variable is the Percentage of Executives Who Left the Companies in *1* or *2* years; the independent variable is TRI Open within *1* or *2* miles. Upper left: 1 year, 1 mile; upper right: 2 years, 1 mile; lower left: 1 year, 2 miles; lower right: 2 years, 2 miles.

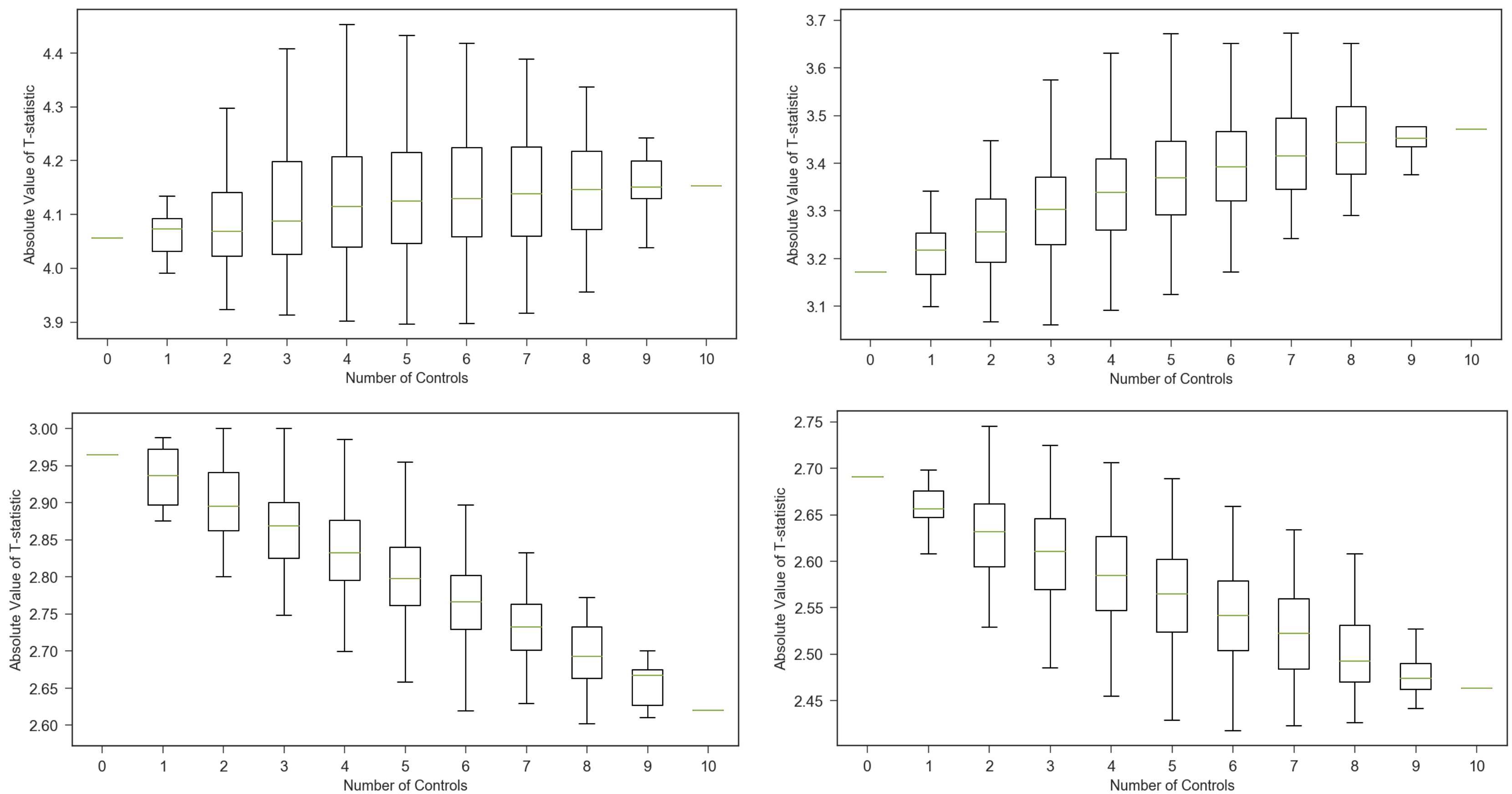

Table 1 Sample Construction and Variable Definition

This table (1) describes the construction of the three samples (Monitor-Plant-Year Sample, Firm-Year Sample, and Person-Year Sample) and (2) provides variable definitions of the dependent, independent, and control variables. The variables are ordered according to when they appear in the tables.

Sample Construction

Firm-Year Sample	Each row is an S&P 1500 firm's observation in a year. Data are constructed from EPA, BoardEx and Compustat.
Monitor-Plant-Year Sample	For each functioning monitor in a year, we match the TRI plant location with it and construct monitor-plant pairs. Each row is a pollutant's density (in nanogram/m^3) in a monitor-plant pair in a year. A dummy shows whether the plant is operating or not within 10 miles of the monitor in a given year. Data are from EPA.
Person-Year Sample	Each row is an executive's observation in an S&P 1500 company in a year. Data are constructed from EPA, BoardEx and Compustat.

Dependent Variables

4-factor CAR (-2, +2)	5-day CAR during the window (-2, +2), where day 0 is the date that an executive announces her leaving. We define abnormal returns by using the difference between actual and projected returns, where we estimate projected returns as follows: (1) based on 4-factor stock abnormal return model, regress the S&P 1500 firm's daily return on the returns on the CRSP value-weighted market portfolio over the 200-day period from the 210th trading day through the 11th trading day before the announcement date and collect the estimated coefficients and (2) use the estimated coefficients to compute the projected returns during the 5-day event window (-2, +2). Data are from CRSP.
Cumulative Abnormal Return in Current Year (%)	Buy-and-hold return minus S&P 1500 market index return in the year following TRI plant openings. Data are from CRSP.
Cumulative Abnormal Return Next Year (%)	Buy-and-hold return minus S&P 1500 market index return in two years following TRI plant openings. Data are from CRSP.
Dummy (Leave the Company in One Year)	In the person-year level data, for each executive that was in the S&P 1500 company in year *y-1*, the dummy equals one if she was in the company in year *y+1*, and equals zero if she was not in the company in year *y+1*. Constructed from BoardEx and ExecuComp.
Dummy (Leave the Company in Two Years)	In the person-year level data, for each executive that was in the S&P 1500 company in year *y-1*, the dummy equals one if she was in the company in year *y+2*, and equals zero if she was not in the company in year *y+2*. Constructed from BoardEx and ExecuComp.
Percentage of Executives Who Left the Companies in One Year	In the firm-year level data, for each S&P 1500 firm, first construct the list of all executives from BoardEx and ExecuComp in year *y-1* (say *n* executives in total), and the list of all executives in year *y+1*; then construct the list of executives who were in the company in year *y-1* but not in year *y+1* (say there are *m* executives who have left the company); then the percentage of executives who left the company is defined as *m/n*. Constructed from BoardEx and ExecuComp.

Percentage of Executives Who Left the Companies in Two Years	In the firm-year level data, for each S&P 1500 firm, first construct the list of all executives from BoardEx and ExecuComp in year *y-1* (say *n* executives in total), and the list of all executives in year *y+2*; then construct the list of executives who were in the company in year *y-1* but not in year *y+2* (say there are *m* executives who have left the company); then the percentage of executives who left the company is defined as *m/n*. Constructed from BoardEx and ExecuComp.
Percentage of Executives Who Left the Companies One Year Ago	In the firm-year level data, for each S&P 1500 firm, first construct the list of all executives from BoardEx and ExecuComp in year *y-2* (say *n* executives in total), and the list of all executives in year *y-1*; then construct the list of executives who were in the company in year *y-2* but not in year *y-1* (say there are *m* executives who have left the company); then the percentage of executives who left the company is defined as *m/n*. Constructed from BoardEx and ExecuComp.
Percentage of Executives Who Left the Companies Two Years Ago	In the firm-year level data, for each S&P 1500 firm, first construct the list of all executives from BoardEx and ExecuComp in year *y-3* (say *n* executives in total), and the list of all executives in year *y-1*; then construct the list of executives who were in the company in year *y-3* but not in year *y-1* (say there are *m* executives who have left the company); then the percentage of executives who left the company is defined as *m/n*. Constructed from BoardEx and ExecuComp.
Percentage of Non-executive Directors Who Left the Companies in One Year	In the firm-year level data, for each S&P 1500 firm, first construct the list of all non-executive directors from BoardEx and ExecuComp in year *y-1* (say *n* non-executive directors in total), and the list of all non-executive directors in year *y+1*; then construct the list of non-executive directors who were in the company in year *y-1* but not in year *y+1* (say there are *m* non-executive directors who have left the company); then the percentage of non-executive directors who left the company is defined as *m/n*. Constructed from BoardEx and ExecuComp.
Percentage of Non-executive Directors Who Left the Companies in Two Years	In the firm-year level data, for each S&P 1500 firm, first construct the list of all non-executive directors from BoardEx and ExecuComp in year *y-1* (say *n* non-executive directors in total), and the list of all non-executive directors in year *y+2*; then construct the list of non-executive directors who were in the company in year *y-1* but not in year *y+2* (say there are *m* non-executive directors who have left the company); then the percentage of non-executive directors who left the company is defined as *m/n*. Constructed from BoardEx and ExecuComp.
Proportion of Being a CEO	The average proportion of whether a person has been a CEO in the current or previous companies. Obtained from BoardEx and ExecuComp.
Proportion of Being a Chairperson of Board	The average proportion of whether a person has been a Chairperson of Board in the current or previous companies. Obtained from BoardEx and ExecuComp.
Shares Compensation	The value of an executive's compensation in the form of granted shares. In thousand USD. Obtained from BoardEx and ExecuComp.
Total Current Compensation (Salary + Bonus)	The total current compensation of an executive, including salary and bonus. In thousand USD. Obtained from BoardEx and ExecuComp.
Total Income ('000 USD)	An executive's total income from a company, including salaries and bonuses. Constructed from BoardEx and ExecuComp.
Years of Being an Executive	The total number of years that the person has been an executive in the current or previous companies. Obtained from BoardEx and ExecuComp.

Independent Variables

Dummy (Plant is Operating)	In the monitor-plant-year sample, this dummy shows whether the plant is operating (=1) or not (=0) within 5 miles of the monitor in a given year.
Generalist CEO Index	General Ability Index defined in Custodio, Ferreira, and Matos (2013) winsorized at 1%. It captures the skills of the CEO that are transferrable across firms and industries, instead of firm-specific skills. The index gives close to equal weights to the past number of positions, firms, and industries and a lower weight to the past CEO and conglomerate experiences.
Non-TRI Open within 1 Mile	At the firm-year level, it equals one if there is at least one non-TRI plant open within 1 mile of an S&P 1500 firm's headquarter location in a given year.
Non-TRI Open within 2 Miles	At the firm-year level, it equals one if there is at least one non-TRI plant open within 2 miles of an S&P 1500 firm's headquarter location in a given year.
TRI Close within 1 Mile	At the firm-year level, it equals one if there is at least one Toxic Release Inventory (TRI) plant closing within 1 mile of an S&P 1500 firm's headquarter location in a given year.
TRI Close within 2 Miles	At the firm-year level, it equals one if there is at least one Toxic Release Inventory (TRI) plant closing within 2 miles of an S&P 1500 firm's headquarter location in a given year.
TRI Open Between 1 and 2 Miles	At the firm-year level, it equals one if there is at least one Toxic Release Inventory (TRI) plant open between 1 and 2 miles of an S&P 1500 firm's headquarter location in a given year.
TRI Open Between 2 and 5 Miles	At the firm-year level, it equals one if there is at least one Toxic Release Inventory (TRI) plant open between 2 and 5 miles of an S&P 1500 firm's headquarter location in a given year.
TRI Open within 1 Mile	At the firm-year level, it equals one if there is at least one Toxic Release Inventory (TRI) plant open within 1 mile of an S&P 1500 firm's headquarter location in a given year.
TRI Open within 2 Miles	At the firm-year level, it equals one if there is at least one Toxic Release Inventory (TRI) plant open within 2 miles of an S&P 1500 firm's headquarter location in a given year.

Control Variables

Accounting Return	Income before extraordinary items deflated by total assets at the beginning of the year. Obtained from Compustat.
Age	Age of an executive. Obtained from BoardEx.
CAR	The difference between raw stock returns and value-weighted CRSP market returns over a 12-month period ending with the current fiscal year-end. Constructed from CRSP.
Cash Flow Volatility	Standard deviation of cash flows in the past five years. Obtained from Compustat. In million USD.
Leverage	Liabilities divided by total assets. Obtained from Compustat.

Operating Cash Flow / Total Assets Ratio	Operating cash flow divided by total assets. Constructed from Compustat.
Retirement	An indicator variable that equals one when the CEO is over the age of 60, and zero otherwise. Constructed from BoardEx.
ROA	Return on assets. Obtained from Compustat.
Sales Growth	Obtained from Compustat.
Stock CAR Volatility	The standard deviation of CAR in past 24 months. Constructed from CRSP.
Total Assets	Obtained from Compustat. In million USD.

Table 2 Summary Statistics

Panel A: Summary Statistics of Firm-Year Level Data

	Obs	Mean	Std. Dev.	25%	Median	75%
Dependent Variables						
Cumulative Abnormal Return in Current Year (%)	15,142	4.96	33.61	-15.90	1.11	21.18
Cumulative Abnormal Return Next Year (%)	14,068	4.11	32.50	-15.92	0.60	19.97
Percentage of Executives Who Left the Companies in One Year	16,787	12.10	14.21	0.00	12.50	20.00
Percentage of Executives Who Left the Companies in Two Years	15,572	22.96	19.36	0.00	20.00	33.33
Percentage of Executives Who Left the Companies One Year Ago	16,977	0.71	3.52	0.00	0.00	0.00
Percentage of Executives Who Left the Companies Two Years Ago	15,721	1.41	5.26	0.00	0.00	0.00
Percentage of Non-executive Directors Who Left the Companies in One Year	16,787	2.10	12.21	0.00	0.00	0.00
Percentage of Non-executive Directors Who Left the Companies in Two Years	15,572	4.16	17.67	0.00	0.00	0.00
Key Independent Variables						
TRI Open within 1 Mile	16,997	0.03	0.18	0.00	0.00	0.00
TRI Open within 2 Miles	16,997	0.10	0.30	0.00	0.00	0.00
TRI Open Between 1 and 2 Miles	16,997	0.06	0.23	0.00	0.00	0.00
TRI Open Between 2 and 5 Miles	16,997	0.14	0.34	0.00	0.00	0.00
TRI Close within 1 Mile	16,997	0.05	0.21	0.00	0.00	0.00
TRI Close within 2 Miles	16,997	0.14	0.35	0.00	0.00	0.00
Non-TRI Open within 1 Mile	16,997	0.18	0.39	0.00	0.00	0.00
Non-TRI Open within 2 Miles	16,997	0.31	0.46	0.00	0.00	1.00
Control Variables						
Accounting Return	13,310	0.11	0.10	0.06	0.10	0.16
CAR	15,182	9.02	49.88	-23.57	1.60	30.99
Cash Flow Volatility	14,893	3.88	17.80	0.00	0.04	0.39
Leverage	15,583	0.22	0.20	0.06	0.20	0.34
Operating Cash Flow / Total Assets Ratio	15,609	0.10	0.08	0.05	0.09	0.14
Retirement	15,033	65.81	22.36	52.38	68.75	82.35
ROA	13,361	0.05	0.12	0.02	0.05	0.09
Sales Growth	15,783	1.25	7.08	1.00	1.08	1.17
Stock Volatility	15,058	9.59	4.79	6.00	8.59	11.98
Total Assets	15,831	14.25	39.44	0.84	2.58	8.74

Panel B: Summary Statistics of Person-Year Level Data						
	Obs	Mean	Std. Dev.	25%	Median	75%
Dependent Variables						
4-factor CAR (-2, +2)	1,552	-0.01	0.07	-0.03	-0.00	0.02
Dummy (Leave the Company in One Year)	84,055	0.13	0.34	0.00	0.00	0.00
Dummy (Leave the Company in Two Years)	71,230	0.19	0.39	0.00	0.00	0.00
Total Income ('000 USD)	514	564.01	540.69	173.94	444.15	821.25
Key Independent Variables						
TRI Open within 1 Mile	96,264	0.04	0.18	0.00	0.00	0.00
TRI Open within 2 Miles	96,264	0.10	0.30	0.00	0.00	0.00
Generalist CEO Index	11,814	-0.07	0.94	-0.75	-0.27	0.46
Control Variables						
Accounting Return	75,809	0.11	0.10	0.06	0.10	0.16
Age	89,207	51.42	7.61	46.00	51.00	56.00
CAR	86,227	8.41	49.66	-23.97	1.12	30.58
Cash Flow Volatility	84,867	3.85	17.56	0.01	0.04	0.41
Leverage	88,451	0.23	0.20	0.07	0.20	0.34
Operating Cash Flow / Total Assets Ratio	88,331	0.10	0.08	0.05	0.09	0.14
ROA	76,007	0.05	0.13	0.02	0.05	0.09
Sales Growth	89,520	1.23	6.49	1.00	1.07	1.17
Stock Volatility	85,484	9.66	4.83	6.04	8.65	12.03
Total Assets	89,687	14.79	40.17	0.87	2.71	9.36

Panel C: Summary Statistics of Monitor-Plant-Year Level Data						
	Obs	Mean	Std. Dev.	25%	Median	75%
Dummy (Plant is Operating)	30,312,380	0.189	0.391	0	0	0
Mean Density (nanograms)						
PM10 Total 0-10um STP	340,935	11627.1	14695.0	0	0	23721.31
Suspended particulate (TSP)	237,410	13393.2	26476.2	0	0	0
Carbon monoxide	173,052	358.1	526.4	0	0	608.74
Ozone	147,325	22.6	22.0	0	32.24	43.55
Lead (TSP) STP	204,712	42.4	406.4	0	0	5.78
Sulfur dioxide	198,377	2204.5	3496.6	0	0	3448.90
Benzene	161,053	959.2	2354.0	0	0	1201.48
Toluene	158,603	2482.2	6865.3	0	0	2498.64
PM10 - LC	170,226	4526.9	10286.3	0	0	0
Ethylbenzene	156,428	383.2	1118.2	0	0	338.24

Table 3: TRI Plant Openings and Major Pollutants

This table reports the effect of TRI plant openings on air pollution. To measure air pollution, we use the annual density of major air pollutants recorded by EPA monitors within one (Panel A) or two (Panel B) miles of each TRI plant. The table reports the estimated coefficient on $Dummy(Plant\ is\ Operating)_{l,t}$, which is a dummy variable that equals zero in the years before a TRI plant opens and one afterwards. The last column of Table 3 provides information on the economic magnitudes of the estimated coefficient on *Dummy (Plant is Operating*) for each pollutant by computing the estimated change in the pollutant as a percentage of the pollutant's average across all monitors in the country. All regressions control for year fixed effects and monitor-plant fixed effects. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

Panel A: Annual density of major air pollutants recorded by EPA monitors within one mile of each TRI plant

Chemical Name	Dummy (Plant is Operating)		Constant	Year Dummy	Monitor-Plant Dummy	R-squared	Observations	Mean Density (Nanograms)	Additional % of Pollutant from One More TRI Plant
PM10 Total 0-10um STP	504.81**	(2.06)	Yes	Yes	Yes	0.458	114,764	11627.050	4.34%
Suspended particulate (TSP)	1,381.78***	(3.04)	Yes	Yes	Yes	0.412	80,549	13393.240	10.32%
Carbon monoxide	24.04*	(1.89)	Yes	Yes	Yes	0.481	50,607	358.102	6.71%
Ozone	1.29**	(2.29)	Yes	Yes	Yes	0.501	44,446	22.597	5.71%
Lead (TSP) STP	11.06	(1.44)	Yes	Yes	Yes	0.116	69,870	42.355	26.11%
Sulfur dioxide	769.88***	(9.83)	Yes	Yes	Yes	0.490	60,667	2204.460	34.92%
Benzene	90.08*	(1.86)	Yes	Yes	Yes	0.258	50,354	959.239	9.39%
Toluene	516.72***	(3.46)	Yes	Yes	Yes	0.249	48,354	2482.186	20.82%
PM10 - LC	132.54	(0.64)	Yes	Yes	Yes	0.411	54,757	4526.893	2.93%
Ethylbenzene	84.71***	(3.67)	Yes	Yes	Yes	0.200	47,858	383.226	22.10%

Panel B: Annual density of major air pollutants recorded by EPA monitors within two miles of each TRI plant

Chemical Name	Dummy (Plant is Operating)		Constant	Year Dummy	Monitor-Plant Dummy	R-squared	Observations	Mean Density (Nanograms)	Additional % of Pollutant from One More TRI Plant
PM10 Total 0-10um STP	571.93***	(3.81)	Yes	Yes	Yes	0.415	340,935	11103.350	5.15%
Suspended particulate (TSP)	392.35	(1.45)	Yes	Yes	Yes	0.402	237,410	12473.680	3.15%
Carbon monoxide	19.38***	(2.68)	Yes	Yes	Yes	0.453	173,052	322.829	6.00%
Ozone	0.79**	(2.52)	Yes	Yes	Yes	0.478	147,325	21.684	3.64%
Lead (TSP) STP	4.08	(0.70)	Yes	Yes	Yes	0.146	204,712	39.829	10.24%
Sulfur dioxide	82.84*	(1.77)	Yes	Yes	Yes	0.480	198,377	2076.380	3.99%
Benzene	92.99***	(3.08)	Yes	Yes	Yes	0.218	161,053	890.236	10.45%
Toluene	317.65***	(3.66)	Yes	Yes	Yes	0.219	158,603	2266.939	14.01%
PM10 - LC	251.94**	(2.16)	Yes	Yes	Yes	0.393	170,226	4159.733	6.06%
Ethylbenzene	44.45***	(3.33)	Yes	Yes	Yes	0.179	156,428	343.336	12.95%

Table 4: Executives Departures and TRI Plant Openings

Panel A: Core results on TRI plant openings and executive departures

This table presents OLS regression results of the relationship between the percentage of executives who leave their S&P 1500 firms in the one or two years following the opening of a nearby TRI plant. The dependent variable is the percentage of executives who leave their firms in the indicated time period. The main independent variables include the dummy variables of TRI plant opening within 1 or 2 miles of the S&P 1500 firm respectively. Regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility* and city-year, industry-year and firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year level. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Percentage of Executives Who Left the Companies in One Year				Percentage of Executives Who Left the Companies in Two Years			
TRI Open within 1 Mile	3.668**		4.789***		5.383***		5.969***	
	(2.329)		(4.153)		(3.068)		(3.471)	
TRI Open within 2 Miles		1.697*		2.682***		2.815***		3.932**
		(1.858)		(2.620)		(2.610)		(2.463)
Firm-year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,787	16,787	10,173	10,173	15,572	15,572	9,414	9,414
R-squared	0.523	0.522	0.650	0.649	0.596	0.595	0.716	0.716

Panel B: TRI plant openings and executive departures, differentiating by distance between TRI plants and S&P 1500 firms

This table presents OLS regression results of the relationship between the percentage of executives who leave their S&P 1500 firms in the one or two years following the opening of a nearby TRI plant. The dependent variable is the percentage of executives who leave their S&P 1500 firms in the indicated time period. The main independent variables are respectively (a) a dummy variable that equals one if a TRI plant opened within one mile of the firm, (b) a dummy variable that equals one if a TRI plant opened between 1 and 2 miles of the firm, and (c) dummy variable that equals one if a TRI plant opened between 2 and 5 miles of the firm. Regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*) and city-year, industry-year and firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year levels. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Percentage of Executives Who Left the Companies in One Year						Percentage of Executives Who Left the Companies in Two Years					
TRI Open within 1 Mile	3.668**			4.789***			5.383***			5.969***		
	(2.329)			(4.153)			(3.068)			(3.471)		
TRI Open Between 1 and 2 Miles		1.562*			3.366**			1.554*			3.397**	
		(1.735)			(2.403)			(1.836)			(2.164)	
TRI Open Between 2 and 5 Miles			0.069			0.651			-1.690			-2.246
			(0.056)			(0.324)			(-1.520)			(-1.142)
Firm-year Controls				Yes	Yes	Yes				Yes	Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,787	16,787	16,787	10,173	10,173	10,173	15,572	15,572	15,572	9,414	9,414	9,414
R-squared	0.523	0.522	0.522	0.650	0.649	0.649	0.596	0.595	0.595	0.716	0.716	0.716

Panel C: TRI plant openings and executive departures, a placebo test of less exposed executives

This table presents OLS regression results of the relationship between the percentage of non-executive directors who leave their S&P 1500 firms in the one or two years following the opening of a nearby TRI plant. The dependent variable is the percentage of executives who leave their S&P 1500 firms in the indicated time period. The main independent variables include the dummy variables of TRI plant opening within 1 or 2 miles of the S&P 1500 firm respectively. Regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*), and city-year, industry-year and firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year levels. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Percentage of Non-executive Directors Who Left the Companies in One Year				Percentage of Non-executive Directors Who Left the Companies in Two Years			
TRI Open within 1 Mile	1.050		1.874		1.736		3.347	
	(0.992)		(0.864)		(0.658)		(0.668)	
TRI Open within 2 Miles		0.204		0.532		0.834		1.154
		(0.323)		(0.418)		(0.667)		(0.556)
Firm-year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,047	17,047	13,487	13,487	15,953	15,953	12,519	12,519
R-squared	0.561	0.561	0.561	0.561	0.561	0.610	0.610	0.610

Panel D: TRI plant openings and executive departures, a placebo test of non-TRI plant openings near S&P 1500 firms

This table presents OLS regression results of the relationship between the percentage of executives who leave their S&P 1500 firms in the one or two years following the opening of a nearby non-TRI plant. The dependent variable is the percentage of executives who leave their S&P 1500 firms in the indicated time period. The main independent variables include the dummy variables of non-polluting plant openings within 1 or 2 miles of the S&P 1500 firm respectively. Regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*), and city-year, industry-year and firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year levels. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Percentage of Executives Who Left the Companies in One Year				Percentage of Executives Who Left the Companies in Two Years			
Non-TRI Open within 1 Mile	0.550		-0.070		-0.082		-0.631	
	(0.440)		(-0.042)		(-0.056)		(-0.217)	
Non-TRI Open within 2 Miles		0.952		0.243		0.466		-0.290
		(1.150)		(0.916)		(0.253)		(-0.126)
Firm-Year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,787	16,787	10,173	10,173	15,572	15,572	9,414	9,414
R-Squared	0.522	0.522	0.648	0.648	0.595	0.595	0.715	0.715

Panel E: TRI plant openings and executive departures, accounting for poorly performing firms

This table presents OLS regression results of the relationship between the percentages of executives who leave their S&P 1500 firms in the one or two years following the opening of a nearby TRI plant, excluding the firms with over 10% stock price drop in the lagged year. The dependent variable is the percentages of executives who leave their S&P 1500 firms in the indicated time period. The main independent variables include the dummy variables of TRI plant opening within 1 or 2 miles of the S&P 1500 firm respectively. Regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*), and city-year, industry-year and firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year levels. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Percentage of Executives Who Left the Companies in One Year				Percentage of Executives Who Left the Companies in Two Years			
TRI Open within 1 Mile	4.067**		4.754***		5.328**		5.141***	
	(2.212)		(2.590)		(2.500)		(2.730)	
TRI Open within 2 Miles		1.956*		2.843*		3.376**		4.985***
		(1.857)		(1.817)		(2.389)		(3.146)
Firm-year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,479	14,479	8,788	8,788	13,427	13,427	8,138	8,138
R-squared	0.554	0.553	0.688	0.687	0.620	0.620	0.742	0.743

Panel F: Robustness Check for TRI plant openings and executive departures: nearest neighbor matching

This table presents OLS regression results of the relationship between the percentages of executives who leave their S&P 1500 firms in the one or two years following the opening of a nearby TRI plant. The dependent variable is the percentages of executives who leave their S&P 1500 firms in the indicated time period. We use a nearest neighbor matched control group in the sample. The main independent variables include the dummy variables of TRI plant opening within 1 or 2 miles of the S&P 1500 firm respectively. All regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*), and city-year, industry-year and firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year levels. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Percentage of Executives Who Left the Companies in One Year				Percentage of Executives Who Left the Companies in Two Years			
TRI Open within 1 Mile	9.34***		8.89*		18.33***		13.11*	
	(3.59)		(1.84)		(3.19)		(1.94)	
TRI Open within 2 Miles		1.69**		1.41**		2.39***		2.22**
		(2.53)		(2.10)		(2.75)		(2.54)
Firm-Year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,649	4,802	1,649	4,802	1,518	4,461	1,518	4,461
R-Squared	0.625	0.395	0.631	0.401	0.742	0.497	0.751	0.506

Panel G: Pre-TRI-opening executive departures

This table presents OLS regression results of the relationship between the percentages of executives who leave their S&P 1500 firms in the one or two years *before* the opening of a nearby TRI plant. The dependent variable is the percentages of executives who leave their S&P 1500 firms in the indicated time period. The main independent variables include the dummy variables of TRI plant opening within 1 or 2 miles of the S&P 1500 firm respectively. All regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*), and city-year, industry-year and firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year levels. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Percentage of Executives Who Left the Companies One Year Ago				Percentage of Executives Who Left the Companies Two Years Ago			
TRI Open within 1 Mile	-0.086		0.116		-0.084		0.851	
	(-0.183)		(0.145)		(-0.187)		(0.885)	
TRI Open within 2 Miles		-0.262		-0.217		-0.319		-0.174
		(-1.095)		(-0.381)		(-1.254)		(-0.215)
Firm-Year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,977	16,977	10,342	10,342	15,721	15,721	9,537	9,537
R-Squared	0.424	0.425	0.530	0.531	0.500	0.500	0.619	0.618

Table 5: Pretreatment Trends

This table examines whether there are any pretreatment trends in the percentage of executives leaving the firms located in TRI-opening areas (treated firms) relative to firms located in areas with no TRI opening (control firms). The dependent variable is either the *Percentage of Executives Who Left the Companies in One Year* or *Percentage of Executives Who Left the Companies in Two Years*. The independent variables of interest are *TRI Open within 1 Mile* or *TRI Open within 2 Miles*, and 3, 2, 1 year(s) *before* or *after* the TRI opening year, which indicate the year relative to the TRI opening year (Year 0). For example, *TRI Open within 1 Mile* (t-1) equals one if it is one year before the TRI opens and zero otherwise. Regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*), and city-year, industry-year and firm fixed effects. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)		(3)	(4)
	Percentage of Executives Who Left the Companies in			Percentage of Executives Who Left the Companies in	
	One Year	*Two Years*		*One Year*	*Two Years*
TRI Open within 1 Mile (t-3)	1.954	2.177	TRI Open within 2 Miles (t-3)	-0.212	0.620
	(0.734)	(1.311)		(-0.226)	(0.293)
TRI Open within 1 Mile (t-2)	-1.139	1.345	TRI Open within 2 Miles (t-2)	-0.145	-0.167
	(-0.560)	(0.379)		(-0.080)	(-0.058)
TRI Open within 1 Mile (t-1)	0.732	5.929	TRI Open within 2 Miles (t-1)	-1.910	1.668
	(0.242)	(1.442)		(-0.853)	(0.719)
TRI Open within 1 Mile	5.376***	7.471***	TRI Open within 2 Miles	2.597**	4.714**
	(3.120)	(2.849)		(2.389)	(2.340)
TRI Open within 1 Mile (t+1)	2.489	3.549	TRI Open within 2 Miles (t+1)	0.967	2.647
	(0.809)	(1.217)		(0.530)	(1.186)
TRI Open within 1 Mile (t+2)	1.543	1.683	TRI Open within 2 Miles (t+2)	0.638	1.291
	(0.655)	(0.416)		(0.332)	(0.462)
TRI Open within 1 Mile (t+3)	0.701	0.080	TRI Open within 2 Miles (t+3)	-1.102	1.386
	(0.442)	(0.036)		(-0.642)	(0.589)
Firm-Year Controls	Yes	Yes	Firm-Year Controls	Yes	Yes
City-Year FE	Yes	Yes	City-Year FE	Yes	Yes
Industry-Year FE	Yes	Yes	Industry-Year FE	Yes	Yes
Firm FE	Yes	Yes	Firm FE	Yes	Yes
Constant	Yes	Yes	Constant	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Double Cluster by City and Year	Yes	Yes
Observations	10,173	9,414	Observations	10,173	9,414
R-Squared	0.650	0.718	R-Squared	0.650	0.717

Table 6: Executive Departures and TRI Plant Openings: Individual-level Analyses

This table presents OLS regression results of the relationship between each executive's decision to leave or remain in their S&P 1500. The dependent variable is a dummy variable that equals one for executives leaving the firm during a one (or two) year period and zero otherwise. The main independent variables include the dummy variables of TRI plant opening within 1 or 2 miles of the S&P 1500 firm respectively. All regressions include time-varying controls (*Accounting Return, Total Assets,* and city-year, industry-year and individual-firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year levels. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dummy (Leave the Company in One Year)				Dummy (Leave the Company in Two Years)			
TRI Open within 1 Mile	0.039**		0.046*		0.044**		0.057***	
	(2.223)		(1.927)		(2.079)		(2.796)	
TRI Open within 2 Miles		0.026**		0.026**		0.034**		0.038**
		(2.550)		(2.019)		(2.544)		(2.430)
Firm-Year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	84,055	84,055	48,982	48,982	71,230	71,230	41,349	41,349
R-Squared	0.449	0.449	0.489	0.489	0.586	0.586	0.610	0.610

Table 7: Individual Probability of Leaving and TRI Plant Openings: Interaction with Generalist CEO Index

This table presents OLS regression results of the relationship between each CEO's decision to leave or remain in their S&P 1500 firm, while differentiating CEOs by the degree of general human capital. The dependent variables are dummies that equal one for the CEO leaving the company in one/two year(s) and zero otherwise. The main independent variables are (a) the dummy variables of TRI plant opening within 1 or 2 miles of the S&P 1500 firm respectively and (b) the interaction of these TRI plant opening variables with the Generalist CEO Index. The Generalist CEO Index measures the skills of the CEO that are transferrable across firms and industries. All regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Age, CAR, Stock CAR Volatility*), and city-year, industry-year and individual-firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year levels. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dummy (Leave the Company in One Year)				Dummy (Leave the Company in Two Years)			
TRI Open within 1 Mile * Generalist CEO Index	0.086**		0.113**		0.095**		0.151***	
	(2.556)		(2.311)		(2.286)		(3.094)	
TRI Open within 1 Mile	0.046		0.064		0.022		0.098	
	(0.852)		(0.886)		(0.365)		(1.335)	
TRI Open within 2 Miles * Generalist CEO Index		0.077***		0.079**		0.073***		0.115***
		(5.148)		(2.313)		(3.941)		(3.254)
TRI Open within 2 Miles		0.024		0.033		0.045		0.060
		(1.033)		(0.759)		(1.209)		(1.165)
Generalist CEO Index	0.244***	0.239***	0.223	0.220	0.399***	0.396***	0.347	0.345
	(2.679)	(2.684)	(1.392)	(1.411)	(3.125)	(3.163)	(1.558)	(1.635)
Firm-Year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,679	10,679	7,252	7,252	9,802	9,802	6,638	6,638
R-Squared	0.645	0.646	0.741	0.741	0.717	0.718	0.801	0.802

Table 8: CAR around Executives' Turnover Announcement

This table presents OLS regression results on the relationship between CARs and the announcement dates of executive departures. The dependent variable is the 5-day CAR around the announced departure dates of executives from S&P 1500 firms computed from 4-factor model. The main explanatory variable is either a dummy variable that equals one if a TRI plant opened within one mile of the S&P 1500 firm (*TRI Open within 1 Mile*) or a dummy variable that equals one if a TRI plant opened within two miles of the S&P 1500 firm (*TRI Open within 2 Miles*). Regressions include firm and year fixed effects. As indicated, regressions (3) and (4) also condition on time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Age, CAR, Stock CAR Volatility*). Robust t-statistics clustered at firm level are in parentheses. *, **, *** indicate significance at 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)
	4-factor CAR (-2, +2)			
TRI Open within 1 Mile	-0.037***		-0.035**	
	(-3.300)		(-2.513)	
TRI Open within 2 Miles		-0.026***		-0.024**
		(-3.376)		(-2.513)
Firm-Individual Controls			Yes	Yes
Constant	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,552	1,552	1,140	1,140
R-Squared	0.542	0.542	0.546	0.546

Table 9: Stock Performance

This table presents OLS regression results of the relationship between the cumulative abnormal return, defined by buy-and-hold return over the market index return, of S&P 1500 firms in the one or two years following the opening of a nearby TRI plant. The dependent variable is the cumulative abnormal return in the indicated time period. The main independent variables include the dummy variables of TRI plant opening within 1 or 2 miles of the S&P 1500 firm respectively. All regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*), and city-year, industry-year and firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year level. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1o%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Cumulative Abnormal Return in Current Year (%)				Cumulative Abnormal Return Next Year (%)			
TRI Open within 1 Mile	-7.038***		-9.722***		0.600		1.026	
	(-2.706)		(-3.074)		(0.219)		(0.187)	
TRI Open within 2 Miles		-5.032**		-6.497***		1.454		0.354
		(-2.222)		(-2.624)		(0.493)		(0.119)
Firm-Year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,142	15,142	10,153	10,153	14,068	14,068	9,327	9,327
R-Squared	0.620	0.620	0.782	0.782	0.608	0.608	0.694	0.694

Table 10: Comparison of Pollution Levels of the Location of Departing Executives

This table compares the pollution levels at the locations of the departing executive's original and new firms. The sample includes executives who left S&P 1500 firms following a TRI plant opening within 2 miles of the firm in the past one year (upper panel) or in the past two years (bottom panel). *, **, *** indicate significance at 1o%, 5% and 1% levels respectively.

Executives leaving S&P 1500 firms with at least one plant opening within 2 miles

Executives who left the S&P 1500 firms with at least one plant opening within 2 miles in the past one year					
Pollutant	New Area	Original Area	Diff	t stat	Obs
PM10 Total 0-10um STP	24.15	24.68	-0.529	-0.591	77
Suspended particulate (TSP)	56.3	47.73	8.574	1.317	15
Carbon monoxide	0.6	0.661	-0.0613**	-2.266	86
Ozone	0.0401	0.0409	-0.000779	-0.855	104
Lead (TSP) STP	0.0313	0.0388	-0.00746	-0.267	22
Benzene	2.116	2.374	-0.258**	-1.722	66
Sulfur dioxide	3.93	4.727	-0.797**	-2.189	66
Toluene	5.748	6.952	-1.204***	-2.552	65
PM10 - LC	22.48	23.92	-1.443**	-2.272	33
Ethylbenzene	0.923	0.933	-0.0101	-0.115	58

	New Company	Original Company 1 Year Before Leave	Diff	t stat	Obs
Total Income ('000 USD)	482.85	620.57	-137.714**	-2.076	96

Executives who left the S&P 1500 firms with at least one plant opening within 2 miles in the past two years					
Pollutant	New Area	Original Area	Diff	t stat	Obs
PM10 Total 0-10um STP	23.47	24.69	-1.211*	-1.589	93
Suspended particulate (TSP)	50.04	55.79	-5.75	-0.827	13
Carbon monoxide	0.551	0.635	-0.0837***	-3.869	102
Ozone	0.0404	0.0387	0.00169	2.175	125
Lead (TSP) STP	0.0762	0.0414	0.0349	0.588	23
Sulfur dioxide	3.628	5.512	-1.884***	-4.623	63
Benzene	2.278	2.774	-0.496***	-2.557	69
Toluene	6.664	8.523	-1.859**	-2.297	68
PM10 - LC	22.69	22.4	0.29	0.566	51
Ethylbenzene	0.987	1.289	-0.302**	-1.759	58

	New Company	Original Company 1 Year Before Leave	Diff	t stat	Obs
Total Income ('000 USD)	481.91	646.10	-164.186***	-2.67	152

Online Appendix

Table OA1: TRI Plant Closings

This table presents OLS regression results of the relationship between the percentages of executives who leave their S&P 1500 firms in the one or two years following the closing of a nearby TRI plant. The dependent variable is the percentage of executives who leave their S&P 1500 firms in the indicated time period. The main independent variables include the dummy variables of TRI plant closing within 1 or 2 miles of the S&P 1500 firm, respectively. All regressions include time-varying controls (*Accounting Return, Total Assets, Leverage, Operating Cash Flow / Total Assets Ratio, Sales Growth, Cash Flow Volatility, ROA, Retirement, CAR, Stock CAR Volatility*), and city-year, industry-year and firm fixed effects. Table 1 provides variable definitions. Standard errors are double clustered at the city and year levels. Robust t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Percentage of Executives Who Left the Companies in One Year				Percentage of Executives Who Left the Companies in Two Years			
TRI Close within 1 Mile	0.476		-1.042		0.656		-0.950	
	(0.351)		(-0.604)		(0.332)		(-0.387)	
TRI Close within 2 Miles		-0.669		-1.043		-0.738		-0.982
		(-0.915)		(-1.011)		(-0.583)		(-0.512)
Firm-Year Controls			Yes	Yes			Yes	Yes
City-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Double Cluster by City and Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,787	16,787	10,173	10,173	15,572	15,572	9,414	9,414
R-Squared	0.522	0.522	0.649	0.649	0.595	0.595	0.715	0.716