Corporate Political Connections and Favorable Environmental Regulation*

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ABSTRACT

We examine whether the Environmental Protection Agency (EPA) uniformly enforces the Clean Air Act for politically connected and unconnected firms using a close election setting. We find no difference in regulated pollutant emissions or EPA investigations between the two groups, though connected firms experience less regulatory enforcement and lower penalties. These results are more pronounced for firms connected to politicians capable of influencing regulatory bureaucrats and for connected firms that are more important to their supported politicians. Taken together, our results show that campaign contributions can indirectly benefit firms by way of reduced environmental regulatory enforcement and penalties.

Key Words: political connections, elections, regulation
JEL Codes: D72, D73, G18

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1. Introduction

In response to decades of environmental concerns and the public's growing dissatisfaction with absent or ineffective environmental regulation, the Environmental Protection Agency (EPA) was created by President Nixon as a "strong, independent agency" to facilitate the control of pollution.[1] However, the extent of the influence Congress and corporations have over the regulatory agency, as well as its consequences, has recently received intense media scrutiny. When President Trump was elected, he appointed former Oklahoma Senator Scott Pruitt, a self-described "leading advocate against the EPA's activist agenda, "[2] as EPA Administrator. Major media also reported that the former Oklahoma Senator engaged in a favorable rent deal with the wife of an energy lobbyist, favored pro-corporate energy policies, and eventually resigned amid many ethical scandals suggesting that he favored corporate interests.[2] While Pruitt left office before he could be found guilty of any ethical violations, during his term, one of the three largest energy companies that donated to him did not pay a single dollar towards environmental penalties for the first time in the past two decades, and a second had its fines reduce by half.[3]

While such anecdotes are consistent with firms using political connections to obtain favorable enforcement by the EPA, to the best of our knowledge, this is the first study that provides systematic evidence of this occurrence and the channels of its implementation. Since clean air provides numerous health benefits and all global citizens are stakeholders, the question of whether corporations can influence environmental regulation is of great importance. Our study contributes to two distinct bodies of literature. The first examines the types of influence that politicians can have over regulators (Stigler,1971; Peltzman, 1976; Grossman and Helpman, 1994; Correia, 2014; Gulen and Myers, 2017). Aside from directly passing and implementing regulation itself, we show that politicians can act as a valuable link between regulated firms and regulators and that campaign contributions are a means for firms to establish that link. Not only do we provide evidence that politically connected firms experience more favorable regulatory outcomes, but we also offer hypotheses and

[1] Former President Nixon established the EPA through an executive order on July 9, 1970. (Nixon, 1970)
[2] As reported in the *New York Times* (Eder and Tabuchi, 2018)
[2] (Eder and Tabuchi, 2018)
[3] Fines calculated using penalty data from the EPA's ECHO database EPA.gov (Accessed January 21, 2017)

empirical evidence indicating the circumstances under which politicians are likely to exert their influence. The second body of literature debates the value of campaign contributions. Some studies suggest that campaign contributions are symptoms of an agency problem (Aggarwal, Meschke, and Wang, 2012; Coates, 2012), while others argue that these contributions are valuable by creating “political capital.” (Cooper, Gulen, and Ovtchinnikov, 2010; Fulmer and Knill, 2012; Correia, 2014). Even the studies favoring the “political capital” story debate the channel that these connections take.[4] Our results are in favor of the political capital story, suggesting that political connections can indirectly create value by way of reducing environmental regulatory enforcement and penalties.

While regulators should ideally be non-partisan and enforce regulation uniformly, evidence suggests this is not always true.[5] In order to directly influence an individual bureaucrat, a regulated company may engage in illegal bribery[6] or take advantage of a past relationship.[7] The company may also indirectly influence the bureaucrat by electing officials that promise to create a favorable regulatory environment.[8] For example, a business that anticipates benefitting from more lax environmental regulations may provide support to a politician campaigning for more lenient laws and limited agency funding.

In this study, we focus our analysis on the regulation of the Clean Air Act.[9] The Act was first passed in 1963 (though significant amendments were added in 1970) to regulate the emissions from stationary sources, such as plants, and mobile sources, such as vehicles used for transportation. As part of the Clean Air Act, the EPA sets National Ambient Air Quality Standards (NAAQS) for seven pollutants considered

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[4] See Ansolabehere, De Figueiredo, and Snyder (2003) for a survey.

[5] Correia (2014) and Kedia and Rajgopal (2011) suggest SEC enforcement is not uniform, while Mixon (1995) Gulen and Myers (2017) provide evidence against consistent EPA enforcement. Hunter and Nelson (1995) and Young et al. (2001) show similar results for the Internal Revenue Service (IRS), while Faith et al. (1982) and Weingast and Moran (1983) show consistency with the Federal Trade Commission (FTC).

[6] The Associated Press reported, for example, that “An elected Arizona utility regulator who is now accused of accepting bribes had $31,000 funneled to him from a water company owner and tried to get the owner to buy him a $350,000 piece of land” (2018, May 27)

[7] According to the Los Angeles Times, “Upon discovering that her former employer, Aerojet, had dumped hazardous waste, Rita Lavelle, the former head of the EPA’s Superfund (toxic waste) program failed to excuse herself from the case and lied about it.” (1985, April 20)

[8] President Trump, who had campaigned on a promise to revive the coal industry, issued an executive order to revise or withdraw the Clean Power Plan within his first days of office, targeting “regulatory burdens that unnecessarily encumber energy production . . . and prevent job creation.” White House (2017)

[9] 42 U Currie.S.C. § 7401

harmful to public health and the environment, referred to as criteria pollutants.[10] The importance of clean air is well-documented and ranges from individual health benefits to environmental benefits for future generations.[11] However, the costs associated with obtaining clean air can be substantial. Policymakers must balance the negative externalities associated with pollution with their potential to create jobs, increase local economic activity, and lead to positive economic spillovers (Greenstone, Hornbeck, and Moretti, 2010).

Within our setting, if a firm's political action committee (PAC) donates to a politician, we consider the firm to be politically connected, as in Akey (2015). Unlike bribery, donating to a politician's campaign, within stipulated campaign contribution limits, is entirely legal. However, the firm's decision to donate is endogenous. To overcome this endogeneity challenge, we use the regression discontinuity design proposed by Lee (2008) and focus our analysis on close elections where a candidate's margin of victory is less than 5%. This framework allows us to causally compare the outcomes of firms connected to politicians who just won a close election to those connected to politicians who just lost a close election. By assuming that there is a meaningful component of randomness in the outcome of these realized close elections, we can isolate the exogenous variation in firms' political networks.

We focus our analysis on two different stages of the enforcement process. First, we examine EPA investigations into firms potentially violating the Clean Air Act. Next, we examine the instances of enforcement actions and their associated penalties. Since the EPA has limited resources, cannot monitor all firms in real time, and cannot investigate all potential violations, the agency has considerable discretion over what types of investigations to launch and when to subsequently enforce the regulation. Depending on agency resources, the agency's own expectation of success, and whether the particular enforcement action requested best fits the agency's overall policies, the EPA has the ability to choose whether to launch an investigation and subsequently enforce the regulation (Heckler v. Chaney, 470 U.S. 821, 1985, as discussed in detail in Section 2.1). If the EPA uniformly enforces the Clean Air Act, we would not expect to

[10] These gasses are carbon monoxide (CO), nitrogen dioxide (NO2), Ozone (O3), lead (Pb), particulate matter (PM10 and PM2.5), and sulfur dioxide (SO2).
[11] See Graff Zivin and Neidell (2012) for a survey. Also, see Isen, Rossin-Slater, and Walker (2017), Chay and Greenstone (2003), Currie and Neidell (2005), Dockery et al. (1993), and Pope III et al. (2002).

see differences in EPA investigations or enforcement between firms with and without political connections.

While we find no significant difference in EPA investigations between politically connected firms and their unconnected counterparts, politically connected firms are less likely to incur environmental penalties, and conditional on a penalty, they realize smaller fines than those without connections. These findings suggest that political connections may indirectly create substantial value by leading to favorable regulatory enforcement. We test two channels through which this connection is most likely to create value. First, we examine whether firms fare better when they are connected the politicians with greater ability to influence the regulator. Second, we test whether firms that are more important to politicians are more likely to receive favorable regulatory outcomes.

While politicians can directly influence regulation by passing laws, some may also be able to sway the bureaucrat informally by developing a rapport through repeated contact, such as through relevant committee work, or informally establishing a quid pro quo relationship. For example, politicians may be able to offer regulators access to their networks in exchange for favorable treatment of a particular firm. The literature has also shown that bureaucrats are motivated by career concerns (see Alesina and Tabellini, 2007 for a discussion), and individual regulators may seek to transition to employment in government work. To ease the transition, they may align themselves with Congressional interests to maximize current and future career prospects. To test this empirically, we define powerful politicians as those having incumbent status, membership in the majority party, party leadership, high seniority, or seats on committees closely related to environmental matters and EPA funding. For all variables of interest, we confirm our predictions empirically with the data.

Even if a politician can influence the regulatory process, he may not uniformly exert his influence for all firms equally. We propose that firms most likely to be valuable to politicians receive preferential regulatory enforcement. Theory models of regulation show that politicians are generally assumed to maximize their probability of re-election (Stigler, 1971; Peltzman, 1976) by catering to their constituencies and optimizing political contributions (Poole and Romer, 1985; Stratmann, 1995). We first measure firm importance by examining whether the connected firm has a headquarters in the state of the election. Next, following Cohen, Diether, and Malloy (2013), we define an "interested industry" as the top three industries, according to sales, of a given state and create a modified classification based on employee count, since employees can cast votes in elections. We also compare large campaign contributors to small contributors. Across all categories of importance, we find evidence that firms that are important to the politicians they support are regulated more favorably.

Finally, we show that our results are robust to three additional tests. First, we examine a special election setting, which occurs when a politician's seat unexpectedly vacates before regular term expirations. While this setting offers the cleanest identification setting, our sample size reduces dramatically, though we observe consistent results. Next, we conduct a plant-level analysis on the emissions of the seven criteria pollutants covered by the Clean Air Act. For each gas, we find no evidence that plants with political connections emit more criteria pollutants than those without political connections. Furthermore, our results are robust to using a weighted measure of campaign contributions.

Our paper proceeds as follows. In Section 2, we provide a discussion of the related background and literature, and we discuss our identification strategy in Section 3. We then present data and variables of interest in Section 4. Section 5 contains our main results and Section 6 shows further analysis and robustness tests, and we conclude in Section 7.

2. Background and Related Literature

2.1. EPA Discretion and Enforcement

Regulatory agencies, such as the EPA, impose and enforce regulations. The Clean Air Act gives the EPA the authority to limit emissions for air pollutants coming from sources like chemical plants, utilities, and steel mills.[12] As part of the Clean Air Act, the EPA sets National Ambient Air Quality Standards (NAAQS) for seven pollutants considered harmful to public health and the environment, referred to as

[12] For further details on air regulation, see https://www.epa.gov/regulatory-information-topic/regulatory-information-topic-air#toxic

criteria pollutants. These gasses are carbon monoxide (CO), nitrogen dioxide (NO_2), Ozone (O_3), lead (Pb), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2), and the EPA publishes detailed guidelines for allowable limits for each gas.[13]

The agency monitors hazardous pollutants and makes sure that plants are complying with regulation by carrying out routine inspections. The agency can also launch additional investigations if there is a triggering event, such as a facility exceeding allowable amounts of emissions. However, since the EPA has limited resources, it has considerable discretion over what types of investigations to launch. According to Heckler v. Chaney, 470 U.S. 821 (1985), “An agency decision not to enforce often involves a complicated balancing of a number of factors which are particularly within its expertise. Thus, the agency must not only assess whether a violation has occurred, but whether agency resources are best spent on this violation or another, whether the agency is likely to succeed if it acts, whether the particular enforcement action requested best fits the agency’s overall policies, and indeed, whether the agency has enough resources to undertake the action at all.”

At the end of the investigation, the staff can make an enforcement recommendation to the administrator, who can directly assess a fine if the firm is found to be violating the regulation. However, if the violation is severe, the administrator can seek charges through the Department of Justice, which may pursue either civil or criminal legal action, if necessary. If legal action is necessary, a judge, with guidance from the EPA’s legal representation, will impose a penalty, which could consist of a monetary and nonmonetary component. These penalties are subject to two levels of discretion: judicial and EPA. Judicial discretion is reviewable, meaning that if it is improperly applied, it can result in the reversal of the trial court’s decision. However, agency (EPA) discretion is unreviewable. When calculating penalties, the EPA considers the benefit that the violator received from noncompliance, which, for example, could be accomplished through delaying or avoiding pollution control expenditures. Even after the court or administrator awards penalties, the EPA has further discretion pertaining to whether to collect the assessed penalties.

[13] Further information on regulation on each one of these criteria pollutants can be found here: https://www.epa.gov/criteria-air-pollutants/naaqs-table

2.2. Congressional Influence over Regulatory Agencies

The first body of literature that we contribute to examines the effect politicians can have on independent regulatory agencies. The most direct way that Congress is related to regulatory agencies is by drafting and passing federal environmental laws, such as the Clean Air Act, which are enforced by the EPA. Furthermore, Weingast (1984), Weingast and Moran (1983), and McCubbins, Noll, and Weingast (1999) discuss how members of Congress can use the appointment of commissioners, agency funding, and oversight to reward (or punish) regulatory agencies that impact their constituencies in favorable (or unfavorable) ways.

A primary underlying assumption of the literature is that both bureaucrats and politicians are subject to career concerns, desiring to maximize their current and future rewards. Politicians maximize their probability of re-election (Stigler, 1971; Peltzman, 1976) by catering to their constituencies and maximizing political contributions (Poole and Romer, 1985; Stratmann, 1995). Bureaucrats fulfill the goals of their organization to be perceived as competent by their peers (Alesina and Tabellini, 2007), which affects their ability to maintain current employment as well as their outside job opportunities.

With confirmation by the Senate, the President of the United States appoints the EPA Administrator, who has historically been aligned with the President's environmental policies (see Fredrickson et al., 2018 for a discussion by party). While individual EPA staff members are not political appointees, many use jobs in regulation as a stepping stone either before or after employment with lobbying firms or supporting Congressman.[14] These career concerns may incentivize staffers to align themselves with senior incumbent politicians to improve their current or future career trajectories (Correia, 2014).[15]

By designating funding, Congress also directly influences the number of employees that the agency can staff, thereby directly impacting employee career prospects, as well as the resources it has available to enforce the regulation. The model proposed by Weignast (1984) shows that agency funding is a mechanism for politicians

[14] The Center for Responsive Politics (CRP) identified 89 EPA staff members as going through the revolving door.
[15] For further discussion on how internalizing the goals of the organization enhances career prospects for bureaucrats, see Chapter 9 in Wilson (1989).

to reward (or punish) agencies for decisions that increase (or decrease) their constituencies. Finally, congressional oversight functions as a mechanism for influence, occurring in its most standard form when a committee holds a public hearing on an agency's implementation of a federal program within the committee's jurisdiction. However, the most common type of oversight is less formal: while members of Congress could directly contact agency heads, the more pervasive practice is for committee staff to communicate with high ranking agency staff (Lazarus, 1991).

Empirical evidence shows that a number of government agencies do not uniformly enforce regulation, including the Federal Trade Commission (Faith, Leavens, and Tollison, 1982; Weingast and Moran, 1983), Internal Revenue Service (Hunter and Nelson, 1995; Young, Reksulak and Shughart, 2001), Nuclear Regulatory Commission (Gordon and Hafer, 2005) and Securities and Exchange Commission (Correia, 2014; Heese, 2015).

To our knowledge, only three other studies examine selective EPA enforcement. Shive and Forster (2019) show that clean air enforcement is not uniform for public and private firms; however, they leave unexplained what drives their findings. Mixon (1995) and Gulen and Myers (2017) examine selective EPA enforcement at the state level; however, they focus on its benefit to politicians rather than on regulated firms. Mixon (1995) shows that carbon emissions violations are not issued uniformly across states, and Gulen and Myers (2017) show that the EPA does not uniformly enforce the Clean Water Act in battleground states. These papers suggest that politicians encourage regulators to selectively enforce regulation to boost their chances of re-election; still, we know little about what drives this selective regulation at the firm-level or whether firms, themselves, can influence this favorable regulation.

We further our understanding of selective EPA regulatory enforcement by focusing on the choice of enforcement targets as well as outcomes at the firm-level. We find that even within a given state, politically connected firms receive more favorable regulatory enforcement. While Mixon (1995) and Gulen and Myers (2017) suggest that politicians can encourage regulators to selectively enforce the regulation in ways that benefit their chance of reelection at the state-level, our results suggest that firms can tap into this connection by using campaign contributions and that this relationship transcends state boundaries. We also further this body of literature by providing context surrounding the circumstances in which politicians are more likely to exert their influence and situations where firms can encourage politicians to exert this influence to benefit corporate interests.

2.3. Value of Firm Political Connections

This paper contributes literature that examines the significance of corporate political contributions and the channel through which they create value. This body of work reviews the degree of connectedness between a firm and politician either by focusing on a specific relationship between the two parties or by measuring political expenditures made by firms in the form of PAC contributions, soft money contributions, and lobbying expenditures.

Many studies have concluded that campaign contributions are beneficial to shareholders because they are investments in "political capital." Cooper, Gulen, and Ovtchinnikov (2010), for example, find that the firm's campaign donations are associated with higher future stock returns. Fulmer and Knill (2012) and Correia (2014) show that firms that make political contributions delay SEC enforcement and realize lower penalties, while Yu and Yu (2011) suggest that firms that spend more money lobbying experience delayed fraud detection. Faccio (2006) shows that connections are valuable internationally. However, additional evidence suggests that politically active firms could suffer from more significant agency problems (Aggarwal, Meschke, and Wang, 2012; Coates, 2012; Borisov, Goldman, and Gupta, 2016).

Although the literature has primarily favored the idea that political connections are valuable and that connected firms have better access to credit (Joh and Chiu, 2004; Cull and Xu, 2005; Johnson and Mitton, 2003; Khwaja and Mian, 2005), more procurement contracts (Tahoun, 2014), lighter taxation (De Soto, 1989; Arayavechkit, Saffie, and Shin, 2018), TARP funding (Ramanna, 2008 and Duchin and Sosyura, 2012, 2014), and corporate bailouts (Faccio, Masulis, McConnell, 2007); however, the mechanisms through which political connections create value remain unclear.

Our study provides evidence consistent with campaign contributions providing "political capital" for donating firms. Furthermore, we study an added channel through which political connections create value: favorable EPA regulatory enforcement. We also contribute to this body of literature by showing that not all firms benefit equally from their campaign contributions. Specifically, firms that are more important to politicians by way of potential voters, campaign contributions, or industry importance receive more favorable regulatory enforcement.

3. Identification of Political Connections

Since the firm's decision to donate to a politician is endogenous, unobserved heterogeneity may potentially drive the decision to donate, as well as the observed differences between connected and unconnected firms for the outcome variables. To examine the causal effect of political connections on EPA regulatory enforcement, we implement the regression discontinuity design (RDD) framework proposed by Lee (2008) and used by Akey (2015), which allows us to compare the outcomes of firms connected to politicians who just won a close election to those of politicians who just lost a close election (if specific criteria are met).

Following Lee (2008), we assume that a component of randomness determines the outcome of a close election. Without a way to measure the amount of randomness in the outcome of a particular race, we must make assumptions about which types of elections are likely affected by this randomness. Following Lee (2008), Do et al. (2012, 2015), and Akey (2015), we use an *ex-post* close election setting, where the elected official only won by five percentage points or fewer. The firms who contributed to politicians who just won the election are exogenously connected to the elected officials, while those connected to politicians who narrowly lost exogenously do not have such a connection. Thereby, we can compare the outcomes of firms donating to candidates who just won vs. just lost the election.

There are two types of elections of federal congress: general elections and special elections. The House of Representative and Senate general elections occur in November in even-numbered years, and a special election is held when a politician's seat unexpectedly vacates before standard term expirations, typically because of a resignation or a death. because there is usually only one election at a time, implementing the RDD setting in close special elections is cleaner because there is usually only one election at a time. However, the infrequency of this type of election dramatically reduces our sample size. Therefore, we examine both types of elections, but we choose to use general elections for our primary analyses. In the subsequent analysis presented in Section 6.1, we show that our results are robust to using special elections.

Studying firm connections in general elections is more complicated due to overlapping races. Henceforce, we construct portfolios of firms' connection shocks on each election by recording the number of winning and losing candidates j that each firm f supported in the two years (one cycle) before each close election at time t in line with Akey (2015). Specifically, we compute the following for each firm-cycle-candidate combination:

$$Win(Lose)P_{ft} = \sum_{j} \left(Donated_{fjt} \times Election\ Outcome_{jt} \right) \tag{1}$$

where $Donated_{fjt}$ equals one if firm f's PAC donated to candidate j's election PAC in cycle t and zero otherwise. $Election\ Outcome_{jt}$ takes the value of one if politician j won (lost) the close election in cycle t and zero otherwise. We construct the variable $TotalP_{ft} = WinP_{ft} - LoseP_{ft}$ to look at a firm's net political connection portfolio, which is our main measure of political connections. We then compute this variable separately for winners and losers, further separating into winning and losing incumbents/challengers and winning and losing Republicans/Democrats. We further describe these variables in Table 1.

4. Data Sources and Variables

We obtain all data to construct variables pertaining to EPA investigations and assessed penalties through the EPA's comprehensive Enforcement and Compliance History Online (ECHO) database. Within ECHO, we obtain enforcement data from the Integrated Compliance Information System for Federal Enforcement and Compliance (ICIS-FE&C). We collect additional data on pollutant emitting plants from the EPA's Toxics Release Inventory (TRI) database.

Political contribution data relating to federal congressional elections come from the Federal Election Committee (FEC), Constituency-Level Elections Archive (CLEA), and OpenSecrets. We collect committee data from Charles Stewart's webpage and seniority data from the House and Senate webpages. We assemble firm fundamentals using the Compustat database.

4.1. Variables of EPA Enforcement Actions

The data for EPA enforcement are from the Integrated Compliance Information System for Federal Civil Enforcement Case Data (ICIS FE&C). We partition out cases pertaining to the Clean Air Act, which regulates seven criteria pollutants. The database contains enforcement data for all administrative cases, which take place before a state or federal governing body, as well as judicial cases, which occur in front of a court, starting in 1980.

For each case, we first examine the case's filing date, which signals the initiation of an EPA investigation, and total the number of investigations each firm has in a given year (Action_Num). We subsequently examine whether the firm was found to be violating the law and the amount and type of penalties assessed. For each firm-year, we analyze the number of penalties that occur at the federal (Fed_Penalty_Num) and state/local levels (State_Local_Penalty_Num) and further aggregate the dollar amount of the fines associated with the violations at each level (Fed_Penalty_Amt and State_Local_Penalty_Amt). We also aggregate federal and state/local variables (Total_Penalty_Num and Total_Penalty_Amt) by firm and plant (Penalty_Plant_Num and Total_Plant_Amt).

To offset some portion of the monetary penalty associated with the settlement of a civil penalty action, the firm may choose to take part in a Supplemental Environmental Project (SEP). A SEP provides tangible environmental or public health benefits to the affected community that would not have been otherwise legally required. Because SEPs can substitute for the instance or amount of penalties, we separately examine their occurrence (SEP_Num) and associated costs (SEP_Amt) each year. A firm may also incur costs, which can be monetary or otherwise, in order to return to environmental compliance. For each firm-year, we compute the number of times the firm needs to perform compliance (Settlement_Num) and the total associated costs (Settlement_Amt).

We augment the ECHO data with plant-level data from TRI to determine the number of pollution-emitting facilities per firm. TRI contains information identifying which industrial plants emit toxic pollutants as well as an identifier (DUNS) for many of the plant's parent firms. For every firm with a DUNS number, we use D&B hoover to query its trading ticker and use its trading ticker to link with Compustat. For any firm without a DUNS number, we use the name-headquarter-state comparison to hand-match the firm-plant pair. For each firm-year, we compute the number of plants a firm has that emit toxic gasses.

We present summary statistics for the raw enforcement variables in Table 2 Panel A. The summary statistics indicate that both the number of penalty types, as well as associated monetary damages, are skewed right. The average firm experiences 0.421 EPA investigations in a given year (Action_Num) and 0.266 penalties (Total_Penalty_Num). Consistent with EPA enforcement primarily being conducted at the state/local level, penalties are more likely to be assessed at the state/local level (State_Local_Penalty_Num = 0.207), opposed to the federal level (Fed_Penalty_Num = 0.081). The average yearly penalty (Total_Penalty_Amt) is $7.125 million with a standard deviation of $263 million. Federal penalties occur less frequently (Fed_Penalty_Num) than state/local penalties (State_Local_Penalty_Num), though on average, they are more expensive. SEPs infrequently occur (SEP_Num), though their penalties are comparable to those assessed at the state/local level ($42,247 vs. $38,650). However, SEPs have a higher standard deviation ($1.327 million vs. $0.898 million). To account for the skewness of these variables, we use the natural logarithm in analysis and present corresponding summary statistics in Table 2 Panel B.

4.2. Data and Variables of Political Connections

We obtain Senate election results from 1976-2016 from the Federal Election Committee (FEC) and House of Representative election results from 1980 from Constituency-Level Elections Archive (CLEA). In order to make a political contribution to a candidate in federal congressional elections, a firm must first establish a political action committee (PAC). The election candidate is also required to establish a PAC to receive contributions and is not allowed to receive money from firms' PACs personally. After the Supreme Court Ruling in Citizens United v. Federal Elections Commission on January 21, 2010, an additional type of "Super PACs" was created, which allowed donors to obstruct their identities. Our sample is restricted to 1980-2010 because we cannot clearly map Super PAC donors to recipient politicians after 2010.[16]

To construct the contribution dataset, we first download three datasets from the FEC bulk datasets: committee-level, candidate-level, and contribution-level. We first match the firm names in the contribution-level data to Compustat and obtain 1,580,770 contribution records donated by Compustat-firm PACs. The committee-level data define six PAC designations. We merge the committee-level information with the contribution-level data and require that the recipient must be a PAC associated with a candidate either running for the Senate or House of Representatives. The PAC must be designated as either authorized by a candidate, authorized by the principal campaign committee of a candidate, or unauthorized.[17] After applying the above committee-level filters on the contribution-level data, we have 1,392,256 contribution records. Each PAC serves one election candidate, and both the PAC and the election candidate have individual IDs. The committee IDs exist in both the committee-level and contribution-level data, and the committee-level data have both the committee IDs and the corresponding candidate IDs. We first merge the committee-level data to the contribution-level data and append candidate IDs to the latter data. Next, we append the candidate information to the contribution-level data via the candidate IDs. Excluding records with missing candidate IDs, we have 1,371,430 records remain in contribution-level data. We further exclude the contributions donated to candidates that are not members of the Democratic or Republican parties and candidates who are neither challengers nor incumbents.[18] After the exclusion, 1,255,415 contribution records remain.

[16] Our results are robust after excluding observations of the 2010 election cycle.
[17] Besides the three categories, the dataset also has the other three PAC designations including Lobbyist/Registrant PACs, joint fundraisers and leadership PACs.
[18] In the data, the incumbency status includes being a challenger, an incumbent, or an "open seat." Open seats are seats where the incumbent never sought re-election.

Next, we merge the contribution-level data with the election results data. The data now have candidate-level information such as election outcomes and voting shares. In a Senate election, each state has one winner, and the winner is the candidate with the highest number of voting shares in the competing state. In a House election, each district has one winner, and the winner is the candidate with the highest number of voting shares in the competing district. From the election outcomes, we define an election as a "close election" if the winner's voting share differs from that of its largest opponent by less than 5%.

We manually match the candidate names in merging the contribution-level data with election result data. When candidate names are missing, we drop the observations. After the merge, we have 984,604 direct contribution records. Of these, 119,369 records pertain to Senate elections, and 865,235 records pertain to House elections. If we only consider close elections, we have 90,071 contribution records that we are able to use to construct the political connection variables discussed in Section 3.

To construct the variables, we aggregate the contribution amount for each firm PAC-candidate PAC-election cycle observation and obtain 45,726 observations.[19] We further aggregate it into firm-cycle-level data. We record the number of winning and losing candidates j that each firm i supported in one cycle prior to each close election at time t in line with Akey (2015). We then calculate $Donated_{fjt}$ and $Election\ Outcome_{jt}$, as described in Section 3 Equation (1), and calculate $WinP_{ft}$, $LoseP_{ft}$ and $TotalP_{ft}$.

The firm-cycle-level data have 6,850 observations involving direct contributions in federal congressional elections. After that, we merge the firm-cycle data with firm-level controls, pollution, and penalty data. We display summary statistics for measures of connection in Table 2 Panel E.

Panel A of Figure 1 depicts the history of the margin of victory for all U.S. elections between 1980-2010. The average election, including the non-close elections, was won by 33.59%, and the imposed 5% cutoff falls at about the 8th percentile. Figure

[19] A minimal number of aggregated contributions are zero or even negative, which are very likely due to wrong data input. We exclude these observations.

1 Panel B reports the average proportion of contributions received by the winning candidate against his margin of victory. For elections with a margin of victory less than 5%, the proportion of contributions hovers around 50% and is statistically uncorrelated with the margin of victory for elections won by less than 5%. This provides evidence that the close elections in our sample are not *ex-ante* predictable.

To obtain each legislator's congressional committee assignments, leadership information, and majority status, we employ two datasets from Charles Stewart's Congressional database. Garrison Nelson collected the "Congressional Committees, 80th--102nd Congresses" dataset, and Charles Stewart III and Jonathan Woon collected the "Congressional Committees, Modern Standing Committees, 103rd--115th Congresses" dataset. Both of these datasets provide detailed congressional committee assignment information for each legislator, including the committee name, the start and termination date of the assignment, the seniority ranking within the committee, the appointment date, the period of service, and the committee status. In addition, these two datasets also provide party information of each legislator, including the name of the party, whether the party holds the majority, and whether the politician holds a party leadership position. Finally, we hand-collect data from the Senate and House webpages to calculate overall politician seniority.

5. Empirical Analysis

5.1. EPA Investigations

In this section, we consider the first step in the investigation process, which is referred to as an EPA action. Our outcome variable is the natural logarithm of one + the number of actions in the next year, where action indicates an Integrated Compliance Information System (ICIS) investigation, information request, or inspection activity. These EPA actions include scheduled facility inspections as well as investigations based on reported potential violations or emissions data that they observe. As discussed in Section 2.1, the EPA publishes guidelines on acceptable amounts of hazardous gas emissions. While allowable emissions can change over time, our yearly fixed effects absorb this effect. While detailed laws pertaining to emissions exist, as described in Section 2.1, the EPA still has considerable discretion over whether or not to launch an investigation.

We first examine whether politically connected firms are investigated more than firms without political connections using the close election framework described in Section 3, which allows us to causally compare the outcomes of firms connected to politicians who just won a close election to those politicians who just lost a close election. We implement the following regression framework:

$$Dep_{ft+1} = \alpha + \beta Con_{ft} + \chi_{ft} + \Phi_f + \Phi_t + \epsilon_{ft} \quad (2)$$

The variable Dep_{ft+1} measures the dependent variable of interest in the next year for a firm f in an election cycle t. The variable Con_{ft} represents various measures of political connection, such as TotalP, WinP, or LoseP, established in an election cycle during year t. All regressions include firm fixed effects, Φ_f, time fixed effects, Φ_t, and thirteen firm-year controls, designated by χ_{ft}. Certain less environmentally-friendly industries (such as mining) may be more prone to environmental regulation than others, and since environmental regulation is primarily implemented at the state level, enforcement may vary at the state level. Firm fixed effects absorb firm-level characteristics that do not vary with time, such as state headquarters and industry, and time-invariant firm policy preferences, including the inclination to always contribute to candidates of a specific party. Meanwhile, our time fixed effect absorbs time-varying changes in regulatory enforcement, agency funding, and Congressional composition, including the identity of the president and majority party.[20]

We scale the following firm-year control variables by total assets: capital expenditures (CAPEX), EBITDA, long-term debt (LEVERAGE), net operating loss carryforward (NOLCF), pretax book income (PTI), research and development (R_D), and selling, general, and administrative expenses (SGA). We also include controls for the change in net operating loss carryforward (CHG_NOLCF), standard deviation of EBITDA (EBITDA_SIGMA), incidence of loss in the last three years (LOSS), incidence of a net operating loss carryforward (TLCF), log assets (SIZE), and volatility of pretax

[20]We also conduct our analysis using various combinations of fixed effects. The economic motivation for these tests are described in detail within the robustness section. Regardless of the fixed effects implemented, our results are quantitatively similar, and tables are available upon request.

book income (VOL_PTBI). Table 1 describes the composition of each control in detail, and we present our empirical results in Table 3.

The results from Table 3 show that the coefficients on TotalP, WinP, and LoseP are not statistically different from zero, indicating that politically connected firms are no less likely to be investigated by the EPA than those without connections, even after controlling for the level of criteria gas emissions. However, because an investigation is just the first step in the regulatory enforcement process, we examine if these connections are valuable in subsequent regulation enforcement, where the EPA can continue to exercise discretion over the enforcement process.

5.2. EPA Penalties

Thus far, the analysis has indicated that politically connected and unconnected firms exhibit no difference in EPA investigations. In this next stage of analysis, we examine all enforcement data starting in 1980 pertaining to all administrative cases, which take place before a state or federal governing body, as well as judicial cases. While regulations for criteria pollutants themselves are narrowly defined, the enforcement process is subject to EPA discretion.[21] If the EPA uniformly enforces regulation, we may not expect to see differences in the instances of penalties or associated fines. However, if discretion is not applied uniformly, we may observe differences at this stage of the enforcement process.

We continue to use the regression framework and controls as discussed in Section 5.1 but focus our attention on various types of EPA penalties in Table 4. First, we examine the number of plants within a firm that experience EPA penalties in Columns 1 and 2. Depending on whether we measure political connections using TotalP or WinP, we find evidence of decreased plant-level penalties. At the 10% level, LoseP is associated with higher instances of plant-level penalties. These results are consistent for total penalties (Columns 3 and 4) and the two components of total penalties: federal penalties (Columns 5 and 6) and state penalties (Columns 7 and 8).

[21] See Section 2.1 for a general discussion. Furthermore, a formal description of the EPA's discretion in enforcing regulation can be found here: https://www.epa.gov/sites/production/files/2013-10/documents/proreq-hermn-mem.pdf

Furthermore, we control for time-varying controls, firm fixed effects, and time fixed effects. These results indicate that a politically connected firm is less likely to be penalized than its unconnected counterpart.

As described in Section 4.1, instead of incurring a monetary fine for a violation, a firm that has an environmental regulation may elect to undertake a Supplemental Environmental Project (SEP), which is an environmentally beneficial project. By law, a SEP must be a project that the violator would not otherwise be legally mandated to perform. In place of a fine, a firm may elect to participate in a Supplemental Environmental Project. Columns 9 and 10 provide limited evidence that firms with better political connections pursue fewer Special Education Programs, only when measured by TotalP, though they pay out less in settlements (Columns 11 and 12). The results presented in Table 4 suggest that regulation is not enforced equally between firms with and without political connections and that firms with political connections are less likely EPA targets.

It's worth noting that campaign contributions are not bribes to politicians or environmental regulators. As long as the firm stays within campaign contribution limits, it is entirely legal to contribute to a political candidate. However, it is possible that politicians are more likely to advocate for firms that support their campaigns or interact with regulators on their behalf.

5.3. EPA Fines

If firms with and without political connections receive equal EPA regulatory enforcement, we would not expect to see differences in the monetary amount of EPA penalties firms incur. Similar to the analysis in Section 5.2, the amount and type of fine assessed may be impacted by EPA discretion. While the results presented in Section 5.2 provide evidence that politically connected firms face fewer penalties, we next examine if differences in monetary penalties exist.

We use the empirical framework discussed in Section 5.2 and present our results in Table 5. We continue to control for time-varying firm controls in addition to saturating the model with firm and time fixed effects. Columns 1 and 2 show that politically connected firms realize lower total penalties. The variable TotalP is negatively associated with Total_Penalty_Amt, and the results are consistent for WinP. These results are consistent for three categories of penalties including federal penalties, state/local penalties, and settlements. Costs associated with SEPs are only significant at the 10% level for TotalP. On the contrary, firms that support losing politicians are associated with higher total penalties and state/local penalties, though these differences are not statistically significant for state/local penalties, SEPs and settlements.

The economic magnitudes associated with penalty decreases are large. For example, Table 5 Column 1 indicates that a one unit increase in TotalP is associated with a 6.45 percent reduction in log total penalties, which translates to roughly a 6.23% change in total (unlogged) penalties.[22] As shown in Table 2 Panel A, the average firm pays about $7,125,118 in total penalties, so a 6.23% decline is approximately $443,748, which is both statistically and economically meaningful. However, this number is primarily driven by the decrease in settlements ($295,070 for the average firm). For the average firm, a one-unit increase in TotalP decreases federal penalties by $3,625 and state/local penalties by $2,328. Since the standard deviation of TotalP is 2.1, for a one standard deviation increase in TotalP, the economic magnitude of these presented numbers approximately doubles. In later analysis (Section 5.6), we compare these penalty reductions to the firm-level campaign contributions.

Taken together, the results from Table 4 and 5 indicate that the EPA does not uniformly enforce environmental regulation. Firms with political connections are more likely to experience selective enforcement, realizing fewer penalties and lower monetary fines, even after controlling for time-varying levels of regulated gas emissions. It is important to note that as long as contributions are within legal limits, a firm's campaign contributions are entirely legal and are not analogous to bribery.

[22] We calculate this number as e^-.0645-1.

5.4. Powerful Politicians and Select Enforcement

Next, we examine if firms with connections to more powerful politicians experience more favorable regulatory outcomes. Because the literature has shown that regulatory bureaucrats are concerned with maximizing current and future career prospects, we hypothesize that they are more likely to selectively enforce firms tied to politicians with powerful networks that may enhance their future career trajectories. A politician's network may be more beneficial to the bureaucrat if he has already previously held office and had time to build it. We hypothesize that this scenario is most likely for politicians that are incumbents, members of the majority party, hold leadership positions, and have high seniority.

To test this hypothesis, we first examine whether firms connected to incumbents experience more favorable selective regulation. We construct a variable similar to TotalP but for incumbents and challengers. IncumbentWinP (IncumbentLoseP) represents firm ties to winning (losing) incumbents, while we construct analogous variables for challengers.

Table 6 shows the results for these tests. While results are consistent across all variables examining the instances of penalties and the total amount of penalties, in the interest of space, we only report the results for total penalties and aggregate fines. We find no difference between EPA investigations and report these results in the Online Appendix. Table 6 Columns 1 and 2 show that firms more closely connected to winning incumbents have fewer penalties and lower fines. Firms linked to incumbents who lose are associated with stricter enforcement in the form of more penalties and higher fines. The positive coefficients on IncumbentLoseP suggest that firms may be penalized for being associated with former politicians, possibly because they were previously experiencing favorable regulatory enforcement and no longer do. Results for EPA actions, incidences of fines, and penalty amounts are all consistent with the results presented in Tables 3-5 and are available in the Online Appendix.

Firms connected to challengers, whether they win or lose, do not realize more frequent or expensive penalties, as shown in Columns 1 and 2. One possible explanation for this result is that if challengers have not previously held office, they may not have had enough time to establish a network or have repeated interaction with regulatory bureaucrats, so they may be less likely to provide influence.

Next, we examine whether selective enforcement differs across party lines. Correia (2014) suggests that bureaucrats may choose to align themselves with politicians in a given party if they believe that this will provide future rewards. As described in Fredrickson et al. (2018), traditionally Republicans have taken a pro-business approach to environmental regulation and favored laxer enforcement, while policies belonging to the Democratic Party have typically preferred stricter environmental regulation. Because of pro-business party beliefs, a Republican may be more likely to encourage a bureaucrat to give preferential treatment to his supporters. However, a Democrat may be penalized for pro-business implementation of environmental regulation, if other constituents find out about this type of arrangement. To test this, we construct a variable indicating how connected a firm is to winning and losing Republicans and Democrats. Table 6 Columns 3 and 4 show that firms connected to winning Republicans or Democrats are associated with lower fines, though the difference in penalties is only significant for winning Democrats. Firms connected to either losing Republicans or Democrats realize more frequent penalties and higher fines at the 10% significance level. Results for all EPA actions, incidences of fines, and penalty amounts are all consistent with the results presented in Tables 3-5 and are available in the Online Appendix.

Even across party lines, a politician may be more likely to influence a bureaucrat if he is a member of the majority party. The politician may be able to use his network to connect the bureaucrat to other members of his party with the ability to enhance his career. He may also be able to more credibly threaten the regulator with funding cuts, which are easier to pass with majority support. In Table 7, we implement an alternative regression framework, as shown in Equation (3):

$$Dep_{ft+1} = \alpha + \beta_1 Con_{ft} * Char_{ft} + \beta_2 Con_{ft} + \beta_3 Char_{ft} + \chi_{ft} + \Phi_f + \Phi_t + \epsilon_{ft} \qquad (3)$$

where Dep_{ft}, Con_{ft} , χ_{ft}, Φ_f, and Φ_t are the same as in Equation (2) and $Char_{ft}$ measures the firm characteristics or firm-supported politicians' characteristics.

In Table 7 Column 1 and 2, we interact TotalP with an indicator variable that equals one if at least one of the firm's supported candidates wins the election and the party wins the majority seats in both the Senate and the House. Majoriy_Seats takes a value of one for 63% of cases, suggesting that corporate political contributions tend to be mostly partisan. In unreported results, we show that results are robust to defining this variable at just the House or Senate level. The interaction term, TotalP*Majority_Seats, indicates that firms connected to politicians with majority representation experience more favorable regulatory outcomes in Columns 1 and 2. We also examine firms connected to politicians who hold leadership positions in either the majority or minority party, defined in a similar way. Only 6% of firms have connections to candidates holding leadership positions, yet the interaction term TotalP*Leadership is negative and statistically significant in Columns 3 and 4, indicating that firms connected to politicians with leadership are penalized less and pay smaller fines. As shown in the Online Appendix, results for EPA actions, incidences of fines, and penalty amounts are all consistent with the results presented in Tables 3-5.

Next, we examine firms tied to relatively senior politicians. We define an indicator variable that takes a value of one if the firm is connected to a member of the House or Senate that has seniority in the top 25%.[23] Consistent with our previous results, the interaction term TotalP*Seniority is negative and statistically significant at the 1% level, indicating that firms connected to more senior politicians experience fewer penalties and smaller fines. As shown in the Online Appendix, results for EPA actions, incidences of fines, and penalty amounts are all consistent with the results presented in Tables 3-5.

We are also interested in examining whether firms connected to politicians with more influence over EPA policies are associated with more favorable regulatory enforcement. If a politician has repeated interaction with a bureaucrat, he may be able to exert more influence over him. As Lazarus (1991) points out, the most pervasive method of Congressional oversight is between committee and agency staff.

[23] Since the Senate consists of 100 Senators, and the House of Representatives consists of 435 Congressmen, the Seniority indicator variable will equal 1 for the 25 longest serving Senators or 109 longest serving members of the House of Representatives.

Alternatively, the politician may also have power in designating agency funding, if he holds a seat on the Appropriations or Budget committee.

We first focus on the types of committees that are most likely to have repeated interaction with the politicians in Table 8. We create a dummy variable that takes a value of one if at least one of the firm's supported candidates wins the election and joins the Oversight Committee (Oversight_Committee). Table 8 Columns 1 and 2 indicate that the interaction term TotalP*Oversight_Committee is negative and significant for both instances and amounts of penalties, indicating that firms connected to politicians on the oversight committee experience more favorable regulation.

According to the EPA's website, numerous committees have jurisdiction over environmental regulation, including Agriculture, Nutrition and Forestry; Environment and Public Works; Energy and Natural Resources; Resources; Energy and Commerce; Public Works and Transportation; Natural Resources; Energy Independence and Global Warming. [24] We group together House and Senate committees that hold similar jurisdictions and responsibilities and create dummy variables, which take a value of one if at least one of the firm's supported candidates wins the election and joins the Agriculture Committee (Agri_Committee), Environmental Committee (Env_Committee), Energy Committee (Energy_Committee), or Commerce Committee (Commerce_Committee) in either the House or Senate. With the exception of Agriculture, for each committee examined, the interaction between TotalP and the committee is negative and significant for both total penalties assessed as well as total fines. While the coefficient on the agriculture interaction is negative, the results are not statistically significant for total penalties.

To generate further insight, we separately examine connections to politicians who designate agency funding. While these politicians may not have as much repeated interaction with the regulatory bureaucrat, they help determine the bureaucrat's career trajectory by allocating resources to the agency. In Table 8 Columns 9-12, we examine the Appropriations and Budget committees separately, which are in charge of

[24] House committees with EPA jurisdiction: https://archive.epa.gov/ocir/leglibrary/pdf/112housejuris.pdf. Senate committees with EPA jurisdiction: https://archive.epa.gov/ocir/leglibrary/pdf/112senatejuris.pdf

agency funding, and find that firms with connections to politicians on these committees are less likely to be penalized and receive smaller fines, suggesting that these connections are valuable. We present the full results for EPA actions, incidences of penalties, and amounts in the Online Appendix.

5.5. Important Firms and Selective Enforcement

In Section 5.4, we provided evidence that firms receive favorable regulatory enforcement when they are connected to politicians that are more likely to have repeated interactions with regulators and have networks that can improve regulator career trajectories. However, a politician may have the ability to influence a regulator, but he may not always seize this opportunity. Theory models of regulation show that politicians are generally assumed to maximize their probability of re-election (Stigler, 1971; Peltzman, 1976) by catering to their constituencies and maximizing political contributions (Poole and Romer, 1985; Stratmann, 1995). In this section, we test if firms that are likely to be more valuable to politicians are associated with greater instances of selective regulatory enforcement.

If the firms in a politician's state or district are successful, constituents may take that as an indicator of the politician's success in office. Furthermore, employees in local firms vote in elections, and if the employees feel as though their jobs are in jeopardy, they may be less likely to support a given candidate. Therefore, a politician may be more likely to exert his influence over a regulator if it has a headquarters in the same state as the politician. We define an indicator variable that takes a value of one if at least one of the firm's supported candidates wins the election and is from the same state of the firm's headquarters (Same_State); we interact this variable with TotalP, utilizing the same framework presented in Equation (3). Our empirical results are reported in Table 9. While the direct effect of Same_State is not significant, the coefficient on TotalP*Same_State is negative and significant, indicating that firms realize fewer penalties and smaller fines when they are better connected to politicians in their own states.

Our next measure of firm importance follows Cohen, Diether, and Molloy (2013), who define "interested industries" in each state as the top three industries according to sales. Echoing their measure, we create an indicator variable that equals one if the firm's industry is one of the top three among all industries in the state-year in terms of sales (Crocial_Industry_Sales) or employment (Crucial_Industry_Emp) and zero otherwise. The interaction terms in Table 9 Columns 3-6 present evidence that firms connected to local politicians that are members of important industries experience fewer penalties and smaller fines. We present the full set of results pertaining to actions, instances of penalties, and amount of penalties in the Online Appendix.

In Table 10, we examine whether corporations that are large campaign contributors are more selectively regulated. Since politicians aim to maximize campaign contributions (Stratmann, 1995), we test whether important donors experience more select regulation. We create four measures of donor importance. The legal limit on campaign contributions is $10,000 per election cycle. We create an indicator variable that takes a value of one if the firm donates $10,000 to one of its supported candidates who wins the election (Donate10k), contributes over 10% of a winning candidate's total donations (Donate10Pct), is within the top 10% of donors for a given politician (Top10Pct_Donor), or if the firm is one of the top five donors of at least one of the firm's supported candidates (Top5_Donor). The results in Table 10 show that the interaction between TotalP and each measure of campaign contributor importance is negative and significant for both the instance of penalties as well as the fines. The results in Table 10 indicate that firms that are important campaign contributors experience favorable regulation by the EPA. See the Online Appendix for robustness.

Our results indicate that political contributions are a key determinant of select regulatory enforcement. However, it is also possible that these political contributions themselves provide signals to the regulator. Gordon and Hafer (2005) propose that a government agency has incomplete information regarding the firm's objective function and, in particular, its costs from complying with the regulation. Firms may use political contributions as a way to signal their willingness to fight the agency's decision, for example, by appealing the decision to the courts or Congress. If regulators believe that there are increased costs of penalizing these firms, it may influence their enforcement decisions (Kedia and Rajgopal, 2011). Alternatively, this signal may help them negotiate more effectively with the EPA.

5.6. Cost-Benefit Analysis

In this section, we attempt to quantify the amount of the penalty reduction politically connected firms realize relative to the size of their donations. Conducting a cost-benefit analysis is not an easy task, considering that the distributions for the penalties, sponsored candidates, and donations are all skewed. Furthermore, we do not observe the counterfactual, which is the penalty firms would have realized if it did not have political connections. In order to conduct our primary analysis with the best possible identification, we restrict our analysis to close elections. However, as previously discussed our estimates are local average treatment effects (LATE). In this section, we attempt to quantify benefits to all politically connected firms.

First, we verify that Tables 3-5 hold for the full sample of elections, not just close elections, as shown in the Online Appendix, though for all elections, the magnitudes associated with each type of penalty are smaller for the full election sample. In Table 11 Panels A and B, for the full sample of elections, we report the coefficients for TotalP associated with each of the penalties, analogous to Row 1 of Table 5. For the full sample of elections, the average (median) TotalP is 33.36 (15), and the average (median) firm makes total contributions of $66,379.49 ($17,500). The average penalty is $5,001,262.44.

In Table 11 Panel A, we conduct our analysis for the average firm. For a given firm, the value of the political contribution is derived from the probability of a violation multiplied by the severity of the violation. The probability of the violation is the percentage decrease in the penalty amount (item b, calculated as 1- e^coefficient) multiplied by the median TotalP (item a); the severity of the violation is average penalty (item c). The cost of this campaign contribution is the total campaign contributions in an election cycle for the average firm.

We present the results for the average firm broken down by penalty type. The average firm has a return of $16.285 for each dollar of campaign contributions made. As discussed in Section 5.3, settlements primarily drive this number. The benefits are considerably smaller for all other penalties assessed. Since the number of supported candidates is skewed left, with many firms only supporting few candidates, we also conduct this analysis at the median in Panel B. When we examine total penalties for the median firm, we find that the return is $27.774 for each dollar of campaign contributions. The differences between Panel A and Panel B are driven by the skewness of the campaign contributions and the number of supported candidates.

It is important to note that the literature has discovered several channels by which firms realize benefits from political connections, as discussed in Section 2.3. Favorable environmental regulation is not the only channel, and firms are not necessarily looking to recover their campaign contributions through environmental regulation alone.

6. Additional Analysis and Robustness

6.1. Special Elections

When a politician's seat unexpectedly vacates before standard term expirations, typically because of a resignation or a death, there is a special election. Since these elections are unanticipated, close special elections offer a better setting for us to examine the effect of corporate political connections. However, since there were only twenty-eight Senate and House close elections from 1980-2010, this reduces our sample size dramatically. We examine the top two candidates with the highest voting shares in close special elections, which leaves us with forty candidates. Excluding elections with victory margins greater than 5%, we are left with 2,640 contribution records for 30 candidates with result records of close elections. We next aggregate the contribution amount for each firm PAC-candidate PAC-election cycle observation and obtain 1,184 unique firm-candidate-cycle observations. Following Akey (2015), we exclude the firms that donated to both competing candidates in one cycle to have the cleanest identification, since those firms could be betting both sides to hedge risk. In the last step, we append control variables as well as air pollution and penalty measures.

In order for our regression discontinuity design to provide causal inference, we need to show "local" exogenous variation and show that neither politicians nor firms can perfectly manipulate election outcomes near the cutoff threshold. To the extent that there is some randomness in the election outcomes, we can causally compare firms connected to politicians who narrowly won an election to firms connected to politicians narrowly losing. We test this assumption by referencing Figure 1, which shows that the distribution of margins of victory is relatively smooth around the 50% cutoff, suggesting that election outcomes cannot be easily manipulated. In unreported results, we test the comparability to firms connected to politicians who just barely won an election to those who barely lost and find no difference in firm fundamentals.

Next, we first present RDD results in Figure 2 to visually check the relation around the cutoff. The plots present the amount of total penalties around the threshold victory margin (0%) in the year of the special election. The horizontal axis shows the margin of victory, which is divided into ten equally spaced bins, each having a width of 4%. In all plots displayed, firms that supported the losing candidates are to the left of the 0% threshold, and firms that supported the winning candidates are to the right of the threshold. The dots in Figure 2 depict the average log amount of penalties in each bin. The solid line represents the fitted quadratic polynomial estimate with a 95% confidence interval around the fitted value.

Figures 2 shows a discontinuity in the amount of penalties at the threshold. Specifically, within a close proximity to the threshold, the average log amount of penalties drop once the victory margin crosses the 0% cutoff point. One interpretation for this observation is that firm connections to a victorious candidate negatively impact firm environmental penalties.

We next present the regression discontinuity analysis. Formally, we estimate the following regressions for dependent variables of EPA actions and penalties:

$$Dep_{ft+1} = \alpha + \beta Win_{ft} + \chi_{ft} + \Phi_f + \Phi_t + \epsilon_{ft} \tag{4}$$

where Dep_{ft}, χ_{ft}, Φ_f, and Φ_t are the same as in Equation (2), and the dummy variable Win_{ft} takes a value of one if the candidate that firm f supported won a close election in cycle t and a value of zero otherwise. By comparing the firms that *only* contributed to the winning candidate and those *only* contributed to the losing candidate in a close special election, we can identify the difference of the outcome variables. We report the results in Table 12. Consistent with the results of the general elections, firms connected to winning candidates are equally investigated by the EPA as ones connected to losing candidates. However, they realize fewer penalties and have smaller fines. We present further special election results, corresponding to Tables 3-5, in the Online Appendix.

While our regression discontinuity framework is a powerful setting that allows us to draw causal inference between firms narrowly connected to politicians and those that are not, we acknowledge that our results may have limited generalizability. The estimates obtained in Table 12 are local average treatment effects (LATE). While we can causally compare public firms connected to politicians that narrowly won close elections to those without connections within our sample period from 1980-2010, our estimates cannot speak to the effect political connections have on private firms or connections made outside our time frame. Our analyses also only focus on the actions and penalties of the air toxic pollutants and not other types of pollutants, such as those released in water. However, despite these limitations, our findings still shed light on assessing the impact political connections have on environmental regulation within the limits of our sample.

6.2. Criteria Pollutant Emissions

Next, we examine whether the reduction of penalties for politically connected firms is due to those firms emitting fewer criteria gasses than those without connections. Due to data limitations that will be later explained, we conduct this analysis at the plant-level. The EPA monitors outdoor concentrations of pollutants at more than 80,000 monitoring stations owned and operated primarily by state environmental agencies.[25] These agencies send hourly or daily readings of toxic air pollutant concentrations to the EPA's Air Quality System (AQS) database, and the AirData database obtains data from AQS. The EPA relies on the monitor readings to enforce the Clean Air Act.[26]

[25]This webpage presents more information on the basics of how these monitors work: https://www.epa.gov/outdoor-air-quality-data/air-data-basic-information

[26] We do not use firm-level toxin data from the EPA's TRI database because the data is less granular than the monitor data. The EPA's TRI database also contains information on aggregated toxins, opposed to individual criteria gasses. Data contained in the TRI database is self-reported, and not all firms measure or report their hazardous emissions. For a discussion on the unreliability of the TRI self-reported data, especially for large polluters, see https://www.environmentalintegrity.org/wp-content/uploads/2017/02/Toxic-Shell-Game.pdf

In order to estimate toxic emissions, we obtain factory coordinates, as well as the identity of the parent corporation for each plant, from the EPA's TRI database. For each plant, we identify the closest air monitor location from AirData and retain the observation if the nearest air monitor is within two miles. We implement a two-mile cutoff, since Currie, Davis, Freenstone, and Walker (2015) show that plants' chemical levels can be detected within two miles, though the density measure becomes noisy if the monitor is further away from the plant. Each year, approximately 6% of monitors contain two or more plants within two miles, and 3% of monitors contain two or more plants within one mile.[27] For each plant-year, we report the annual density of each of the criteria pollutants. Consistent with other studies examining toxic air pollutants (Currie, Davis, Freenstone, and Walker, 2015 and Shive end Forester, 2019), we use the natural log of each of these variables in our analysis to curtail the influence of outliers and present the summary statistics in Table 2 Panel G. Variable definitions pertaining to the plant-level criteria gasses are in Table 1. An advantage of using the data from the air monitors is that data on toxin emissions are monitored and collected in real time, maintained by independent agencies, and unlikely to be systematically manipulated by monitored firms.

We implement a plant-level empirical framework for a plant p. Our dependent variable, Dep_{fpt+1}, is measured at the plant-year level, and we include plant-level fixed effects, Φ_p, and time fixed effects, Φ_t. We calculate our contribution measure, Con_{ft}, at the parent-firm level. Our regression framework is formally shown in Equation 5:

$$Dep_{fpt+1} = \alpha + \beta Con_{ft} + \Phi_p + \Phi_t + \epsilon_{fpt} \quad (5)$$

We present our results for each of the seven criteria gasses, including two types of particulate matter in Table 13. Except for PM2.5, we find no statistical difference in pollutant emissions between politically connected firms and those without connections. However, for PM2.5, we find that emissions are higher for politically connected firms as measured by TotalP and WinP.

While there are over 80,000 monitors in the U.S. that were installed to aid in the enforcement of the Clean Air Act, not all monitors are functioning at all times, and

[27] In untabulated results, we find that our results are robust to using a one-mile cutoff and dropping observations where there are two or more plants within two miles of an air monitor.

not all monitors track all criteria gasses. Therefore, we conduct our primary criteria gas analysis at the plant-level, since we do not have complete data for all criteria gas emissions pertaining to all firm plants. Since not all monitors record measurements for all types of criteria gasses, our observations vary based on the type of pollutant analyzed. Because some plants do not have nearby monitors within two miles of a firm, causing missing observations, we are unable to generate precise criteria gas emissions at the firm-level. Despite these data limitations, we aggregate the yearly plant-level criteria gas emissions at the parent-firm level and employ the empirical framework in Equation 2 with our estimated parent-level criteria gas emissions as the dependent variable. Consistent with the plant-level results shown in Table 13, the firm-level criteria gas emission results show no significant difference in any criteria gas emissions for politically connected and unconnected firms. The results are presented in the Online Appendix Table OA13.1.

Our plant-level criteria gas analysis complements our previous findings. By showing that there is no difference in emitted criteria gasses for plants with parent-firms that have political connections, it naturally follows that politically connected parent-firms are no more likely to be investigated than those without connections, as shown in Table 3. However, coupled with the finding that politically connected firms are less likely to experience an enforcement action, and conditional on that action, experience smaller penalties, the results suggest that the EPA is selectively enforcing Clean Air Act regulation and that politically connected firms realize favorable selective regulation.

6.3. Corruption vs. Soft Information

In this section, we attempt to disentangle whether politically connected firms are benefitting from soft information or corruption. It is possible that politicians and their agents are conveying soft information to the regulator, such as the firm's intention to have cleaner future emissions, or encouraging the regulator to provide favorable treatment. While we cannot know for sure what type of information is being exchanged, we can examine future hazardous gas emissions. In the Online Appendix Table OA13.2, we conduct the same plant-level analysis presented in section 6.2 but examine emissions at time t +2. If the politician or his agent is conveying soft information that emissions will improve over time, we expect to find criteria gas emissions decreasing. However, we find evidence that emissions of five of the seven criteria gasses (CO, O3, Pb, PM2.5, SO2) increase at time t + 2, indicating that we cannot completely rule out the possibility of corruption.

6.4. Weighted Campaign Contributions

Previously mentioned theory models of regulation show that politicians are generally assumed to maximize their probability of re-election (Stigler, 1971; Peltzman, 1976) by catering to their constituencies and maximizing political contributions (Poole and Romer, 1985; Stratmann, 1995). Similar to the arguments made in Section 5.5, we believe that a politician is more likely to exert any influence over regulatory bureaucrats for firms that enhance his future election prospects. We suspect that firms that contribute more money to winning politicians are regulated more selectively because these campaign contributions are more valuable to the politician.

All of the analysis in Section 5 was conducted using WinP, LoseP, and TotalP. Thereby, Tables 3-5 examine the number of winning (losing) candidates involved in a close election that the firm donated to before the election. While these variables measured whether firms were connected to politicians taking office, they did not consider the amount of donations that the corporation was making to the firms. We weigh WinP, LoseP, and TotalP by firm campaign contributions to create the variables AmountWinP, AmountLoseP, and TotalP. We report the results in Table 14. Consistent with our previous results, we find no difference in EPA investigations for firms with and without political connections that are weighted by campaign contributions, as indicated in Table 14 Columns 1-2. However, AmountTotalP is associated with fewer penalties and lower fines, suggesting that politically connected firms are selectively regulated. This result is consistent for AmountWinP, though firms that made more contributions to losing politicians are penalized more and pay more in fines. Further results related to weighted campaign contributions are available in the Online Appendix.

6.5. Additional Robustness

We also perform four additional robustness checks. First, the EPA may choose to selectively regulate firms that are more (or less) visible. Following Kedia and Rajgopal (2011) and Correia (2014), we include a Fortune 500 indicator variable that takes a value of one, if the firm is present in the Fortune 500 index, and we find that our results are robust. Second, we examine all dependent variables at year $t + 2$. Every other year, during even-numbered years, elections are held. Therefore, the composition of both the Senate and the House of Representatives is fixed during a two-year period, so a firm's connection to a politician may be valid for at least two years. We confirm this hypothesis and find that our results are quantitatively similar when we examine EPA enforcement variables at time $t+2$.

Third, we conduct our analysis with various fixed effects to ensure their robustness. Gulen and Myers (2017) show that the Clean Water Act is not uniformly applied in battleground states during presidential elections. They find that regulation, which is typically enforced at the state level, is less likely to be enforced in plants located in battleground states. Therefore, to control for the time-varying status of battleground states during presidential elections, we conduct all analysis including state-year fixed effects and find quantitatively similar results. Our results are further robust if we exclude firm fixed effects or add industry-year fixed effects. While our sample contains firms from many industries, adding industry-year fixed effects helps alleviate the concern that our results are driven by firms operating in only a small number of industries. These untabulated tables are available upon request.

Finally, we find that our results hold for the full sample of elections spanning 1980-2010, not just close elections, and our results are presented in the Online Appendix Table 15. As discussed in detail within Section 6.1, while the close election setting provides us with the cleanest identification, our estimates are still local average treatment effects. Coupled with our close and special election results, our full sample results provide corroborating evidence that political connections are associated with more favorable environmental regulation.

7. Conclusion

In this paper, we examine whether the EPA selectively regulates politically connected firms. We find no difference in EPA investigations between politically connected and unconnected firms. However, firms with political connections are less likely to receive a penalty, and conditional on receiving a penalty, they incur lower fines. Using a setting that allows us to causally examine the differences in regulatory enforcement between firms with and without connections, we contribute to the literature debating whether corporate campaign contributions are beneficial to firms. The analysis indicates that these contributions can indirectly benefit firms by way of reduced environmental regulatory enforcement and fines.

Not only do we provide evidence that politically connected firms experience more favorable regulatory outcomes, but we also provide theories and empirical evidence indicating the circumstances in which this influence is likely to be exerted, contributing to the literature examining the influence politicians have over regulators. Firms that donate to politicians that are more likely to be capable of influencing regulators experience more favorable regulatory outcomes. Furthermore, firms that are likely to be more important to politicians by way of industry, potential voters, or campaign contributions are less likely to experience environmental penalties and fines.

While there are numerous anecdotes suggesting that corporations use political connections to obtain favorable treatment by the EPA, this study provides the first systematic evidence of this occurrence. Given the intense scrutiny that the EPA has been facing, our study sheds light on the question of whether the agency uniformly enforces the Clean Air Act. Our evidence suggests that campaign contributions are an effective way to link firms to regulators and that firms that establish this link receive favorable regulatory enforcement.

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Table 1: Variable Definition

Variable Name	Definition	Source
Dependent Variables		
Environmental Action and Penalties		
Action_Num	Natural logarithm of (1 + # of action). An action is an ICIS investigation, information request or inspection activity.	EPA ECHO ICIS-FE&C
Fed_Penalty_Amt	Natural logarithm of (1 + Federal Penalty amount). Federal Penalty amount is the total amount assessed or agreed to for an enforcement action. Civil penalties are monetary assessments paid by a person or regulated entity due to a violation or noncompliance.	EPA ECHO ICIS-FE&C
Fed_Penalty_Num	Natural logarithm of (1 + # of federal enforcement cases with federal Penalty record). Federal penalties are the penalties assessed or agreed to for a federal enforcement action.	EPA ECHO ICIS-FE&C
Penalty_Plant_Num	Natural logarithm of (1 + # of plants with either federal or State/local Penalty record).	EPA ECHO ICIS-FE&C
SEP_Amt	Natural logarithm of (1 + SEP amount). SEP amount is the cost applied to the type(s) of environmentally beneficial projects which a defendant/respondent agree to undertake in settlement of an enforcement action, but which the defendant/respondent is not otherwise legally required to perform.	EPA ECHO ICIS-FE&C
SEP_Num	Natural logarithm of (1 + SEP number). SEP number is the number of settlements in the Supplemental Environment Projects (SEPs) in which a defendant/respondent agree to undertake in settlement of an enforcement action, but which the defendant/respondent is not otherwise legally required to perform.	EPA ECHO ICIS-FE&C
Settlement_Amt	Natural logarithm of (1 + settlement amount). Settlement amount is the settlement-level sum of the dollar values of injunctive relief and the physical or nonphysical costs of returning to compliance. Injunctive relief represents the actions a regulated entity is ordered to undertake to achieve and maintain compliance, such as installing a new pollution control device to reduce air pollution or preventing emissions of a pollutant in the first place.	EPA ECHO ICIS-FE&C
Settlement_Num	Natural logarithm of (1 + # of settlement cases).	EPA ECHO ICIS-FE&C
State_Local_Penalty_Amt	Natural logarithm of (1 + State/local Penalty amount). State/local Penalty amount is the dollar penalty amount to be paid to a state or local enforcement authority that is party to a concluded enforcement action.	EPA ECHO ICIS-FE&C
State_Local_Penalty_Num	Natural logarithm of (1 + # of State/local penalty record).	EPA ECHO ICIS-FE&C
Total_Penalty_Amt	Natural logarithm of (1 + Total Penalty amount). Total Penalty amount includes federal, state/local, SEP and settlement amount.	EPA ECHO ICIS-FE&C
Total_Penalty_Num	Natural logarithm of (1 + # of all cases). The cases include federal, state/local, SEP and settlement cases.	EPA ECHO ICIS-FE&C
Interaction Variables		
Agri_Committee	An indicator variable that equals one if at least one of the firm's supported candidates wins the election and joins the committees of agriculture in either Senate or House.	Charles Stewart's Congressional Data Page
Appropriation_Committee	An indicator variable that equals one if at least one of the firm's supported candidates wins the election and joins the committees of appropriations in either Senate or House.	Charles Stewart's Congressional Data Page
Budget_Committee	An indicator variable that equals one if at least one of the firm's supported candidates wins the election and joins the committees of budget in either Senate or House.	Charles Stewart's Congressional Data Page
Crucial_Industry_Emp	An indicator variable that equals one if the firm's industry is one of the top 3 among all industries in the state-year in terms of employment and zero otherwise.	Compustat
Crucial_Industry_Sales	An indicator variable that equals one if the firm's industry is one of the top 3 among all industries in the state-year in terms of industry total sales and zero otherwise.	Compustat

Donate10K	An indicator variable that equals one if the firm donates at least 10 thousand US dollars to one of the supported candidates who wins the election.	FEC, CLEA, OpenSecrets
Donate10Pct	An indicator variable that equals one if the firm's donation to at least one candidate who wins the election is over 10 percent of that candidate's total received donation.	FEC, CLEA, OpenSecrets
Energy_Committee	An indicator variable that equals one if at least one of the firm's supported candidates wins the election and joins either the Energy and Natural Resources committee in the Senate or the Energy and Commerce committee in the House.	Charles Stewart's Congressional Data Page
Env_Committee	An indicator variable that equals one if at least one of the firm's supported candidates wins the election and joins the committees of Natural Resources, Environment and Public Works or Energy Independence and Global Warming in either Senate or House.	Charles Stewart's Congressional Data Page
Leadership	An indicator variable that equals one if at least one of the firm's supported candidates wins the election and has one of the following leadership positions in the Congress: majority leader, majority whip, speaker, minority leader or minority whip.	Charles Stewart's Congressional Data Page
Majority_Seats	An indicator variable that equals one if at least one of the firm's supported candidates wins the election and the party wins the majority seats in both the senate and the house.	Charles Stewart's Congressional Data Page
Oversight_Committee	An indicator variable that equals one if at least one of the firm's supported candidates wins the election and joins the oversight committees in either Senate or House.	Charles Stewart's Congressional Data Page
Same_State	An indicator variable that equals one if at least one of the firm's supported candidates wins the election and is from the same state that the firm's headquarters locates in.	Compustat. FEC, CLEA
Seniority	An indicator variable that equals one if the candidate has seniority within the top 25% of the Senate or House. The indicator variable will equal 1 for the 25 longest serving Senators or 109 longest serving members of the House of Representatives.	Senate and House websites
Top10Pct_Donor	An indicator variable that equals one if the firm is one of the top 10% donors of at least one of the firm's supported candidates who wins the election. For example, if a candidate has 30 donors in total, the firm is among top 10% donors if its donations rank top three among all donors.	FEC, CLEA, OpenSecrets
Top5_Donor	An indicator variable that equals one if the firm is one of the top five donors of at least one of the firm's supported candidates who wins the election.	FEC, CLEA, OpenSecrets
Political Contribution Measures		
Win	An indicator variable that equals one if the firm-supporting candidate won a close election and zero otherwise.	FEC, CLEA, OpenSecrets
AmountLoseP	# of losing candidates involved in a close election that a firm donated to prior to the election weighted by the firm's contribution to the candidate.	FEC, CLEA, OpenSecrets
AmountTotalP	AmountWinP – AmountLoseP.	FEC, CLEA, OpenSecrets
AmountWinP	# of winning candidates involved in a close election that a firm donated to prior to the election weighted by the firm's contribution to the candidate.	FEC, CLEA, OpenSecrets
ChallengerLoseP	# of losing challengers involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
ChallengerWinP	# of winning challengers involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
DemLoseP	# of losing Democratic candidates involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
DemWinP	# of winning Democratic candidates involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
IncumbentLoseP	# of losing incumbents involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
IncumbentWinP	# of winning incumbents involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
IndirectAmountLoseP	# of losing candidates involved in a close election that a firm indirectly donated to prior to the election weighted by the firm's contribution to the candidate.	FEC, CLEA, OpenSecrets
IndirectAmountTotalP	IndirectAmountWinP - IndirectAmountLoseP.	FEC, CLEA, OpenSecrets
IndirectAmountWinP	# of winning candidates involved in a close election that a firm indirectly donated to prior to the election weighted by the firm's contribution to the candidate.	FEC, CLEA, OpenSecrets

IndirectLoseP	# of losing candidates involved in a close election that a firm indirectly support via donations to leadership PACs.	FEC, CLEA, OpenSecrets
IndirectTotalP	IndirectWinP - IndirectLoseP.	FEC, CLEA, OpenSecrets
IndirectWinP	# of winning candidates involved in a close election that a firm indirectly support via donations to leadership PACs.	FEC, CLEA, OpenSecrets
LoseP	# of losing candidates involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
RepLoseP	# of losing Republican candidates involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
RepWinP	# of winning Republican candidates involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
TotalP	WinP - LoseP.	FEC, CLEA, OpenSecrets
WinP	# of winning candidates involved in a close election that a firm donated to prior to the election.	FEC, CLEA, OpenSecrets
Control Variables		
CAPEX	Capital expenditures scaled by lagged total assets.	Compustat
CHG_NOLCF	Change in net operating loss carryforward (TLCF) scaled by lagged total assets (AT). NOLCF is set equal to 0 if missing (TLCF).	Compustat
EBITDA	EBITDA measured over the prior five fiscal years, scaled by lagged total assets.	Compustat
EBITDA_SIGMA	Standard deviation of EBITDA measured over the prior five fiscal years, scaled by lagged total assets.	Compustat
LOSS	Equals one if the firm reports a loss (IB < 0) in any of the last three fiscal years.	Compustat
LEVERAGE	Long-term debt (DLTT) scaled by lagged total assets.	Compustat
NOLCF	Net operating loss carryforward (TLCF) scaled by lagged total assets (AT). NOLCF is set equal to 0 if missing (TLCF).	Compustat
PTBI	Pretax book income (PI) scaled by lagged total assets (AT).	Compustat
R_D	Research and development expenditures scaled by lagged total assets.	Compustat
SGA	The change in sales (scaled by total assets) over the prior fiscal year.	Compustat
SIZE	Natural log of total assets (AT).	Compustat
TLCF	An indicator that equals one if the firm reports net operating loss carryforwards, and 0 otherwise.	Compustat
VOL_PTBI	Standard deviation of the ratio of annual pretax book income (PI) to lagged total assets (AT) measured over a five-year period.	Compustat
Plant-year NAAQS-regulated Air Toxics Density		
CO	Natural logarithm of (1 + density) where density is the density of the carbon monoxide recorded by the nearest air monitor within two miles of each plant.	EPA Air Data
NO2	Natural logarithm of (1 + density) where density is the density of the nitrogen dioxide including NO and NO2 recorded by the nearest air monitor within two miles of each plant.	EPA Air Data
O3	Natural logarithm of (1 + density) where density is the density of the ozone recorded by the nearest air monitor within two miles of each plant.	EPA Air Data
Pb	Natural logarithm of (1 + density) where density is the density of the lead recorded by the nearest air monitor within two miles of each plant.	
PM10	Natural logarithm of (1 + density) where density is the density of the particulate matter 10 micrometers or less in diameter recorded by the nearest air monitor within two miles of each plant.	EPA Air Data
PM2.5	Natural logarithm of (1 + density) where density is the density of the particulate matter 2.5 micrometers or less in diameter recorded by the nearest air monitor within two miles of each plant.	EPA Air Data
SO2	Natural logarithm of (1 + density) where density is the density of the sulfur dioxide recorded by the nearest air monitor within two miles of each plant.	EPA Air Data

Table 2: Summary Statistics

	Obs	Mean	Std. Dev.		Obs	Mean	Std. Dev.
			Environmental Action and Penalties				
Panel A: Firm-year Raw Value of Interest				*Panel B: Firm-year Log Values Used in Analysis*			
Action_Num	4,764	0.421	2.520	Action_Num	4,764	0.127	0.450
Fed_Penalty_Amt	4,764	73,264	1,514,527	Fed_Penalty_Amt	4,764	0.309	1.968
Fed_Penalty_Num	4,764	0.081	0.842	Fed_Penalty_Num	4,764	0.029	0.206
Penalty_Plant_Num	4,764	0.195	0.879	Penalty_Plant_Num	4,764	0.093	0.323
SEP_Amt	4,764	42,247	1,327,293	SEP_Amt	4,764	0.036	0.736
SEP_Num	4,764	0.026	0.524	SEP_Num	4,764	0.003	0.071
Settlement_Amt	4,764	6,991,549	259,000,000	Settlement_Amt	4,764	0.174	1.603
Settlement_Num	4,764	0.049	0.704	Settlement_Num	4,764	0.015	0.150
State_Local_Penalty_Amt	4,764	38,650	897,690	State_Local_Penalty_Amt	4,764	0.535	2.337
State_Local_Penalty_Num	4,764	0.207	1.606	State_Local_Penalty_Num	4,764	0.061	0.303
Total_Penalty_Amt	4,764	7,125,118	263,000,000	Total_Penalty_Amt	4,764	0.748	2.901
Total_Penalty_Num	4,764	0.266	1.898	Total_Penalty_Num	4,764	0.083	0.357
			Political Contribution Measures				
			Panel C: Firm-year Political Contribution Measures				
LoseP	4,764	2.041	2.214	ChallengerLoseP	4,764	0.339	0.796
WinP	4,764	2.722	2.953	ChallengerWinP	4,764	0.376	0.916
TotalP	4,764	0.768	2.221	IncumbentLoseP	4,764	1.715	1.983
				IncumbentWinP	4,764	2.361	2.603
AmountLoseP	4,764	4.185	8.010				
AmountWinP	4,764	5.314	10.361	DemLoseP	4,764	0.599	1.300
AmountTotalP	4,764	1.129	6.616	DemWinP	4,764	1.107	1.951
Special Elections				RepLoseP	4,764	1.455	1.945
Win	1,063	0.840	0.367	RepWinP	4,764	1.634	1.987

	Obs	Mean	Std. Dev.		Obs	Mean	Std. Dev.
Interaction Variables							
Panel D: Interactions							
Agri_Committee	4,764	0.310	0.462	Energy_Committee	4,764	0.317	0.465
Appropriation_Committee	4,764	0.270	0.440	Env_Committee	4,764	0.288	0.453
Budget_Committee	4,764	0.262	0.440	Oversight_Committee	4,764	0.077	0.266
Leadership	4,764	0.006	0.075	Crucial_Industry_Emp	4,764	0.283	0.450
Majority_Seats	4,764	0.627	0.484	Crucial_Industry_Sales	4,764	0.341	0.474
Seniority	4,764	0.337	0.473	Same_State	4,764	0.155	0.362
Donate10K	4,764	0.081	0.273	Top10Pct_Donor	4,764	0.239	0.427
Donate10Pct	4,764	0.065	0.247	Top5_Donor	4,764	0.226	0.418
Control Variables							
Panel E: Firm-year Controls							
CAPEX	4,764	0.071	0.072	NOLCF	4,764	0.525	30.584
CHG_NOLCF	4,764	0.003	0.184	PTBI	4,764	0.050	0.899
EBITDA	4,764	0.126	0.758	R_D	4,764	0.020	0.057
EBITDA_SIGMA	4,764	0.055	0.595	SGA	4,764	0.177	0.250
LOSS	4,764	0.265	0.441	SIZE	4,764	7.927	2.192
LEVERAGE	4,764	0.255	0.228	TLCF	4,764	0.240	0.427
VOL_PTBI	4,764	0.085	1.323				
NAAQS-regulated Air Toxics Density							
Panel F: Plant-year Raw Value of Interest				*Panel G: Plant-year Log Values Used in Analysis*			
CO	4,055	0.385	0.470	CO	4,055	0.275	0.309
NO2	2,970	13.816	21.335	NO2	2,970	1.359	1.711
O3	4,726	0.025	0.022	O3	4,726	0.024	0.021
Pb	5,361	0.012	0.088	Pb	5,361	0.010	0.058
PM10	7,333	6.629	12.040	PM10	7,333	0.829	1.426
PM2.5	11,600	1.288	4.941	PM2.5	11,600	0.211	0.750
SO2	5,280	2.563	3.506	SO2	5,280	0.825	0.928

Table 3: General election contribution and the number of EPA actions on air emission rules violation

This table presents the OLS regression results with fixed effects. The dependent variable is the number of EPA actions in the next year. The independent variables of interest are TotalP, WinP, LoseP defined in Table 1. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1)	(2)
	Action_Num	
TotalP	-0.0036	
	(-1.1194)	
WinP		-0.0013
		(-0.4334)
LoseP		0.0052
		(0.9538)
Firm-year Controls	Yes	Yes
Constant	Yes	Yes
Year FE	Yes	Yes
Firm FE	Yes	Yes
Cluster	Firm	Firm
Observations	4764	4764
R-squared	0.679	0.692

Table 4: General election contribution and the number of EPA penalties on air emission rules violation

This table presents the OLS regression results with fixed effects. The dependent variables are the numbers of different EPA penalties charged to the firms in the next year and are defined in Table 1. The independent variables of interest are TotalP, WinP and LoseP. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Penalty_Plant_Num		Total_Penalty_Num		Fed_Penalty_Num		State_Local_Penalty_Num		SEP_Num		Settlement_Num	
TotalP	-0.0071***		-0.0085***		-0.0058***		-0.0109***		-0.0009**		-0.0035***	
	(-3.3685)		(-2.7759)		(-3.2282)		(-3.9809)		(-2.0111)		(-2.6760)	
WinP		-0.0065***		-0.0058**		-0.0037**		-0.0090***		-0.0008		-0.0031***
		(-3.2059)		(-2.4585)		(-2.5701)		(-4.1505)		(-1.5955)		(-2.7283)
LoseP		0.0069**		0.0112**		0.0076**		0.0115***		0.0005		0.0026*
		(2.0062)		(2.0318)		(2.3945)		(2.5817)		(0.8129)		(1.6536)
Firm-year Controls	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
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	4764	4764	4764	4764	4764	4764	4764	4764	4764	4764	4764	4764
R-squared	0.644	0.618	0.618	0.546	0.361	0.369	0.554	0.606	0.121	0.127	0.212	0.214

Table 5: General election contribution and the amount of EPA penalties on air emission rules violation

This table presents the OLS regression results with fixed effects. The dependent variables are the amount of different EPA penalties charged to the firms in the next year and are defined in Table 1. The independent variables of interest are TotalP, WinP and LoseP. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Total_Penalty_Amt		Fed_Penalty_Amt		State_Local_Penalty_Amt		SEP_Amt		Settlement_Amt	
TotalP	-0.0645***		-0.0509***		-0.0623***		-0.0075*		-0.0405**	
	(-3.0543)		(-2.6818)		(-3.3129)		(-1.9362)		(-2.3701)	
WinP		-0.0530**		-0.0354**		-0.0559***		-0.0071*		-0.0335***
		(-2.5776)		(-2.1847)		(-3.0761)		(-1.7169)		(-2.7269)
LoseP		0.0718**		0.0686**		0.0584*		0.0050		0.0345
		(1.9840)		(2.3533)		(1.9151)		(0.8498)		(1.4750)
Firm-year Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	4764	4764	4764	4764	4764	4764	4764	4764	4764	4764
R-squared	0.543	0.606	0.392	0.403	0.575	0.483	0.108	0.114	0.240	0.246

Table 6: Interaction with political power of the elected politicians

This table presents the OLS regression results with fixed effects. The dependent variables are the next year's total EPA violations (Total_Penalty_Num), and total fines assessed (Total_Penalty_Amt). The independent variables of interest are IncumbentWinP, IncumbentLoseP, ChallengerWinP, ChallengerLoseP, RepWinP, RepLoseP, DemocratWinP, and DemocratLoseP. Further variable descriptions are in Table 1. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1) Total_Penalty_Num	(2) Total_Penalty_Amt	(3) Total_Penalty_Num	(4) Total_Penalty_Amt
IncumbentWinP	-0.0070***	-0.0577**		
	(-2.7152)	(-2.5006)		
IncumbentLoseP	0.0098**	0.0666**		
	(2.3172)	(2.2354)		
ChallengerWinP	-0.0018	-0.0455		
	(-0.3939)	(-1.0850)		
ChallengerLoseP	0.0164	0.1015		
	(0.9185)	(0.9301)		
RepWinP			-0.0055	-0.0694**
			(-1.6339)	(-2.3159)
RepLoseP			0.0115*	0.0721*
			(1.7107)	(1.7406)
DemWinP			-0.0068**	-0.0459*
			(-1.9893)	(-1.6834)
DemLoseP			0.0101*	0.0792*
			(1.7747)	(1.6979)
Firm-year Controls	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm
Observations	4764	4764	4764	4764
R-squared	0.559	0.589	0.618	0.592

Table 7: Powerful Politician Interactions

This table presents the OLS regression results with fixed effects. The dependent variables are the next year's total EPA violations (Total_Penalty_Num), and total fines assessed (Total_Penalty_Amt). The independent variables of interest are TotalP, Majority_Seats, Env_Committee, and their interactions. Further variable descriptions are in Table 1. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1) Total_Penalty_Num	(2) Total_Penalty_Amt	(3) Total_Penalty_Num	(4) Total_Penalty_Amt	(5) Total_Penalty_Num	(6) Total_Penalty_Amt
TotalP*Majority_Seats	-0.0167***	-0.1524***				
	(-3.7159)	(-3.8288)				
Majority_Seats	0.0162	0.1394				
	(1.5766)	(1.4768)				
TotalP*Leadership			-0.1274***	-1.0646***		
			(-4.0002)	(-3.3525)		
Leadership			0.1029	0.7582*		
			(1.6394)	(1.7782)		
TotalP*Seniority					-0.0159***	-0.1162***
					(-3.3522)	(-3.3370)
Seniority					0.0271**	0.2709**
					(2.1753)	(2.4766)
TotalP	0.0060*	0.0573*	-0.0078**	-0.0565**	0.0021	0.0040
	(1.8609)	(1.9441)	(-2.4764)	(-2.5741)	(0.7402)	(0.1751)
Firm-year Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm
Observations	4764	4764	4764	4764	4764	4764
R-squared	0.602	0.671	0.687	0.552	0.586	0.600

Table 8: Committee Interactions

This table presents the OLS regression results with fixed effects. The dependent variables are the next year's total EPA violations (Total_Penalty_Num), and total fines assessed (Total_Penalty_Amt). The independent variables of interest are TotalP, Oversight_Committee, Appropriation_Committee, Budget_Committee, Agri_Committee, Env_Committee, Energy_Committee, and their interactions with TotalP. Further variable descriptions are in Table 1. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1) Total_Penalty_ Num	(2) Total_Penalty_ Amt	(3) Total_Penalty_ Num	(4) Total_Penalty_ Amt	(5) Total_Penalty_ Num	(6) Total_Penalty_ Amt	(7) Total_Penalty_ Num	(8) Total_Penalty_ Amt	(9) Total_Penalty_ Num	(10) Total_Penalty_ Amt	(11) Total_Penalty_ Num	(12) Total_Penalty_ Amt
TotalP*Oversight_Committee	-0.0290***	-0.2504***										
	(-3.6544)	(-4.4388)										
Oversight_Committee	0.0801***	0.6503***										
	(2.8710)	(2.9304)										
TotalP*Agri_Committee			-0.0120**	-0.0539								
			(-2.2070)	(-1.4073)								
Agri_Committee			0.0159	0.0398								
			(1.0586)	(0.3325)								
TotalP*Env_Committee					-0.0231***	-0.1645***						
					(-4.2311)	(-4.6051)						
Env_Committee					0.0164	-0.0207						
					(1.3130)	(-0.2051)						
TotalP*Energy_Committee							-0.0159***	-0.1199***				
							(-3.5290)	(-3.3227)				
Energy_Committee							0.0496***	0.3703***				
							(3.1525)	(3.1020)				
TotalP*Appropriation_Committee									-0.0099***	-0.0905***		
									(-2.7832)	(-2.9740)		
Appropriation_Committee									0.0142	0.1120		
									(1.1237)	(1.1262)		
TotalP*Budget_Committee											-0.0147***	-0.0953***
											(-3.4081)	(-2.9686)
Budget_Committee											0.0168	0.1050
											(1.2575)	(0.9508)
TotalP	-0.0019	-0.0091	-0.0020	-0.0339	0.0070**	0.0575**	-0.0022	-0.0138	-0.0001	-0.0038	0.0006	-0.0124
	(-0.6608)	(-0.4607)	(-0.7085)	(-1.2795)	(2.5761)	(2.4585)	(-0.7155)	(-0.5724)	(-0.0361)	(-0.1755)	(0.2240)	(-0.5980)
Firm-year Controls	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
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	4764	4764	4764	4764	4764	4764	4764	4764	4764	4764	4764	4764
R-squared	0.573	0.594	0.583	0.537	0.592	0.682	0.570	0.618	0.659	0.580	0.631	0.570

Table 9: Important Firm Interactions

This table presents the OLS regression results with fixed effects. The dependent variables are the next year's total EPA violations (Total_Penalty_Num), and total fines assessed (Total_Penalty_Amt). The independent variables of interest are TotalP, Same_State, Crucial_Industry_Emp, Crucial_Industry_Sales, and their interactions. Further variable descriptions are in Table 1. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1) Total_Penalty_Num	(2) Total_Penalty_Amt	(3) Total_Penalty_Num	(4) Total_Penalty_Amt	(5) Total_Penalty_Num	(6) Total_Penalty_Amt
TotalP*Same_State	-0.0176***	-0.1787***				
	(-3.1295)	(-3.5840)				
Same_State	0.0284	0.2424				
	(1.5713)	(1.5190)				
TotalP*Crucial_Industry_Emp			-0.0172*	-0.1349**		
			(-1.8012)	(-2.3664)		
Crucial_Industry_Emp			0.0125	0.0840		
			(0.3802)	(0.3161)		
TotalP*Crucial_Industry_Sales					-0.0181***	-0.1266***
					(-2.9712)	(-2.7710)
Crucial_Industry_Sales					0.0247	0.2162
					(1.0876)	(1.1483)
TotalP	-0.0031	-0.0269	-0.0059**	-0.0479**	-0.0028	-0.0371
	(-1.2878)	(-1.5191)	(-2.4993)	(-2.3013)	(-1.1508)	(-1.5895)
Firm-year Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm
Observations	4764	4764	4764	4764	4764	4764
R-squared	0.627	0.653	0.681	0.612	0.601	0.558

Table 10: Important Firm Donor Interactions

This table presents the OLS regression results with fixed effects. The dependent variables are the next year's total EPA violations (Total_Penalty_Num), and total fines assessed (Total_Penalty_Amt). The independent variables of interest are TotalP, Donate10K, Donate10Pct, Top10Pct_Donor, Top5_Donor, and their interactions. Further variable descriptions are in Table 1. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total_Penalty_Num	Total_Penalty_Amt	Total_Penalty_Num	Total_Penalty_Amt	Total_Penalty_Num	Total_Penalty_Amt	Total_Penalty_Num	Total_Penalty_Amt
TotalP*Donate10K	-0.0313***	-0.2131***						
	(-3.2807)	(-3.7354)						
Donate10K	0.1088**	0.6149**						
	(2.5087)	(2.4111)						
TotalP*Donate10Pct			-0.0248**	-0.1881**				
			(-2.3977)	(-2.4055)				
Donate10Pct			0.0208	0.1210				
			(0.8123)	(0.6295)				
TotalP*Top10Pct_Donor					-0.0261***	-0.1720***		
					(-5.3826)	(-5.3953)		
Top10Pct_Donor					0.0233*	0.1813		
					(1.9062)	(1.6132)		
TotalP*Top5_Donor							-0.0271***	-0.1867***
							(-4.0105)	(-4.7187)
Top5_Donor							0.0141	0.0809
							(0.9101)	(0.6366)
TotalP	-0.0009	-0.0116	-0.0024	-0.0090	0.0073***	0.0420**	0.0057**	0.0381**
	(-0.3808)	(-0.6545)	(-0.8455)	(-0.4619)	(2.7459)	(2.1340)	(2.4539)	(2.1174)
Firm-year Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Obs	4764	4764	4764	4764	4764	4764	4764	4764
R-squared	0.709	0.670	0.634	0.595	0.719	0.601	0.602	0.614

Table 11: Cost-benefit Analysis

This table presents the cost-benefit analysis of firms' political contribution to the federal congressional election candidates. The row of "Estimated Regression Coefficient" presents the coefficients of regressions in Table OA15.2, which is similar to Table 5 but using the full sample including close as well as non-close elections. Row (a) presents the average (Panel A) or median (Panel B) TotalP of the full sample. Row (b) presents the calculated percentage decrease of penalty amount, which is equal to 1 – e^(coefficient). For example, the percentage decrease of total penalty amount equals 1-e^(-0.0065). Row (c) presents the average penalty amount. Row (d) calculates the amount of penalty reduction for an average firm, which equals the multiplication product of Rows (a), (b) and (c), representing the benefits of political donations. Row (e) presents the average (Panel A) or median (Panel B) firm donations, or the costs. The last row calculates the benefit/cost ratio for the total and each item of penalties from toxics emissions.

Panel A: Average TotalP, Average Firm Donations

	All Elections (Close and Non-close Elections)				
	Total_Penalty_Amt	Fed_Penalty_Amt	State_Local_Penalty_Amt	SEP_Amt	Settlement_Amt
Estimated Regression Coefficient	-0.0065	-0.0036	-0.0061	-0.0012	-0.0028
a: Average TotalP	33.36	33.36	33.36	33.36	33.36
b: Decrease of Penalty Amount (%)	0.648%	0.359%	0.608%	0.120%	0.280%
c: Average Penalty	5,001,262.44	65,080.88	31,161.04	26,034.97	4,878,986.00
d: Penalty Reduction (=a*b*c)	1,081,007.63	7,802.27	6,322.14	1,041.66	455,120.27
e: Average Firm Donations	66,379.49	66,379.49	66,379.49	66,379.49	66,379.49
Benefit/Cost Ratio (=d/e)	16.285	0.118	0.095	0.016	6.856

Panel B: Median TotalP, Median Firm Donations

	All Elections (Close and Non-close Elections)				
	Total_Penalty_Amt	Fed_Penalty_Amt	State_Local_Penalty_Amt	SEP_Amt	Settlement_Amt
Estimated Regression Coefficient	-0.0065	-0.0036	-0.0061	-0.0012	-0.0028
a: Median TotalP	15	15	15	15	15
b: Decrease of Penalty Amount (%)	0.648%	0.359%	0.608%	0.120%	0.280%
c: Average Penalty	5,001,262.44	65,080.88	31,161.04	26,034.97	4,878,986.00
d: Penalty Reduction (=a*b*c)	486,041.41	3,508.05	2,842.55	468.35	204,630.66
e: Median Firm Donations	17,500	17,500	17,500	17,500	17,500
Benefit/Cost Ratio (=d/e)	27.774	0.200	0.162	0.027	11.693

Table 12: Robustness Checks Using Special Election Contribution

This table presents the OLS regression results with fixed effects for special elections. The dependent variables are the next year's Action_Num, Total_Penalty_Num, and Total_Penalty_Amt. Action_Num is the number of EPA actions, which can be an ICIS investigation, information request or inspection activity. Total_Penalty_Num represents the number EPA violations a firm has, and Total_Penalty_Amt is the total fines assessed. The independent variable of interest is Win, which is an indicator variable that equals one if the firm-supporting candidate won a close election and zero otherwise. Further variable descriptions are in Table 1. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1) Action_Num	(2) Total_Penalty_Num	(3) Total_Penalty_Amt
Win	0.0488	-0.1249***	-0.9239***
	(1.0463)	(-4.5508)	(-4.3542)
Firm-year Controls	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Cluster	Firm	Firm	Firm
Observations	1063	1063	1063
R-squared	0.458	0.407	0.417

Table 13: General Election Contribution and Air Toxins Emissions

This table presents the OLS regression results with fixed effects on the plant-year-level sample. The dependent variables are seven regulated air toxins densities recorded by the nearest air monitor within two miles of each TRI plant in year t+1. The independent variable of interest is each plant's parent firm's political connection measure TotalP. Year fixed effects and plant fixed effects are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	CO		NO2		O3		Pb		PM10		PM2.5		SO2	
TotalP	0.0989		-1.5715		0.0018		-0.0308		-0.3727		0.5609**		0.1585	
	(0.7200)		(-1.4979)		(0.1824)		(-0.8873)		(-0.6311)		(2.0251)		(0.4252)	
WinP		0.0523		-1.6558		0.0011		-0.0042		-0.0713		0.5680**		0.3078
		(0.3576)		(-1.4805)		(0.1157)		(-0.1351)		(-0.1143)		(2.1286)		(0.8146)
LoseP		-0.2754		0.7392		0.0068		0.0412		1.1303		-0.3543		-0.2214
		(-1.5061)		(0.5011)		(0.4959)		(0.5967)		(1.4200)		(-0.8617)		(-0.4066)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,055	4,055	2,970	2,970	4,726	4,726	5,361	5,361	7,333	7,333	11,600	11,600	5,228	5,280
R-squared	0.6529	0.6531	0.5383	0.5383	0.6212	0.6212	0.4000	0.4000	0.4787	0.4789	0.4590	0.4590	0.6417	0.6454

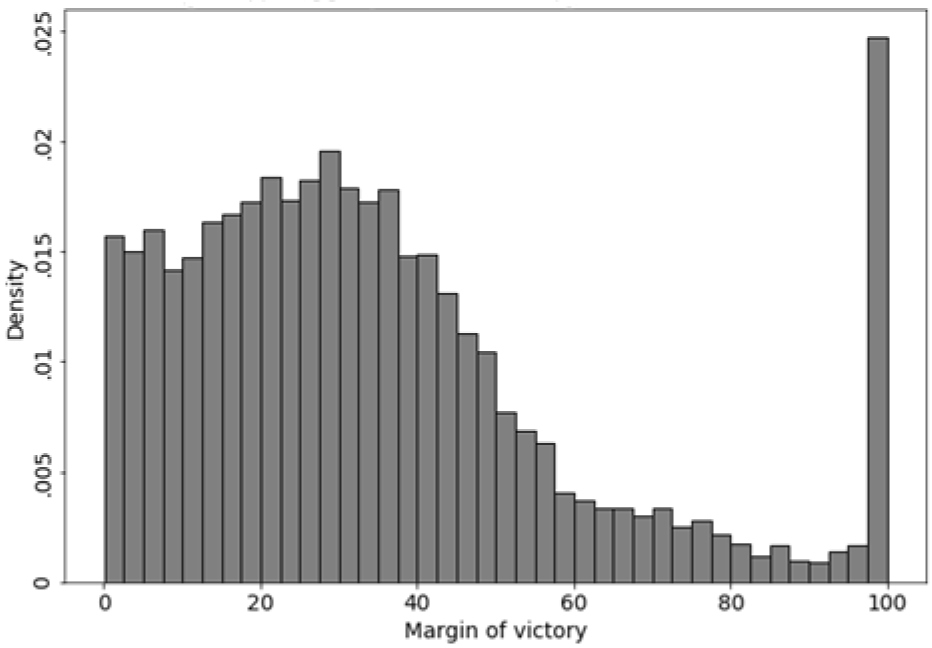
Table 14: Robustness Checks Using Weighted Candidate Contributions

This table presents the OLS regression results with fixed effects. The dependent variables are the next year's Action_Num, Total_Penalty_Num, and Total_Penalty_Amt. Action_Num is the number of EPA actions, which can be an ICIS investigation, information request or inspection activity. Total_Penalty_Num represents the number EPA violations a firm has, and Total_Penalty_Amt is the total fines assessed. The independent variables of interest are AmountTotalP, AmountWinP, and AmountLoseP. Further variable descriptions are in Table 1. Election cycle fixed effects, firm fixed effects and firm-year controls including PTBI, VOL_PTBI, LEVERAGE, SIZE, CHG_NOLCF, NOLCF, LOSS, SGA, TLCF, R_D, CAPEX, EBITDA_SIGMA and EBITDA are included in all regressions. Standard errors are clustered by firm. Robust t-statistics are in parentheses. *, **, *** indicate significance at 1%, 5% and 10%.

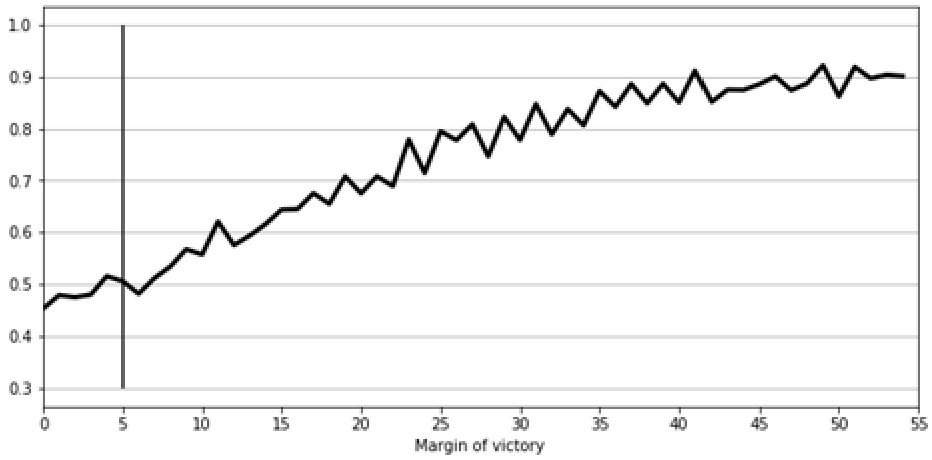
	(1)	(2)	(3)	(4)	(5)	(6)
	Action_Num		Total_Penalty_Num		Total_Penalty_Amt	
AmountTotalP	-0.0014		-0.0024**		-0.0146**	
	(-1.2789)		(-2.1256)		(-2.4282)	
AmountWinP		-0.0009		-0.0021**		-0.0119**
		(-1.0728)		(-2.3998)		(-2.2314)
AmountLoseP		0.0049*		0.0062**		0.0309*
		(1.8350)		(2.0119)		(1.9282)
Firm-year Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm	Firm	Firm	Firm	Firm	Firm
Observations	4764	4764	4764	4764	4764	4764
R-squared	0.686	0.701	0.546	0.632	0.537	0.589

Figure 1 Electoral Statistics

Panel (A) presents a histogram of the margin of victory for all U.S. general congressional elections from 1980-2010. Panel (B) plots the average proportion of total contributions made to the winning candidate of an election (y-axis) against the margin of victory by which the candidate won the election (x-axis)



(A) Margin of victory in U.S. congressional elections



(B) Proportion of contributions received by the winning politician

Figure 2 Regression Discontinuity Plots of Penalty Amounts

This figure presents regression discontinuity plots using a fitted quadratic polynomial estimate with a 95% confidence interval around the fitted value. The horizontal axis is margin which for the winning candidates (the right part of each plot) is the difference between the share of votes cast for the *winning* candidate and the second-place candidate in an election; and for the *losing* candidates (the left part of each plot) is the share of votes cast for the losing candidate and the winning candidate in an election. The outcome variables are the log amount of total penalties in the year of the special election. The dots depict the average outcome variables in each of ten equally spaced bins (with a bin width of 4%).