Regulation and Private Political Participation: EPA Enforcement during the Fracking Boom

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Abstract

How do special interests react to an increase in their regulatory burden? In this paper, I use a shock to the regulatory environment by analyzing EPA enforcement of the Clean Air Act during the fracking boom in seven states. First, I show that the fracking boom is associated with an increase in EPA regulation activities. I then investigate how interest groups adjust their campaign contributions in response to this change in their regulatory burden. I find that more EPA enforcements are associated with an increase in the share of campaign contributions going to Republicans, but only at the state-level, where the majority of enforcement activities take place. These results provide some of the first evidence that changes to the regulatory environment can spur private sector mobilization and also highlight the importance of carefully selecting the level of government and type of regulatory outcomes when studying the influence of interest groups.

Regulation is a central part of public policy. Even when legislation passes through Congress, its actual impact depends heavily on regulatory enforcement and compliance. For this reason, the government has a wide set of regulatory agencies at the federal and subnational level. The case of environmental policy in the U.S. and the recent changes in approaches of the last administrations illustrates the importance of regulatory enforcement. During Donald Trump's presidency, much of the roll backs in environmental rules were carried out by the Environmental Protection Agency (EPA) (Popovich, Albeck-Ripka, and Pierre-Louis 2021). Even as no major change was made to important legislation such as the Clean Air Act or the Clean Water Act, criminal prosecutions under these statutes dropped by 50% and 70% respectively during the first two years of his tenure (Schwartz 2020). Such a change in enforcement had clear and dramatic impacts. A recent study shows that the increase in air pollution, a consequence of the lax regulatory approach of Trump's administration, was responsible for almost 10,000 deaths in 2018 alone (Clay and Muller 2019).

Given the importance of government regulation, it is unsurprising that the private sector tries to influence regulatory policy. There is a large literature in American politics on the influence of special interest groups (SIGs) on regulatory outcomes and enforcement. Yet, it is not clear how the private sector adjust its behavior when regulation or the costs associated with regulations change. If special interests see campaign contributions or lobbying as a way to get preferential treatment by regulators, such regulatory activities and its enforcement could affect the degree of political participation of these groups. In this paper I analyze how special interests change their political contribution behavior in response to an increase in the regulatory environment.

Analyzing regulation and interest groups' behavior empirically is challenging. Changes in regulation can be the result of changes in the relative power or influence of interest groups. That is to say, the level of regulatory enforcement can be endogenous to SIG's behavior. To isolate the effect of regulation on interest groups' mobilization, variation in the regulatory process is needed. I focus on the regulatory activities of the EPA during the fracking boom in the U.S. I analyze how the development of the fracking industry affected EPA enforcement of the Clean Air Act (CAA) in the seven states where the bulk of this industry is located between 1990 and 2014. I follow the approach by Sances and You (Forthcoming) and apply a difference in differences design using the year 2005 as the time in which technological advances made fracking economically viable. This technological development should be unrelated to SIGs' influence on regulators. I find that the presence of fracking is associated with a significant increase in EPA activity at the zip code level and that this effect increased over time as the industry continued to develop. Having at least one fracking well is associated with an increase in EPA overall regulatory actions of almost 43%. Importantly, this increase is not confined to the oil and gas sector, but affects firms across different industries broadly. This context enables me to study interest groups' behavior in a context of increased regulatory enforcement.

Such an increase in the regulatory burden should have uneven consequences across the political spectrum. Politicians have different ways to influence bureaucratic agencies (McCubbins, Noll, and Weingast 1987; McCubbins and Schwartz 1984; Wood and Waterman 1991; Shipan 2004), and it has been shown that contributions can facilitate access to politicians (Kalla and Broockman 2016). I predict that an increase in EPA activity will mobilize the affected interest groups to increase their campaign contributions, but that this mobilization should disproportionately target Republican candidates. The Democratic and Republican parties have very different positions regarding private sector regulation and the environment, with the latter being historically more opposed to stricter environmental protection (Karol 2019). Thus, an increase in private political participation following EPA enforcement should tend to benefit Republicans. I focus on the post fracking boom period (2006-2014) in which EPA enforcement greatly increased due to the fracking industry, and use the share of campaign contributions to Republicans as my primary outcome of interest[1].

1. Since I focus on the broad universe of firms regulated by the CAA, which includes many small and

Existing research on SIGs and their influence on regulatory agencies focuses almost exclusively on regulatory outcomes at the federal level, neglecting the federal structure of different areas of enforcement. For many agencies such as EPA, states have a great deal of responsibility in administering and enforcing federal mandates carrying out most of regulatory activities. In the states I analyze in this paper, more than 75% of regulatory actions are done by the states[2]. Failure to understand how federal regulations are enforced, and which level of government is responsible for these regulations, can lead to misleading findings. Therefore, when analyzing the reaction of special interests to an increase in regulation, I consider the effect of federal and state regulatory actions separately.

I find that regulatory enforcement of the CAA is associated with an increase in the share of contributions to Republican candidates in state races, and this effect is consistent for different types of regulatory activities. I find no effect prior to the fracking boom. These results are also robust to different specifications and ways to control for fracking activity. I also show that this increase in contributions benefits the most conservative candidates. On the other hand, I do not find any effect of regulatory state activities on federal elections, nor an effect of federal regulatory activities on either type of races. The stark differences in results for the federal and state level show the importance of considering the federal dimension of regulatory enforcement. These results show that interest groups know the level of government responsible for regulation and target it when the costs of this regulation increase.

Finally, I examine the policy implications of interest groups' mobilization. I present

medium side firms, campaign contributions are a more suitable outcome than lobbying, which is strongly linked to firms' size (Kerr, Lincoln, and Mishra 2014).

2. Differences between federal and state regulatory activities are even larger for measure such as firms inspections. More than 90% of firms inspections in my sample are carried out by the states.

suggestive evidence of state Republican politicians being more lenient in environmental enforcement by showing that PM 2.5 (a pervasive air pollutant) is higher in state districts with Republican legislators. I use a panel specification with fixed effects at the electoral district level to focus on the effect of changes in partisanship. Analyzing the mechanisms behind this result is beyond the scope of this paper. Although, this finding is consistent with political control of bureaucratic agencies at the state level, a topic which has received less attention in the literature than its federal counterpart.

This article makes three contributions to the extant literature. First, unlike most studies, I analyze a regulatory shock and the response by interest groups, and how regulatory enforcement can increase private political mobilization. There is a large literature on special interests' influence on the regulatory process, starting with Stigler (1971) and Peltzman (1976). A number of more recent papers have shown how private interests can affect regulatory enforcement using campaign contributions (Gordon and Hafer 2005; Heitz, Wang, and Wang, Forthcoming), or lobbying (Lambert 2019; Papadimitri and Wohlschlegel 2019). Here I invert the causal arrow and show how a change in the regulatory burden can affect the patterns of political mobilization of interest groups, focusing on the causes of the political involvement of the private sector.

Second, this paper highlights the importance of carefully considering the level of government and outcomes when studying interest groups' influence. This is particularly important in federal systems, where regulatory powers are often shared between the federal and states governments. When aggregating all types of enforcement together my analysis shows mixed results, while considering separately enforcement carried by federal and state level officials reveals a strong response of contributors at the state level. These results are important not only for EPA, but also for other agencies and programs that share responsibilities with the states such as the Occupational Safety and Health Administration, the Consumer Financial Protection Act, and Medicaid.

Finally, states have been a key driving force in environmental policy in the U.S. in the last decades. States have authority to regulate important industries such as fracking, have experimented with different policies such as cap and trade programs, and actively challenge federal environmental initiatives in court. In an influential recent study, Stokes (2020) shows how the energy sector has used its resources to hamper environmental policy across different states. I expand the analysis of interest groups at the state level to show how they can use resources such as campaign contributions to affect not only state environmental policy, but also how federal regulation is administered and enforced.

Fracking in the U.S.

The development of the fracking industry is probably the most consequential event in the energy sector in the U.S. of the last decades. Although the potential of shale has been known for years, until the 21th century no technology was available to extract oil and gas from these rock formations at a competitive price. The recent boom in this type of unconventional extraction was made possible by two technological developments. Horizontal drilling was combined with hydraulic fracturing to enable the extraction these underground resources. Hydraulic fracturing, commonly known as fracking, involves the use of high pressure liquids to create new fractures in the rocks. First applied to the extraction of natural gas, this process was soon adapted to the extraction of oil too.

It is hard to overstate the impact that fracking has had across the energy sector. It has enabled the U.S. to move from the position of being the largest oil importer in the world to a net exporter. The ban on oil exports imposed during the Oil Crisis in the 1970s was lifted in 2015 due to the increasing domestic production. According to the U.S. Energy Information Administration, by 2015, two thirds of natural gas production came from hydraulic fracturing. Shale oil reached two thirds of total production in 2019.

Fracking has also been a contentious issue in American politics, both at the state and the national level. During the presidential campaign in 2020, Donald Trump made his support for the industry clear, especially in battleground states where fracking provides thousands of jobs, such as Pennsylvania (Lakhani 2020). The Democratic candidate, Joe Biden, made a call for an eventual transition from fossil fuels to a clean energy economy (Puko 2020), although he repeatedly stated that a ban on fracking was not on his agenda, at least for existing permits (DeVane 2020). Since fracking is mostly regulated by states, there is a lot of variation at the subnational level. Some states have actively promoted it, while at the other extreme New York (a state with substantial fracking reserves) banned this industry in 2015.

The fracking revolution had a huge economic impact on the communities where extraction takes place. Different studies have documented gains in terms of wages and employment (Feyrer, Mansur, and Sacerdote 2017), public revenues (Newell and Raimi 2018), and spillovers to other industries such as manufacturing (Allcott and Keniston 2018) and banking (Gilje, Loutskina, and Strahan 2016). Besides its economic effects, fracking has raised the alarms of environmental groups, politicians, and large segments of the public. Water pollution and the risk of seismic activity have received a lot of attention, but some researchers have started to point out that the gas and oil boom may have broader implications for climate change and greenhouse gases emissions. For example, Howarth (2019) finds the fracking boom in the U.S. to be responsible for the reverse in the downward trend in methane emissions around the year 2006.

In addition to the economic and environmental effects, the political consequences of fracking have also received attention from some recent studies. Besides the importance of these findings on their own, understanding how fracking affects the political process is crucial, since politics affect the way in which these resources impact the economy and the environment (Breetz, Mildenberger, and Stokes 2018).

Studies have shown that fracking is associated with better electoral performance by Republicans, affecting legislators roll call votes in a more conservative direction (Cooper, Kim, and Urpelainen 2018; Fedaseyeu, Gilje, and Strahan 2018). Focusing on contributors and voters, Sances and You (Forthcoming) find that, while fracking has positive impacts on wages and employment, it is also associated with a series of negative externalities. As a result, Republican candidates benefit from an increase in contributions and from a decrease in turnout that negatively affected Democratic candidates. Similar patterns have been found in state legislatures, in which shale oil and gas are associated with an increase in Republican contributions in historically blue districts (DiSalvo and Li 2020).

Environmental Protection Agency

Established in 1970, the EPA is the most important environmental regulatory agency in the U.S., with the power to oversight firms, enforce regulation, and impose fines to violators. In this paper, I focus on the oversight and regulatory enforcement of one of the most substantial pieces of legislation in U.S. environmental policy, the Clean Air Act (CAA, 1963). With its amendments, it stipulates command and control regulations, establishing thresholds for pollution at the plant level based on current technologies and practices (Blundell, Gowrisankaran, and Langer 2020). The CAA requires the EPA to establish National Ambient Air Quality Standards for six air pollutants[3]. States are responsible for establishing the procedures to attain those standards. These plans have to be submitted and approved by EPA. The CAA also gives the EPA the authority to issue court orders and impose penalties, and to monitor and conduct inspections to assess compliance with the air standards.

Although this is a federal agency, the largest share of oversight and enforcement actions are done by states and their environmental agencies. This institutional feature of environmental federalism aims at using the information and local knowledge that state officials have to enforce federal mandates. The EPA has the responsibility to oversee what states do, but

3. These criteria air pollutants are carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide.

the power over them is limited. The tools that EPA formally has to act against a state that is not doing its job are rarely used. Moreover, this agency has limited resources, so the threats of taking over the control of environmental policy in a state are not credible (Farber 2016). Finally, federal and state agencies can work together. In 2012, after a joint work of federal EPA and local officials, BP North America Inc agreed to pay $8 million in fines and invest $400 million in pollution controls and emissions reductions in their refinery in Whiting, Indiana.

Many studies have found that EPA activities are not uniformly distributed. At the federal level, (Ringquist 1995) analyzes the EPA regulatory control of the Clean Water Act and finds that appointments and budgetary decisions have a clear effect on EPA actions. Some authors have shown that Republican politicians are associated with lower levels of enforcement (Innes and Mitra 2015; Bergquist 2018), although these findings have been disputed (Elrod, Karadas, and Theyson 2018; Fredriksson and Wang 2020). Perhaps the study that is closest to this one is Heitz, Wang, and Wang (Forthcoming). The authors analyze the impact of campaign contributions on EPA activity and find that politically connected firms are not less likely to be inspected, but they receive fewer penalties.

In this paper I highlight the importance of taking a subnational perspective to analyze EPA regulatory activity. There are a number of ways in which state politicians can affect environmental enforcement, some more direct than others. First, governors and state legislatures control the budget of the state environmental agencies that hold, for example, the task of monitoring and enforcing environmental standards. For the seven states considered in this paper, which all show electoral gains for the Republican party during the period of analysis, there is a decrease in the staffing of state environmental agencies, with Louisiana leading the ranking with a decrease of 30% in the 2008-2018 period. Second, there is anecdotal evidence that politicians can also influence how cases are referred to the attorney general[4]. For ex-

4. In this context, cases are referred to the state attorney general when a dispute arises between a state agency and an individual or firm and the parts involved are unable to make a settlement over a possible violation or misconduct.

ample, during the tenure as governors of Rod Blagojevich and Pat Quinn, both Democrats, the average number of yearly referrals to the attorney general in Illinois was 198 and 144, respectively. During the first three years of Republican governor Bruce Rauner's tenure the yearly average dropped to 73 (Hawthorne 2019). Finally, state politicians can directly contact state bureaucrats. A FOIA request submitted to the Texas Commission on Environmental Quality (TCEQ) reveals that the governor and state legislators regularly contact this agency (much more frequently than other elected officials such as members of Congress). Records of communication show that instead of just asking for information, state politicians usually use this channel of communication to show support or opposition to how the TCEQ is handling different areas of work, or to ask for particular actions, such as grant or denied a permit to a firm.

Finally, some states have directly opposed EPA federal guidance. Many states opposed Barack Obama's Clean Power Plan and sued the EPA. Governors such as Mike Pence from Indiana said publicly that they would not comply with these new restrictions on carbon plants. Resistance also came from state environmental regulators. In 2014 Bryan Shaw, head of the TCEQ, resisted this new regulation on power plants. This case is interesting since it shows how interest groups and local politicians work together. The Texas Public Policy Foundation (TPPF), a conservative think tank, worked with state legislators so Texas could ignore the new regulations. In a revealing statement, Karen Lugo, director of the TPPF Center for the Tenth Amendment Action, said that if enough states resisted the new rules, the federal government would just not have enough resources to make and enforce plans for every state (Satija 2014). In the end, she was right. 26 states sued EPA and the Supreme Court halted implementation of the Clean Power Plan in 2016.

Theoretical Expectations

I start with the uncontroversial claim that interest groups try to influence public policy (Anzia 2018). An aspect of public policy in which the private sector has a great stake is regulation and regulatory agencies. Much of what passes through the legislative body has to be overseen and enforced by federal and state agencies. Also, regulators can, with varying degrees of freedom, set different regulations and standards unilaterally. Many studies haven analyzed how the private sector can use mechanisms such as campaign contributions and lobbying to influence regulatory outcomes (Gordon and Hafer 2005; Lambert 2019; Papadimitri and Wohlschlegel 2019; Heitz, Wang, and Wang, Forthcoming).

The second assumption is that regulation is costly to firms[5]. If a firm complies with new regulations, the burden of the regulation is given by the adaptation costs to the new laws and standards. A firm may not comply, but if regulators find out firms would likely face a cost. The most direct one is in the form of fines. In a high profile case for the EPA, in the year 2000 Cinergy Corporation, a subsidiary of Duke Energy, settled a case regarding the CAA by paying $8.5 million in civil penalties, and agree to spend $21.5 million on environmental projects and $1.4 billion on new emissions controls. Non-compliance with rules such as environmental regulation can also have more indirect costs such as reputation and consumer backlash, or negative effects on the stock market (Badrinath and Bolster 1996). Importantly, firms can use their resources to influence politicians and regulators in an effort to avoid the adverse consequences of non-compliance. So, at least for the cases in which the cost of gaining this influence is lower than the costs of the new regulation, the expectation is that firms will try to use tools such as campaign contribution or lobby in order to get better

5. This claim might not be universally true. (Kennard 2020) shows that productive firms with low adjustment costs may prefer stronger environmental regulations in order to get a larger share of the market in an open economy. Nonetheless, given that I consider many different firms of varying sizes and industries, the assumption that regulation is costly on average seems like a reasonable one.

treatment by regulators.

The previous discussion raises two related questions. First, certain politicians or parties can have different stands on the issue being regulated, making them more or less likely to be affected by interest groups. There is a huge divide between Democrats and Republicans around environmental protection (Egan and Mullin 2017). These partisan differences manifest in the public's assessment of EPA and it's mandate. The 2014 round of the Cooperative Congressional Election Study (CCES) shows that support among Democrats for EPA enforcement is more than double that among Republicans. Politicians have also highlighted these differences. In a press release from 2013, Senator Marco Rubio boasted about the efforts by Florida to reduce EPA regulatory activities in favor of state control: "By limiting the federal government's interference in Florida's affairs and preserving the proper relationship between federal and state regulation here, we've set a good example other states can emulate when facing similar undue pressure from EPA bureaucrats" (Marco Rubio,2013). Therefore, my first hypothesis is that interest groups using campaign contributions to reduce their environmental regulatory burden will disproportionately target the Republican party.

The second question to be addressed is what level of government should be the target of special interest groups. Most research on federal regulatory agencies focuses on this level of government[6]. Nonetheless, given the federalist structure of regulatory enforcement for many agencies such as EPA, it is likely that special interests are actually responding to this increase in regulatory enforcement by targeting state politics. First and foremost, many federal agencies rely on states and other subnational units to conduct monitoring and enforcement. Under the CAA, state environmental agencies conduct most of the regulatory

6. Some exceptions are (Agarwal et al. 2014) who study differences in enforcement between federal and state banking regulators, and (Gulen and Myers 2020) who distinguish between federal and state EPA enforcement in battleground states.

activities. More than 75% of all regulatory activities in my sample are carried out by state officials. These differences are also evident when comparing the resources that EPA has versus the states. The four largest environmental agencies in the U.S. have almost as many employees as the EPA[7].

There are reasons to believe that interest groups can be more influential at the subnational level. For example, when the EPA sued the Southern Coal Corporation for violations of the Clean Water Act, West Virginia did not join other states in supporting EPA's case, although many violations occurred in that state. The fact that the owner of this company was a very influential businessman, who later became governor, is revealing of how local business can influence state politics. State politics are less salient and publicized, it is less likely that different interest groups clash at the state level, and also citizens knowledge and participation is lower at the state level (Anzia 2018). My second hypothesis is, then, that the increase in the share of contributions to Republicans due to EPA enforcement should be concentrated in state races.

Fracking and EPA Regulations

In this section I analyze how the fracking boom affected EPA activity. To this end, I rely on two datasets. The first one includes information on fracking wells in the U.S., which was compiled by Sances and You (Forthcoming). With data on the total number of horizontal wells, the authors provide a measure of the number of fracking wells at the zip code level. In this study, I focus on the seven states where the fracking boom was more pronounced: Arkansas, Louisiana, North Dakota, Oklahoma, Pennsylvania, Texas and West Virginia. By the year 2014, these seven states represented 93% of the total shale gas production in the

7. These agencies are the California Environmental Protection Agency, the New York Department of Environmental Conservation, the Texas Commission on Environmental Quality, and the Pennsylvania Department of Environmental Protection.

U.S (U.S. Energy Information Administration)[8]. For information regarding environmental enforcement, I use the Air Facility System (AFS) from the Enforcement and Compliance History Online (ECHOS) compiled by the EPA. This dataset includes every EPA regulatory activity at the plant level from 1978 to 2014 under the Clean Air Act. I focus on the period going from 1990 to 2014. Each activity is recorded with the corresponding date and zip code of the facility being audited. The sample for the seven states considered here includes 354,515 cases of EPA activities for 39,736 different facilities. This facility level information is aggregated at the zip code/year level, in order to match it with the fracking data.

From the AFS I take five EPA regulatory activities measures. The first variable is *inspections*, for which I count every firm inspection related to the CAA, and aggregate them to the zip code/year level. Second, the variable *enforcement* is the sum of a series of formal regulatory measures from notices of noncompliance to consent decrees, which are signed by the enforcement authority, the violator and by a court, and require compliance by means specified in the decree. The third variable (*violation*) aggregates every case in which a violation of the CAA was found. Since some monitoring is done electronically, violations are not fully contained in inspections. Fourth, I use a variable that indicates if EPA assigned a penalty to the facility under scrutiny (*penalty*). As a fifth variable, I sum the amount of penalties assigned to a given zipcode in a given year, in 2014 dollars (*penalty amount*). Since I have multiple variables, I construct another one which is used in the main tables in the next sections. The variable *action* is the sum of all EPA regulatory activities. Basically, it adds up all inspections, enforcement actions, violations found, and penalties assigned, also at the zip code/year level. I use *action* as an overall index of EPA regulatory activity. More information on this data set and variable construction, as well as descriptive statistics for the variables used in the empirical analysis, can be found in Appendix A.

8. The figures for each state are 7.72% for Arkansas, 8.86% for Louisiana, 3.17% for North Dakota, 6.46% for Oklahoma, 29.81% for Pennsylvania, 30.91% for Texas, and 6.46% for West Virginia

To estimate the effect fracking on EPA activities I follow the approach by (Sances and You, Forthcoming). Taking 2005 as the year in which technological developments made fracking a profitable industry, I apply a difference in differences design comparing EPA activity in zip codes with at least one fracking well during the sample with those that do not registered any well between 1990 and 2014.

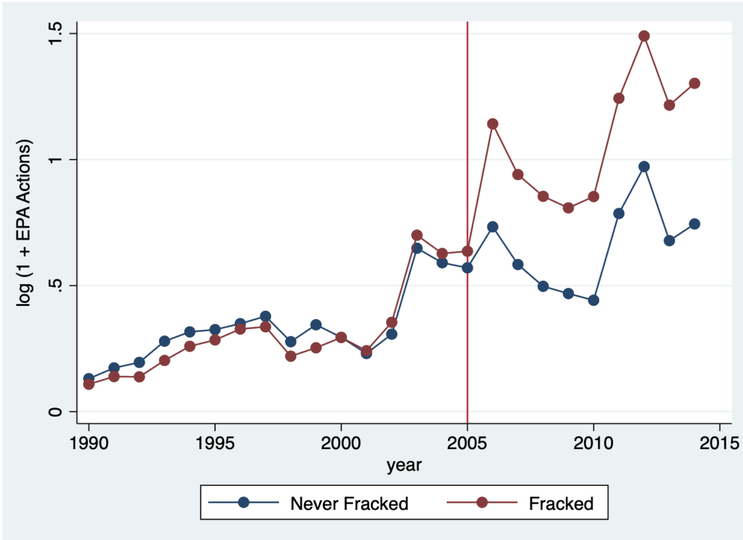
The econometric specification is as follows:

$$
\begin{aligned}
log(1 + Action_{i,t}) \;=\; \alpha \;+\; \delta\, fracked_i \;+\; \gamma\, Post\, 2005_t \;+ \\
\beta\, (fracked_i * Post\, 2005_t) \;+\; \theta_i \;+\; \eta_t \;+\; \epsilon_{i,t}
\end{aligned}
\tag{1}
$$

where i and t represent zip codes and years, respectively. $Action_{i,t}$ stands for the index of EPA regulatory activities. For the other EPA variables the econometric specification is the same. The variable $fracked_i$ takes the value of 1 if a zip code registered a fracking well at any point in the sample, and 0 otherwise; while $Post\ 2005_t$ takes the value of 1 for all years starting in 2005, and 0 otherwise. The coefficient of interest is β, which represents the difference in differences estimate. θ_i and η_t are zip code and year fixed effects. Finally, $\epsilon_{i,t}$ is the error term. Standard errors are clustered at the zip code level and all regressions are estimated by OLS.

The difference in differences design requires that pre-treatment trends in the treated and control group follow a similar path. Figure 2 shows the evolution of the log of EPA actions (plus one) in fracked and never fracked zip codes between 1990 and 2014. The red vertical line in 2005 represents the treatment year. Prior to 2005 both groups move in a similar way, and also the mean level of actions in fracked and never fracked zip codes is very similar. The divergence between both groups starts in 2005 and continues for the rest of the sample. Analog plots for the other EPA regulatory activities are relegated to Appendix B.I.

Figure 1: Parallel Trends - EPA Actions



Note: EPA actions (in logs) for zip codes with fracking (red) and places without fracking (blue). Red vertical line is the treatment year.

To further investigate for pre-treatment differences between both groups, I estimate the effect of having at least one fracking well on EPA activities before 2005. To perform this placebo test I estimate the effect of the *fracked* variable on each EPA outcome for the period 1990-2004. Results are shown in Appendix B.II. The coefficients are all insignificant and close to zero, further supporting this research design[9].

Next, I present the results for the effect of the fracking boom on EPA activities, as in Equation 1. In Table 1 I find a significant and positive effect of fracking on EPA activities. Contrary to a story based on regulatory capture, the fracking boom actually increased EPA presence in the zip codes with fracking activity. Having at least one fracking well increases the number of EPA actions by almost 43%. Facing a new, potentially polluting industry, the EPA increased oversight in these areas.

9. Given that the variable *fracked* does not vary over time in this sub sample, I use state fixed effects instead of zip code fixed effects.

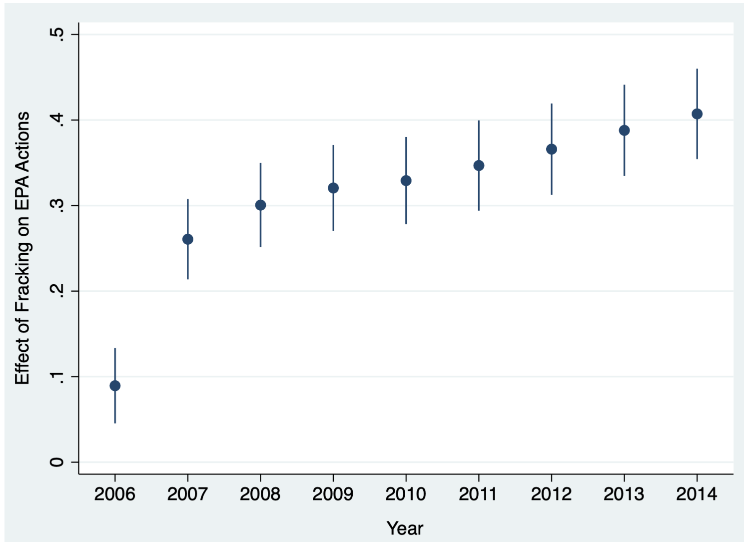
Table 1: Fracking and EPA Activity

Variables	(1) Action	(2) Inspection	(3) Enforcement	(4) Violation	(5) Penalty	(6) Penalty Amount
Fracked * Post 2005	0.425***	0.298***	0.0242***	0.401***	0.0182***	0.2317***
	(0.0270)	(0.0215)	(0.0051)	(0.0311)	(0.0050)	(0.0429)
Mean DV	0.4831	0.3591	0.0422	0.2779	0.0324	0.3139
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	146,500	146,500	146,500	146,500	146,500	146,500
Zip codes	5,860	5,860	5,860	5,860	5,860	5,860

Note: All dependent variables in logs. The variable *fracked * Post 2005* is the difference in differences estimate. Standard errors are clustered at the zip code level. *** p<0.001, ** p<0.01, * p<0.05.

To get a more complete picture of the effect of the fracking boom on EPA activity, in the next figure I analyze the dynamics of these effects, to see how they changed over time. In Figure **??**, I estimate the main specification as in Equation 1 for EPA actions by year. So, the first estimate goes from 1990 to 2006, one year after the fracking boom. The second estimate includes two years after the fracking boom, and so on. The effect is significant and positive in all cases, and it also increases over time. In Appendix C I show the point estimates and standard errors by year for each EPA outcome. The general picture is the same as in Figure **??**. The effects are always positive and almost in all cases significant at 5%. Interestingly, the estimated coefficients increase over time for all outcomes except penalties amounts, showing that the difference between fracking and no fracking zip codes grew as the fracking industry developed.

Figure 2: Effect of Fracking on EPA Actions Over Time



Note: Estimated effect of fracking on EPA actions by year. Each point represents the difference in differences estimate, with 95% confidence intervals.

To check for heterogeneity by industry, I estimate the main specification as in Equation 1 for two different ways of coding EPA regulatory activities. The AFS dataset includes the NAICS code of each facility on record. On the one hand, I estimate the effect of fracking on EPA activities for firms related to the oil and gas sector. These include different entries in the following two digit NAICS categories: Mining, Quarrying, and Oil and Gas Extraction (21), Utilities (22), Manufacturing (32), and Transportation and Warehousing (48). In the second specification, I include all the NAICS codes unrelated to the oil and gas sector (all the other NAICS codes not included in the previous specification). A list of all the economic activities included in the oil and gas related category, as well as the results for both specifications, is shown in Appendix D.

As expected, the fracking boom is associated with an increase in EPA activities in oil and gas related industries. More surprisingly, the effect is also positive and significant for actions, inspections, violations found and penalties amounts for non oil and gas related industries. One way to explain these results is to consider that EPA has a considerable amount of discretion in how and who to target, but also limited resources. If the fracking industry is making the EPA send more resources to these places, this could create an externality to other economic sectors. Given that EPA is already present in a fracking zip code, the marginal cost of investigating other facilities in those areas decreases. Importantly, the effect in non-oil related industries is not restricted to inspections and monitoring. These firms are also receiving higher fines for the violations found by EPA agents.

To sum up, I find evidence that the EPA increased its presence and activity due to the fracking boom. This effect is present in different types of industries, and increases over time. In the next section I rely on this regulatory enforcement shock in places with fracking to analyze if and how the private sector reacted to this increase in the regulatory burden.

EPA and Campaign Contributions

In this section I focus on the post fracking boom period (2006-2014), for which I find an increase in EPA's regulatory enforcement. To analyze how EPA activity affected the patterns of political contributions of the private sector, I use data on campaign contributions from the Database on Ideology, Money in Politics, and Elections: Public version 2.0 (DIME, (Bonica 2016)). Campaign contributions represent a suitable measure to analyze special interests' efforts to influence regulatory enforcement, and EPA enforcement in particular, for a number of reasons. First, at both the federal and state level, the executive and legislative branches exert control over the budget and oversight of the EPA and the states' environmental agencies, respectively. Second, as Kalla and Broockman (2016) show, campaign contributions facilitate access to politicians. Finally, working with professional lobbyists demands a lot of resources, so it is unlikely that small and medium size firms engage in this activity (Kerr, Lincoln, and Mishra 2014). As enforcement of the CAA goes well beyond large and productive firms, political contributions cover a larger share of affected firms.

Campaign contributions are aggregated at the zip code/year level and transformed into 2014 dollars. I then calculate the share of total contributions to the Republican party

(Republican contributions over the total amount of campaign contributions in that zip code). Observations that do not register any campaign contribution are excluded since this quantity is undefined (it would involve a division with a denominator equal to zero)[10]. I use this variable since the expectation is that, if EPA activities are promoting political participation, these effects should disproportionately benefit Republican candidates.

As I have shown before, fracking is associated with an increase in EPA activity, while extant research shows that fracking affected the patterns of campaign contributions. So, when estimating the effect of EPA activity on campaign contributions it is crucial to control for fracking activity. In all the following specifications I include the log of fracking wells plus one as a control variable. This is the most common measure of fracking intensity in the political science (Fedaseyeu, Gilje, and Strahan 2018; DiSalvo and Li 2020; Sances and You, Forthcoming) and economics literature (Gilje, Loutskina, and Strahan 2016; Feyrer, Mansur, and Sacerdote 2017). Even with no data on actual production, the number of wells should be a good proxy for the intensity of the fracking industry.

Given the multiple effects of fracking, this control variable might be insufficient. For example, the fracking boom had a large economic impact in many communities. So, it is important to control for these income effects on campaign contributions. Focusing on the share of contributions to Republicans only mitigates this problem partially. Some of the largest gains were made by individuals related to the oil and energy sector, who tend to favour the Republican party (Bonica 2013). To account for this channel of influence from fracking to campaign contributions, I include a series of variables to capture these income effects with data from the Quarterly Census of Employment and Wages. These include

10. In a balanced panel, I would have 29,300 observations in this section, so the loss of observations is not trivial. As this quantity is not defined for those zip codes that did not register any contribution, it is hard to make inferences about them. Nonetheless, the results from the previous section showing an increase of EPA enforcement after the fracking boom stand when restricting the sample to the zip codes with registered campaign contributions.

employment and weekly wages for all employees, and employment and weekly wages in the natural resources and mining industries. Since there is not such data at the zip code level, I assign the same value to each zip code within the same county.

To estimate the effects of EPA on campaign contributions I use the following panel specification:

$$\begin{aligned} Rep\ Cont_{i,t} \ = \ \alpha \ + \ \beta\ log(1 + Action_{i,t}) \ + \ \delta\ log(1 + fracking_{i,t}) \ + \ \nu \mathbf{X}_{i,t} \ + \\ \theta_i \ + \ \eta_t \ + \ \epsilon_{i,t} \end{aligned} \tag{2}$$

where i and t stand for zip codes and election cycles, respectively. $Rep\ Cont_{i,t}$ represents the share of contributions to Republicans. $Action_{i,t}$ stands for the index of EPA regulatory activities. For the other EPA variables the econometric specification is the same. The coefficient of interest here is β, which represents the effect of EPA activities on campaign contributions. The variable $fracking_{i,t}$ is the cumulative number of fracking wells. $\mathbf{X}_{i,t}$ includes total employment, total weekly wages, and employment and weekly wages for workers in the natural resources and mining sector, all four variables in logs. θ_i and η_t are zip code and election cycle fixed effects. Finally, $\epsilon_{i,t}$ is the error term. Standard errors are clustered at the zip code level and all regressions are estimated by OLS.

In Appendix E I show that there is no pre-treatment effect of EPA activities on campaign contributions prior to the fracking boom. In Table 2 I present the results for EPA actions, which is the category that includes every regulatory[11]. Column 1 shows a positive and significant effect of EPA actions on the share of contributions to Republicans. This specification includes as an independent variable only EPA actions, so in the next column I include the set of controls discussed in the previous paragraphs. Estimates remain almost the same, and an increase of 1% in EPA actions is associated with an increase in the share of

11. To ease interpretation, in this section I present the results for the aggregated measure of EPA actions. Each estimation is repeated in the Appendix for the disaggregated measures of EPA regulatory activities.

contributions to the Republican party of almost 0.01 points. When considering the different EPA regulatory activities separately, I find a positive effect for four of the six EPA variables. Full results are presented in Appendix F.I.

As I claimed before, most of regulatory activities under the CAA are carried out at the state level. So, aggregate regulatory activities and contributions at both the federal and state level can hide important dynamics. The AFS data separates the EPA activities done by federal agents, and the ones carried out by state agencies regarding the enforcement of the CAA. The states considered in this paper regularly conduct inspections, enforcement actions and even issue penalties. The AFS data distinguishes between actions carried out by federal EPA and state environmental agencies. Details on the construction of these variables are presented in Appendix A.

Table 2: EPA and Republican Contributions

Variables	(1) Rep Cont Total	(2) Rep Cont Total	(3) Rep Cont Federal	(4) Rep Cont Federal	(5) Rep Cont State	(6) Rep Cont State
Action	0.00963***	0.00922***				
	(0.0021)	(0.0021)				
Action Federal			0.00388	0.00443		
			(0.0035)	(0.0035)		
Action State					0.01658***	0.01569***
					(0.0026)	(0.0026)
Fracking		-0.00385		-0.0033		-0.00503
		(0.0037)		(0.0040)		(0.0048)
Mean DV	0.45	0.45	0.43	0.43	0.50	0.50
Controls	No	Yes	No	Yes	No	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,929	26,781	25,331	25,219	22,882	22,774
Zip codes	5,766	5,740	5,634	5,609	5,564	5,536

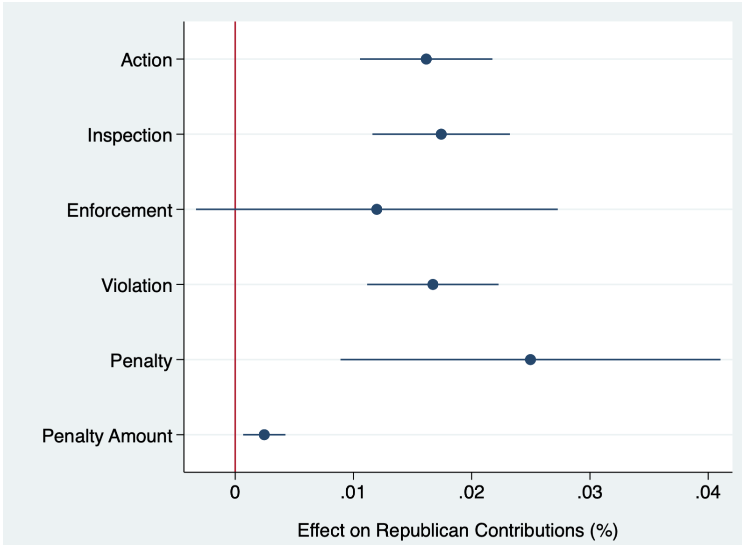
Note: Dependent variables are the share of campaign contributions to Republicans in all races (Columns 1 and 2), federal races (Columns 3 and 4), and state races (Columns 5 and 6). Independent variables in logs. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** p<0.001, ** p<0.01, * p<0.05.

If firms are reacting to an increase in EPA actions carried out at the federal level, the expectation is that they target politicians at this level of government. To analyze this possibility I estimate a similar model as in Equation 2, including only federal EPA activities and contributions to federal races. The results in Column 3 and 4 of Table 2 show no effect of EPA federal actions in contributions to federal races. In Appendix F.II I present the results for the six federal EPA dependent variables and find no significant effect.

Another possibility is that special interests are reacting to an increase in environmental regulatory burden at the state level. State environmental agencies have the tools to conduct inspections, enforcement actions, and issue penalties. In fact, most of the regulatory actions under the CAA are carried out at the state level. To study this possibility I estimate a similar model as in Equation 2, including only state EPA activities. The dependent variable is the share of campaign contributions to Republican candidates in state races. Results are shown in Columns 5 and 6 in Table 2. In stark contrast with the previous findings, I find a positive and significant effect of state actions on contributions to Republicans in state races. A 1% increase in state EPA actions is associated with an increase of almost 0.017 points in the share of total contributions to Republicans. Importantly, the coefficients for EPA actions in this specification almost double the estimates for the specification including both federal and state contributions and EPA activities. The number of observations decreases a little since I have to drop the observations that do not register any campaign contribution for state races[12]. Figure 3 shows a positive and significant effect of EPA state actions, inspections, violations found, penalties and penalties amount on the share of Republican contributions in state races. Full results in Appendix F.III.

12. The null findings for federal EPA actions and races in Columns 3 and 4 in Table 2 do not change when I restrict the sample to the cases for which there is also contributions to state races.

Figure 3: State EPA Activities



Note: Estimated effect of EPA variables carried out by state officials on the share of contributions to Republicans in state races.

Robustness Checks

The main takeaway of the previous results is that interest groups increase their contributions to the Republican party for state elections as a response for EPA activities carried out at the state level, but not at the federal level. To further back these results I perform a number of checks. First, I estimate the model for EPA state actions and state races for the pre fracking boom period. My argument rests on the idea that the fracking boom provided a shock in the regulatory burden that increased campaign contributions. If the observed effects in Figure 3 are also present in the years before the fracking boom, that would compromise this research design. As I show in Appendix G.I, this is not the case.

Then, I estimate a similar model as in Equation 2 for the share of contributions to Republican in state races including both federal and state EPA activities, separately. Results are presented in Appendix G.II. Five out of the six measures of EPA state activities are significant and have the expected sign (expect enforcement activities). On the other hand, coefficients for EPA federal activities are mostly insignificant, and some have negative signs. Only federal actions and federal violations have a positive and significant coefficient. These two variables are also the two federal activities that are more correlated with state activities, as shown in Appendix G.II.

Third, I use different measures of fracking intensity. In the previous specifications I controlled for the log of the cumulative of fracking wells at the zip code level. As a second measure of fracking production I create a dummy variable that takes the value of 1 if zip code i is located in one of the major shale plays in the seven states under analysis. Third, I include both of these measures and the interaction between the two. Here again I find that EPA state activities are associated with an increase in campaign contributions to Republican candidates in state races. Details and full results are presented in Appendix G.III.

Finally, as a placebo check I analyze the effect of EPA state actions on federal elections, and the effect of EPA federal actions on state elections (Appendix G.IV). If my argument is true, there should not be any effect here, since in both cases firms would be targeting the wrong level of government. When running these models I only find a significant effect for two of six EPA federal activities on state races, while I find no significant effect on EPA state activities on contributions to federal races.

Candidates and Contributors

After showing that EPA activities increased the share of contributions to Republicans, I analyze if this increase is uniform or if some candidates are benefiting more than others. If contributors are trying to get rid of environmental regulatory enforcement, the expectation is that less pro environmental candidates should benefit more. Research has shown that ideology is the strongest predictor of environmental attitudes, with more conservative individuals caring less for environmental protection (Hornsey et al. 2016).

Using the CF scores from Bonica's data, I divide into quintiles according to their ideology, with the first quintile including the least conservative candidates, and the fifth quintile including the most conservative candidates. Then, I divide each quantile for the total contributions to Republican candidates. The resulting measure is the share of contributions to candidates in quintile k, over total contributions to Republicans. Results are shown in Appendix H.I. I find no effect for the most liberal candidates in Columns 1 and 2. This is not surprising, since Republicans contribute little to liberal politicians. The other three columns show that EPA actions are associated with a decrease in the share of contributions to moderate (Column 3) and conservative candidates (Column 4), and a corresponding increase in the share of contributions to the most conservative candidates (Column 5). These results suggest that increased EPA activity made Republican contributors move from moderate candidates to very conservative ones.

Second, I estimate the same model as in Equation 2 for contributions made by an individual or an organization, separately. My argument focuses on interest groups and firms, and it is also less likely that individuals are as responsive to regulatory actions as firms. So, if my story is correct, we should observe the same patterns for state EPA actions and contributions when restricting the sample to contributions from organizations. These results are shown in Appendix H.II. While I find positive effects of EPA actions on both types of contributors, the estimated effects on contributions from organizations are more significant and estimated coefficients are larger.

Environmental Consequences

So far, I find that EPA state activities are associated with an increase in the share of contributions to Republicans in state races, and that this increase favored the most conservative candidates in the party. In this last section I analyze if state Republican politician affect environmental outcomes. My outcome of interest is air pollution, measured as particulate matter 2.5 (PM 2.5) concentration level. Particulate matter refers to small solid and liquid particles in the air. Although it comes from many sources, the largest source is human-made, with natural sources accounting for just a little share of total concentrations. The main source of PM is the combustion of fossil fuels. There are different ways of measuring

PM according to the size of the particles. PM 2.5 refers to particles in the air that are smaller than 2.5 micrometers. This is a pervasive type of air pollution which is regulated by the CAA.

I focus on this outcome for two reasons. First, the regulatory activities that I have shown are associated with an increase in contributions to Republicans are related to the CAA. Even as politicians can affect different environmental outcomes, if my argument is correct, the effects on policy outcomes should be related to the CAA. Regulation has been shown to be responsible for a large share of the decrease in per capita emissions and pollution in the U.S. This is particularly true for the case of the EPA and the CAA (Shapiro and Walker 2018; Currie and Walker 2019). These studies show that regulatory enforcement actually affects pollution and that these variables are correlated. Second, Currie, Voorheis, and Walker (2020) show that EPA enforcement had a large effect on PM 2.5. Also, reversal of many regulations and enforcement efforts during the Trump administration have served as an experiment to show that environmental outcomes actually react quickly to changes in regulation. The declining trend in PM 2.5 started reversing in 2017, just one year into the new Republican administration (Clay and Muller 2019).

I analyze if the politicians that benefited from the increase in contributions due to increased regulatory activity had an effect on environmental outcomes. The expectation is that Republican politicians should be associated with a worsening of environmental outcomes, given their approach to environmental regulation. I use state House districts as the unit of analysis, and check if electing Republican legislators is associated with an increase in PM 2.5 concentrations.

For this empirical exercise I rely on several datasets, and the details of the sample construction can be consulted in Appendix I. I restrict the sample to the seven states analyzed in this paper and to the years 2002 to 2011 to avoid complications due to redistricting. I use data on PM 2.5 concentrations from Wu et al. (2020), and information on state legislators comes from Shor and McCarty (2011).

The empirical specification is as follow:

$$PM2.5_{i,t} = \alpha + \beta\ Republican_{i,t} + \delta\ log(1 + fracking_{i,t}) + \nu \mathbf{X}_{i,t} + \theta_i + \eta_t + \epsilon_{i,t} \tag{3}$$

where i and t stand for state electoral districts and years, respectively. $PM2.5_{i,t}$ represents the level of PM 2.5 concentration. $Republican_{i,t}$ takes the value of one if district i on year t had a Republican representative, and zero otherwise[13]. The coefficient of interest here is β, which represents the effect of Republican legislators on PM 2.5 concentrations. The variable $fracking_{i,t}$ is defined as before, and it is included since it affects both the electoral fortune of the Republican party and the level of pollution. $\mathbf{X}_{i,t}$ includes a series of control variables described in the following paragraph. θ_i and η_t are electoral districts and year fixed effects. Finally, $\epsilon_{i,t}$ is the error term. Standard errors are clustered at the electoral district level. Given that I use electoral district fixed effects, identification comes from changes in the partisanship of state representatives.

The set of control variables is taken from the American Community Survey, 5 year waves. Starting in 2009 this data is available at the state legislative district level. For the years between 2002 and 2008 I use a combination of ACS 2009 and 2000 Census data, as described in Appendix I. Control variable include real median income (in logs), total population (in logs), unemployment rate, education (as the percentage of adults with a bachelor degree), and the percentage of white population. I also include the share of the labour force in 13 different industries.

Results are presented in Table 3. In Columns 1 and 2 the coefficient of interest is positive and significant, indicating that having a Republican representative is associated with an in-

13. For those cases in which, in a given year, there was an special election or another reason for a change in the party representing that district, I assign a value of 0.5 to this variable. Results remain unchanged when dropping these cases.

crease of 0.1442 in PM 2.5 concentration. As I showed before, the increase in contributions to Republicans due to increased regulatory oversight concentrated more in the most conservative legislators. So, in Column 3 I interact the variable *Republican* with the ideology of the legislators, taken from Shor and McCarty (2011). The interaction term is positive and significant, implying that the positive effect on PM 2.5 concentration is larger for more conservative Republican representatives.

Table 3: PM 2.5 Concentration

	PM 2.5 Concentration				
	(1)	(2)	(3)	(4)	(5)
Republican	0.14418**	0.10082*	-0.12832	0.08324	0.05145
	(0.0465)	(0.0443)	(0.0823)	(0.0434)	(0.0496)
Ideology			-0.26148***		
			(0.0738)		
Republican * Ideology			0.59214***		
			(0.1172)		
Majority				0.2017***	
				(0.0359)	
Republican *Majority				-0.01289	
				(0.0404)	
Governor					-0.34251***
					(0.0348)
Republican * Governor					0.1027*
					(0.0504)
Mean DV	9.65	9.50	9.50	9.50	9.50
Controls	No	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	7,113	5,628	5,628	5,628	5,628
Districts	735	735	735	735	735

Note: Dependent variable in all columns is the concentration of PM 2.5. Sample construction and information on control variables is available in Appendix I. Standard errors are clustered at the electoral district level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

To further investigate the effects of state politicians on environmental outcomes, in Column 4 I interact the variable of interest with an indicator of Republican majority in the state House (*Republican * Majority*) and find no conditional effect. That is to say, the effect of Republican representatives on PM 2.5 is not conditional on Republicans holding the majority in the lower chamber of the legislature. Finally, in Column 5 I interact *Republican* with a variable that takes the value of 1 when the state has a Republican governor (*Republican * Governor*). In this case the results show that the positive effect on pollution of having a Republican legislator is only present when a Republican also holds the governorship.

Although only indirect, these results point to the benefits that the donors helping Republicans get elected can receive in return. As shown by extant research, regulatory actions such as enforcement of the CAA have a substantial and rather quick effect on pollution. EPA activities are making donors favor the Republican party (in particular, the most conservative candidates), whose legislators are associated with higher levels of air pollution.

Conclusion

Regulatory enforcement is crucial if public policy is to achieve its goals. Although the literature has shown how the private sector can try to influence regulators, less is known about how government regulations can affect private political engagement. Analyzing zip code level data for the seven states in which the fracking boom took place I show that EPA regulatory activities under the CAA increased because of the new fracking industry. This enables me to study SIGs in a context of increased regulatory burden.

Departing from most literature on SIGs and regulatory agencies, I distinguish between enforcement carried out by federal and state agencies. As is the case with other federal agencies and statutes, the CAA is mostly enforced by the states and their environmental agencies. I show that state regulatory enforcement is associated with an increase in campaign contributions to Republicans in state races. On the other hand, I find no effect for federal enforcement or federal races. These results highlight the importance of taking into account the federal structure of regulatory enforcement. When considering all types of enforcements together, my analysis shows mixed results, misrepresenting the actual behavior of SIGs. Overall, these results provide important insights for future work on regulatory enforcement and SIGs at the federal and state level.

The question of what SIGs get out of their contributions in terms of regulatory policy remains open. The Republican party has historically been more reluctant towards environmental regulations, and their distance in this issue from Democrats has increase in the last two decades. I present some evidence suggesting the Republican state politicians might be more lenient in terms of environmental enforcement. Although suggestive, this is only indirect evidence since I do not measure legislators' actual actions or efforts to affect environmental outcomes. Future research should focus on the link between state politics and regulatory enforcement. Although there is a large literature on political influence on the bureaucracy at the federal level, less is known about what happens at the state level and what are the specific mechanisms by which state politicians can affect monitoring of federal and state mandates.

Finally, this study is also relevant for environmental policy in the U.S. Given the importance of states in fighting global warming, recent studies have shown how firms and interest groups can hamper stricter laws and regulations in the states (Stokes 2020). Here I argue that interest groups operating at the state level can try to affect how federal regulation is enforced. A possible avenue for future research would be to analyze if the benefits of such a semi-decentralized enforcement arrangement of the EPA compensate for the larger leverage that interest groups opposed to environmental regulation could have at the state level.

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Appendix: Supporting Information for

Regulation and Private Political Participation EPA Enforcement during the Fracking Boom

Contents

A AFS Variables and Descriptive Statistics

The Air Facility System is the national repository for air stationary source surveillance and state enforcement activity. It covers from large industrial facilities to small ones, such as dry cleaners. In this data set, each federal or state activity covered by the Clean Air Act and reported in the AFS constitutes an observation. For almost all variables each observation takes the value of one or zero. Given that this is a list of regulatory activities, the most comprehensive measure (EPA actions) takes the value of one for each observation in the dataset. Other variables may also receive a zero. For example, an inspection that does not lead to a penalty has a value of one for *action* and *inspection*, but a value of zero for *penalty*. The only EPA variable that is not dichotomous is the amount of the penalty issued. These values are expressed in 2014 dollars .

One thing to notice is that emissions and violations control covered in this data do not necessarily require in-person inspections. A part of the control over facilities is done electronically. This is not uncommon in EPA data. For example, the Toxic Release Inventory relies on information submitted by facilities. The consequence of this is that the violations category is not completely contained by the inspections variables. That is to say, we can find some observations that report a violation found, but not an in-person inspection.

The following table shows the codes for all agency activities in the AFS data. Both the AFS data and the codebook can be found in the following link: https://echo.epa.gov/tools/data-downloads.

Table A1: EPA Activities - AFS Codes

Code	Description	Code	Description
1A	EPA INSPECTION - LEVEL 2 OR GREATER	C7	CLOSEOUT MEMO ISSUED
1B	113(D)(4) INNOV. TECH. ORDER APPROVD/ISS	C8	DECREE LODGED
1C	APPLICATION TO EPA COMPLETE	CB	TITLE V ANNUAL COMPL CERT DUE/RECVD BY
2A	EPA CONDUCTED STACK TEST	CC	TITLE V COMPLIANCE CERT DUE/RECEIVED BY
2C	EPA PSD PERMIT ISSUED	EC	EPA INVESTIGATION CONDUCTED
2D	CONSENT AGREEMENT FILED	ED	EPA/STATE DEMAND LETTER
2K	COMPL BY STATE, NO ACT REQ	EE	COMPLAINT ON-SITE PCE (EPA)
2L	PROPOSED SIP REVISION TO COMPLIANCE	EI	EPA INVESTIGATION STARTED
3A	OWNER/OPERATOR CONDUCTED SOURCE TEST	EM	PROCESS OFF-SITE PCE (EPA)
3C	NEW SOURCE COMMENCE CONSTRUCTION	EO	ON-SITE PCE OBSERVATION (EPA)
3E	WARNING NOTIFICATION OF VIOLATION	ER	TITLE V COMPLIANCE CERTIFICATION REVIEW BY EPA
3F	WARNING SUBSTANTIVE VIOLATION	ES	EPA PCE/ON-SITE (PCE = Partial Compliance Evaluation)
4A	NESHAP WAIVER OF COMPLIANCE ISSUED	EX	EPA PCE/OFF-SITE
4C	NEW SOURCE START-UP	FE	EPA FCE/ON-SITE (FCE = Full Compliance Evaluation)
4D	STATE NONCOMPLIANCE PENALTY ASSESSED	FF	STATE CONDUCTED FCE/OFF-SITE
5A	EPA PRE-NOV LETTER SENT	FS	STATE CONDUCTED FCE/ON-SITE
5C	STATE INSPECTION - LEVEL 2 OR GREATER	FZ	EPA CONDUCTED FCE/OFF-SITE
5D	STATE PSD APPLICABILITY DETERMINATION	HR	113D HEARING
6A	EPA NOV ISSUED	LL	EPA SECTION 114 LETTER
6B	EPA COURT CONSENT DECREE	OT	OTHER ADDRESSING ACTION
6C	STATE CONDUCTED STACK TEST	PC	COMPLAINT ON-SITE PCE (STATE)
6D	STATE PSD APPLICATION COMPLETE	PO	ON-SITE PCE OBSERVATION (STATE)
7A	NOTICE OF NONCOMPLIANCE (SECTION 120)	PP	PERMIT ON-SITE PCE (STATE)
7C	STATE NOV ISSUED	PR	PROCESS OFF-SITE PCE (STATE)
7D	STATE PSD PERMIT ISSUED	PS	STATE PCE/ON-SITE
7E	EPA 167 ORDER	PX	STATE PCE/OFF-SITE
7F	113D APO COMPLAINT FILED.	SC	STATE INVESTIGATION CONDUCTED
7G	COMPL BY EPA, NO ACT REQ	SD	STATE DEMAND LETTER
8A	EPA 113(A) ORDER ISSUED	SE	113(D) SETTLEMENT
8B	113(D) PENALTY ORDER FILED	SI	STATE INVESTIGATION STARTED
8C	STATE ADMINISTRATIVE ORDER ISSUED	SR	TITLE V COMPLIANCE CERTIFICATION REVIEW BY STATE
8D	OFFSET APPLICABILITY DETERMINATION	ST	AGENCY NON-MDR STACK TEST
9A	113(D) DELAYED COMPL.	TE	EPA REQ STACK TEST/NOT OBSVD
9B	EPA PSD APPLICABILITY DETERMINATION	TO	EPA REQ (O/O COND) STACK TEST OBSERVED & REVIEWED
9D	OFFSET PERMIT ISSUED	TR	STATE REQ (O/O COND) STACK TEST/NOT
C1	113 CONFERENCE	VR	VIOLATION RESOLVED
C4	FINAL COMPLIANCE	WD	EPA 113D WITHDRAWN

The following list presents the categories included in each of the EPA variables used in this paper.

- EPA actions: all codes included in Table 1.

- EPA inspections: 1A, 5C, EM, EO, ES, EX, FF, FS, FE, FZ,PC, PO, PP, PR, PS, PX.

- EPA enforcement: 1B, 2D, 6B, 7A, 7E, 7F, 8A, 8C, 9A.

- EPA violations: takes the value of one is the variable "all_violating_poll_codes" is non-missing.

- EPA penalties: takes the value of one if the variable "penalty_amount" is greater than zero.

- EPA penalty amounts: taken directly from AFS data. Values converted to 2014 dollars.

- State actions: 2C, 2D, 2E, 2K, 4D, 5C, 6B, 5D, 6D, 7A, 7C, 7D, 8C, FE, FF, FS, FZ, PC, PP, PR, PS, PX, SC, SD, SI, TR, TS.

- State inspections: 5C, FE, FF, FS, FZ, PC, PO, PP, PS, PR, PX.

- State enforcement: 6B, 7A, 8C, 9A.

- State violations: takes the value of one if "EPA violation" and "State action" are equal to one.

- State penalties: takes the value of one if "EPA penalty" and "State action" are equal to one.

- State penalty amounts: equal to “EPA penalty amounts” if “State action” is equal to one.
- Federal actions: equal to “EPA actions” minus “State action”.
- Federal inspections: equal to “EPA inspections” minus “State inspections”.
- Federal enforcement: equal to “EPA enforcement” minus “State enforcement”.
- Federal violations: equal to “EPA violations” minus “State violations”.
- Federal penalties: equal to “EPA penalties” minus “State penalties”.
- Federal penalty amounts: equal to “EPA penalty amounts” minus “State penalty amounts”.

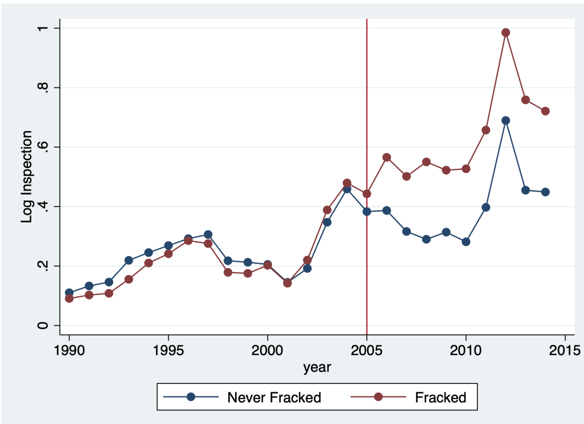
Table 2 shows descriptive statistics for the variables used in this paper.

Table A2: Descriptive statistics

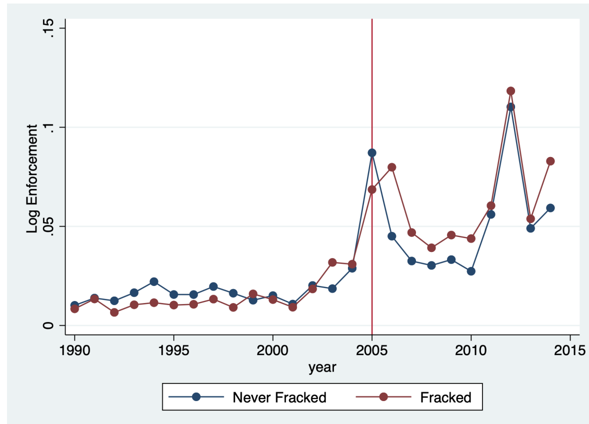
Variables	Obs	Mean	Std. Dev.	Min	Max
Actions	146,500	2.0862	10.2615	0	943
Federal Actions	146,500	0.5139	4.3697	0	858
State Actions	146,500	1.5723	7.9904	0	666
Inspections	146,500	1.223	6.3746	0	518
Federal Inspections	146,500	0.1000	0.1965	0	22
State Inspections	146,500	1.2127	6.3432	0	516
Enforcement	146,500	0.0614	0.4885	0	30
Federal Enforcement	146,500	0.0028	0.0507	0	2
State Enforcement	146,500	0.0591	0.4830	0	29
Violations	146,500	1.3493	9.4024	0	930
Federal Violations	146,500	0.3778	4.2439	0	856
State Violations	146,500	0.9719	7.2119	0	666
Penalties	146,500	0.044	0.4114	0	30
Federal Penalties	146,500	0.0047	0.1066	0	10
State Penalties	146,500	.0329	0.0392	0	30
Penalty Amount	146,500	2,884	216,139	0	7.52e+07
Federal Penalties Amount	146,500	810.8852	164,966	0	6.26e+07
State Penalties Amount	146,500	3,323.689	230,591.3	0	7.85e+07
Fracking Wells	146,500	0.7957	11.3016	0	1070
Fracked	146,500	0.2076	0.4055	0	1
Rep Contributions (%)	56,871	0.5665	0.3532	0	1
Federal Rep Contributions (%)	50,629	0.5957	0.3617	0	1
State Rep Contributions (%)	39,431	0.5144	0.3761	0	1
Employment	35,462	149,032	343,749	0	2,329,021
Wages	35,462	781	180	0	1800
Employment Nat Res and Mining	35,462	2,790	11,137	0	93,675
Wages Nat Res and Mining	35,462	1,115	699	0	4,556

B EPA Activities - Checks

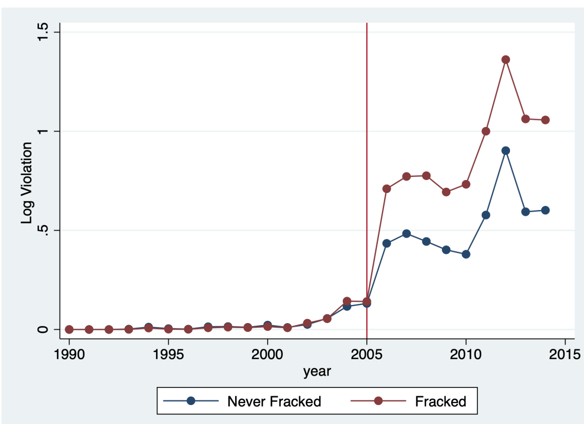
B.I Parallel Trends



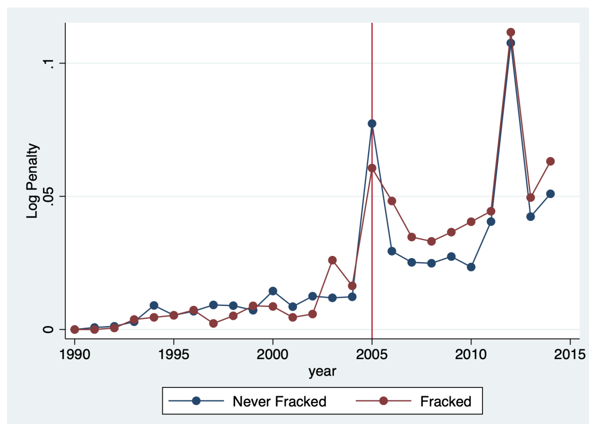
((a)) Inspections



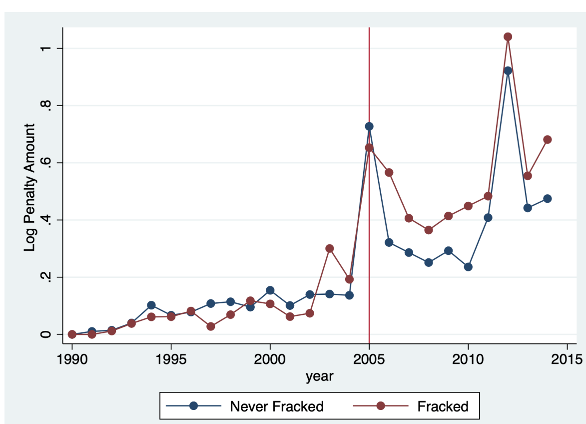
((b)) Enforcement



((c)) Violations



((d)) Penalty



((e)) Penalty Amount

Figure A1: Parallel Trends

B.II Pre Treatment Effects

Table A3: Pre treatment Effects

Variables	(1) Action	(2) Inspection	(3) Enforcement	(4) Violation	(5) Penalty	(6) Penalty Amount
Fracked	0.0244	0.0168	-0.00023	0.00127	-0.00003	0.00382
	(0.0151)	(0.0121)	(0.0018)	(0.00194)	(0.0001)	(0.0110)
Mean DV	0.3180	0.2516	0.0190	0.0264	0.0090	0.1033
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	87,900	87,900	87,900	87,900	87,900	87,900
Zip codes	5,860	5,860	5,860	5,860	5,860	5,860

Note: All dependent variables in logs. The variable *fracked* takes the value of 1 if a zip code registered at least one fracking well between 1990 and 2014, and 0 otherwise. The sample is restricted to the pre fracking boom period (1990-2004). Standard errors are clustered at the zip code level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

C Effect of Fracking on EPA Activities

Table A4: Effects by year

	Estimate	SE	N		Estimate	SE	N
Action				*Inspection*			
1990-2006	0.261	0.0239	99,620	1990-2006	0.136	0.0165	99,620
1990-2007	0.301	0.0251	105,480	1990-2007	0.158	0.0154	105,480
1990-2008	0.321	0.0256	111,340	1990-2008	0.2128	0.0212	111,340
1990-2009	0.330	0.0260	117,200	1990-2009	0.2385	0.0214	117,200
1990-2010	0.347	0.0269	123,060	1990-2010	0.2540	0.0219	123,060
1990-2011	0.366	0.0272	128,920	1990-2011	0.2574	0.0223	128,920
1990-2012	0.3879	0.0272	134,780	1990-2012	0.2674	0.0231	134,780
1990-2013	0.4072	0.0270	140,640	1990-2013	0.2738	0.0225	140,640
1990-2014	0.4246	0.0270	146,500	1990-2014	0.2836	0221	146,500
Enforcement				*Violation*			
1990-2006	0.0432	0.0082	99,620	1990-2006	0.2179	0.0229	99,620
1990-2007	0.0399	0.0066	105,480	1990-2007	0.2688	0.0261	105,480
1990-2008	0.0329	0.0058	111,340	1990-2008	0.2919	0.0272	111,340
1990-2009	0.0290	0.0054	117,200	1990-2009	0.3021	0.0278	117,200
1990-2010	0.0278	0.0051	123,060	1990-2010	0.3206	0.0286	123,060
1990-2011	0.0250	0.0049	128,920	1990-2011	0.3419	0.0297	128,920
1990-2012	0.0230	0.0050	134,780	1990-2012	0.3644	0.0304	134,780
1990-2013	0.0218	0.0049	140,640	1990-2013	0.3836	0.0306	140,640
1990-2014	0.0242	0.0051	146,500	1990-2014	0.4010	0.0311	146,500
Penalty				*Penalty Amount*			
1990-2006	0.0368	0.0078	99,620	1990-2006	0.3741	0.0683	99,620
1990-2007	0.0350	0.0061	105,480	1990-2007	0.3272	0.0549	105,480
1990-2008	0.0254	0.0054	111,340	1990-2008	0.2778	0.0488	111,340
1990-2009	0.0222	0.0050	117,200	1990-2009	0.2501	0.0455	117,200
1990-2010	0.0219	0.0049	123,060	1990-2010	0.2503	0.0436	123,060
1990-2011	0.0195	0.0047	128,920	1990-2011	0.2286	0.0425	128,920
1990-2012	0.0173	0.0048	134,780	1990-2012	0.2156	0.0420	134,780
1990-2013	0.0165	0.0047	140,640	1990-2013	0.2099	0.0416	140,640
1990-2014	0.0182	0.0049	146,500	1990-2014	0.2317	0.0429	146,500

Note: Difference in differences estimates of fracking on EPA activities for different sample ranges.

D Oil Related Industries

The following table shows the NAICS codes I use to classify firms into the category oil/gas related industry. Every firm in the sample with one of the following NAICS codes is considered oil/gas related. Firms with other codes are considered non-oil/gas related.

Table A5: NAICS Codes

Code	Title
211120	Crude Petroleum Extraction
211130	Natural Gas Extraction
212230	Copper, Nickel, Lead, and Zinc Mining
213111	Drilling Oil and Gas Wells
213112	Support Activities for Oil and Gas Operations
221112	Fossil Fuel Electric Power Generation
221210	Natural Gas Distribution
324110	Petroleum Refineries
324121	Asphalt Paving Mixture and Block Manufacturing
324122	Asphalt Shingle and Coating Materials Manufacturing
324191	Petroleum Lubricating Oil and Grease Manufacturing
324199	All Other Petroleum and Coal Products Manufacturing
486110	Pipeline Transportation of Crude Oil
486210	Pipeline Transportation of Natural Gas
486910	Pipeline Transportation of Refined Petroleum Products
486990	All Other Pipeline Transportation

Table 5 shows the results for oil/gas related industries and non-oil/gas related industries. The econometric specification is the same as in Equation 1 in the paper. In the upper panel I only include EPA activities for firms related to the oil and gas sector. As expected, the estimates are positive and significant. In the lower panel I find a positive and significant effect for four of the six measures of EPA activity for non oil/gas related industries. One possible explanation for this is that, given that EPA is deploying resources to fracking areas, the oversight costs for other firms in those places decreases.

Table A6: Oil vs Non-oil Industries

Variables	(1) Action	(2) Inspections	(3) Enforcement	(4) Violation	(5) Penalty	(6) Penalty Amount
OIL INDUSTRY						
Fracked * Post 2005	0.1968***	0.124***	0.00808**	0.204***	0.00682**	0.0788**
	(0.0177)	(0.0124)	(0.0024)	(0.0203)	(0.0025)	(0.0227)
Mean DV	0.1392	0.0953	0.0090	0.0821	0.0069	0.06960
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	146,500	146,500	146,500	146,500	146,500	146,500
Zip codes	5,860	5,860	5,860	5,860	5,860	5,860
NON-OIL INDUSTRY						
Fracked * Post 2005	0.3355***	0.241***	0.0154**	0.302***	0.0102*	0.145***
	(0.0250)	(0.0198)	(0.0046)	(0.0283)	0.0043	0.0379
Mean DV	0.4084	0.3057	0.0353	0.2347	0.0271	0.2667
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	146,500	146,500	146,500	146,500	146,500	146,500
Zip codes	5,860	5,860	5,860	5,860	5,860	5,860

Note: All dependent variables in logs. The variable *fracked * Post 2005* is the difference in differences estimate.. Oil and non-oil related industries coding based on NAICS codes as described in text. Standard errors are clustered at the zip code level. *** p<0.001, ** p<0.01, * p<0.05.

E EPA and Campaign Contributions - Pre Treatment Effects

Table A7: Pre-treatment Effects

	Republican Contributions (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	-0.00002					
	(0.0029)					
Inspection		-0.00341				
		(0.0029)				
Enforcement			0.02005			
			(0.0112)			
Violation				0.01316*		
				(0.0051)		
Penalty					-0.00074	
					(0.0129)	
Penalty Amount						-0.00001
						(0.0012)
Fracking	-0.05873	-0.05832	-0.0599	-0.0599	-0.0587	-0.05874
	(0.0332)	(0.0332)	(0.0333)	(0.0332)	(0.0332)	(0.0332)
Mean DV	0.37	0.37	0.37	0.37	0.37	0.37
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,319	33,319	33,319	33,319	33,319	33,319
Zip codes	5,657	5,657	5,657	5,657	5,657	5,657

Note: Dependent variable in all columns is the share of total contributions to Republicans. Independent variables in logs. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

F EPA and Campaign Contributions

F.I Federal and State Races

Table A8: EPA and Republican Contributions

	Republican Contributions (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	0.00922***					
	(0.0021)					
Inspection		0.0051*				
		(0.0022)				
Enforcement			0.0099			
			(0.0053)			
Violation				0.00955***		
				(0.0021)		
Penalty					0.01366*	
					(0.0055)	
Penalty Amount						0.00105
						(0.0006)
Fracking	-0.00385	-0.00304	-0.00293	-0.00388	-0.00294	-0.00294
	(0.0037)	(0.0037)	(0.0038)	(0.0037)	(0.0037)	(0.0038)
Mean DV	0.45	0.45	0.45	0.45	0.45	0.45
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,781	26,781	26,781	26,781	26,781	26,781
Zip codes	5,740	5,740	5,740	5,740	5,740	5,740

Note: Dependent variable in all columns is the share of total contributions to Republicans. Independent variables in logs. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

F.II Federal Races

Table A9: Federal EPA Activities

	Republican Contributions (%) - Federal Races					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	0.00443					
	(0.0035)					
Inspection		-0.00117				
		(0.0130)				
Enforcement			0.03637			
			(0.0268)			
Violation				0.00465		
				(0.0035)		
Penalty					0.00101	
					(0.0172)	
Penalty Amount						0.00092
						(0.0020)
Fracking	-0.0033	-0.00289	-0.00291	-0.00331	-0.00291	-0.0029
	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)
Mean DV	0.43	0.43	0.43	0.43	0.43	0.43
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,219	25,219	25,219	25,219	25,219	25,219
Zip codes	5,609	5,609	5,609	5,609	5,609	5,609

Note: Dependent variable in all columns is the share of total contributions to Republicans in federal races. Independent variables in logs. EPA variables for federal activities. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

F.III State Races

Table A10: State EPA Activities

	Republican Contributions (%) - State Races					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	0.01569***					
	(0.0029)					
Inspection		0.01777***				
		(0.0028)				
Enforcement			0.01188			
			(0.0066)			
Violation				0.01581***		
				(0.0026)		
Penalty					0.02084**	
					(0.0069)	
Penalty Amount						0.00207*
						(0.0008)
Fracking	-0.00503	-0.00442	-0.0043	-0.00504	-0.00438	-0.00442
	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0048)
Mean DV	0.50	0.50	0.50	0.50	0.50	0.50
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,774	22,774	22,774	22,774	22,774	22,774
Zip codes	5,536	5,536	5,536	5,536	5,536	5,536

Note: Dependent variable in all columns is the share of total contributions to Republicans in state races. Independent variables in logs. EPA variables for state activities. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** p<0.001, ** p<0.01, * p<0.05.

G Robustness Checks

G.I Pre Fracking Boom Period

Table A11: Pre Fracking Boom Period

	Republican Contributions (%) - State Races					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	-0.01023**					
	(0.0039)					
Inspection		-0.01060**				
		(0.0039)				
Enforcement			0.00348			
			(0.0184)			
Violation				0.00949		
				(0.0076)		
Penalty					-0.0082	
					(0.0244)	
Penalty Amount						-0.00010
						(0.0019)
Fracking	-0.03573	-0.03645	-0.03599	-0.03603	-0.03548	-0.03576
	(0.0361)	(0.0361)	(0.0363)	(0.0364)	(0.0362)	(0.0363)
Mean DV	0.49	0.49	0.49	0.49	0.49	0.49
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,117	20,117	20,117	20,117	20,117	20,117
Zip codes	5,350	5,350	5,350	5,350	5,350	5,350

Note: Dependent variable in all columns is the share of total contributions to Republicans in state races. Independent variables in logs. EPA variables for state activities. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. The time span of this specification goes from 1990 to 2004. Standard errors are clustered at the zip code level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

G.II State and Federal EPA activities

The following table shows the correlation between the different measures of EPA regulatory activity at the federal and state level. These correlations are rather small, except for the aggregated index of regulatory actions and for violations found. In Table 12 I include both federal and state activities in each model. I find a positive effect of EPA state activities on Republican contributions for the six different independent variables. On the other hand, the only federal level variables that have a significant effect are the ones who have the stronger correlation with their state counterpart.

Table A12: Correlation between Federal and State Enforcement

State \ Federal	Action	Inspection	Enforcement	Violation	Penalty	Penalty Amount
Action	0.6797					
Inspection		0.1682				
Enforcement			0.1229			
Violation				0.7421		
Penalty					0.2621	
Penalty Amount						0.3462

Table A13: State and Federal EPA activities

	Republican Contributions (%) - State Races					
	(1)	(2)	(3)	(4)	(5)	(6)
State Action	0.01211***					
	(0.0029)					
Federal Action	0.01278**					
	(0.0045)					
State Inspection		0.01776***				
		(0.0028)				
Federal Inspection		-0.0221				
		(0.0164)				
State Enforcement			0.01209			
			(0.0066)			
Federal Enforcement			-0.02959			
			(0.0406)			
State Violation				0.01231***		
				(0.0029)		
Federal Violation				0.012406**		
				(0.0046)		
State Penalty					0.02019**	
					(0.0070)	
Federal Penalty					0.01313	
					(0.0231)	
State Penalty Amount						0.00197*
						(0.0008)
Federal Penalty Amount						0.00163
						(0.0026)
Fracking	-0.00598	-0.0041	-0.0043	-0.0059	-0.00436	-0.00439
	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0048)
Mean DV	0.50	0.50	0.50	0.50	0.50	0.50
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,774	22,774	22,774	22,774	22,774	22,774
Zip codes	5,536	5,536	5,536	5,536	5,536	5,536

Note: Dependent variable in all columns is the share of total contributions to Republicans in state races. Independent variables in logs. EPA variables for federal and state activities, separately. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

G.III Alternative Measures of Fracking Intensity

As a first alternative measure of fracking intensity I use a dummy variable that takes the value of 1 if a zip code is located within the boundaries of one of the major shale plays in the seven states under study. These plays are Permian (western Texas and southeastern New Mexico), Eagle Ford (Texas), Haynesville (southwestern Arkansas, northwest Louisiana, and East Texas), Bakken (Montana and North Dakota), and Marcellus (New York, northern and western Pennsylvania, eastern Ohio, western Maryland, most of West Virginia and extreme western Virginia). These are among the 10 largest shale plays in the U.S. according to Worldwide Power Products.

The econometric specification is as follows:

$$Rep\,Cont_{i,t} \;=\; \alpha \;+\; \beta\, log(1 + Action_{i,t}) \;+\; \delta\, Major\_Play_{i,t} \;+\; \eta_t \;+\; \epsilon_{i,t}$$

where i and t stand for zip codes and election cycles, respectively. $Rep\,Cont_{i,t}$ represents the amount of contributions to Republicans over total contributions. $EPA_{i,t}$ stands for each of the six types of EPA state activities considered here. The coefficient of interest here is β, which represents the effect of EPA activities on campaign contributions. The variable $Major\_Play_{i,t}$ indicates if zip code i is located in one of the major shale plays. Given that this variable is time invariant, in this specification I drop the zip code fixed effects and include only year effects (η_t). Finally, $\epsilon_{i,t}$ is the error term. Standard errors are clustered at the zip code level.

The results presented in Table 13 are consistent with the main takeaway of the paper: EPA state activities are associated with an increase in campaign contributions to Republicans in states races.

Table A14: Major Plays

	Republican Contributions (%) - State Races					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	0.01289***					
	(0.0022)					
Inspection		0.01560***				
		(0.0023)				
Enforcement			0.01298*			
			(0.0078)			
Violation				0.05219***		
				(0.0028)		
Penalty					0.02278***	
					(0.0082)	
Penalty Amount						0.0023**
						(0.0007)
Major Play	0.05219***	0.05206***	0.05314***	0.01359***	0.05296***	0.05297***
	(0.0092)	(0.0092)	(0.0592)	(0.0589)	(0.0092)	(0.0592)
Mean DV	0.50	0.50	0.50	0.50	0.50	0.50
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,774	22,774	22,774	22,774	22,774	22,774
Zip codes	5,536	5,536	5,536	5,536	5,536	5,536

Note: Dependent variable in all columns is the share of total contributions to Republicans in state races. Independent variables in logs. EPA variables for state activities. The variable *Major Play* takes the value of 1 for zip codes located within a major fracking play. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** p<0.001, ** p<0.01, * p<0.05.

As another alternative measure of fracking intensity I include the log of fracking wells and the dummy variable for major plays and the interaction between the two. Otherwise, the econometric specification is similar to the previous one.

$$Rep\ Cont_{i,t} \ = \ \alpha \ + \ \beta\ log(1 + Action_{i,t}) \ + \ \delta\ log(1 + wells_{i,t}) \ + \ \gamma$$
$$Major\ Play_i \ + \ \beta\ (log(1 + wells_{i,t}) * Major\ Play_i) \ + \ \theta_i \ + \ \eta_t \ + \ \epsilon_{i,t}$$

The results in Table 14 are in line with my previous findings. For this specification, all the EPA variables have the expected sign and are significant at 5%. So, campaign contributions for state races are associated with EPA activities carried out at the state level.

Table A15: Major Plays and Fracking Wells

	Republican Contributions (%) - State Races					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	0.01552***					
	(0.0029)					
Inspection		0.01738***				
		(0.0028)				
Enforcement			0.01069			
			(0.0067)			
Violation				0.01563***		
				(0.0026)		
Penalty					0.01989**	
					(0.0069)	
Penalty Amount						0.00193*
						(0.0008)
Fracking	-0.02145***	-0.02045***	-0.02084**	-0.02142***	-0.02081**	-0.03083**
	(0.0059)	(0.0060)	(0.0067)	(0.0059)	(0.0060)	(0.0060)
Fracking *	0.03364***	0.03283***	0.0338***	0.03356***	0.03365***	0.03361***
Major Play	(0.0088)	(0.0088)	(0.0089)	(0.0088)	(0.0089)	(0.0089)
Mean DV	0.50	0.50	0.50	0.50	0.50	0.50
Controls	Y	Y	Y	Y	Y	Y
Zip code FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	22,744	22,744	22,744	22,744	22,744	22,744
Zip codes	5,536	5,536	5,536	5,536	5,536	5,536

Note: Dependent variable in all columns is the share of total contributions to Republicans in state races. Independent variables in logs. EPA variables for state activities. The variable *Major Play* takes the value of 1 for zip codes located within a major fracking play. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** p<0.001, ** p<0.01, * p<0.05.

G.IV Placebo Checks

Table A16: Federal EPA Activities - State Races

	Republican Contributions (%) - State Races					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	0.02083***					
	(0.0040)					
Inspection		-0.02229				
		(0.0167)				
Enforcement			-0.02678			
			(0.0547)			
Violation				0.02075***		
				(0.0040)		
Penalty					0.02293	
					(0.0223)	
Penalty Amount						0.00273
						(0.0025)
Fracking	-0.00611	-0.00395	-0.00427	-0.00604	-0.00422	-0.00423
	(0.0048)	(0.0049)	(0.0048)	(0.0048)	(0.0048)	(0.0048)
Mean DV	0.50	0.50	0.50	0.50	0.50	0.50
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,774	22,774	22,774	22,774	22,774	22,774
Zip codes	5,536	5,536	5,536	5,536	5,536	5,536

Note: Dependent variable in all columns is the share of total contributions to Republicans in state races. Independent variables in logs. EPA variables for federal activities. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Table A17: State EPA Activities - Federal Races

	Republican Contributions (%) - Federal Races					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	0.00258					
	(0.0022)					
Inspection		0.00154				
		(0.0023)				
Enforcement			-0.00101			
			(0.0058)			
Violation				0.00188		
				(0.0022)		
Penalty					-0.00206	
					(0.0060)	
Penalty Amount						-0.00047
						(0.0007)
Fracking	-0.00309	-0.00295	-0.0029	-0.00304	-0.00289	0-.00287
	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)
Mean DV	0.43	0.43	0.43	0.43	0.43	0.43
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,546	25,546	25,546	25,546	25,546	25,546
Zip codes	5,725	5,725	5,725	5,725	5,725	5,725

Note: Dependent variable in all columns is the share of total contributions to Republicans in federal races. Independent variables in logs. EPA variables for state activities. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** p<0.001, ** p<0.01, * p<0.05.

H Contributors and Candidates

H.I Candidate Ideology

Table A18: Recipient Candidates by Ideology

Variables	(1) Rep Cont 1th quintile	(2) Rep Cont 2th quintile	(3) Rep Cont 3th quintile	(4) Rep Cont 4th quintile	(5) Rep Cont 5th quintile
Action	-0.00026	0.00034	-0.00408***	-0.01208***	0.01608***
	(0.0002)	(0.0003)	(0.0007)	(0.0026)	(0.0026)
Fracking	-0.00030	-0.0008	-0.00239**	-0.00073	0.00422
	(0.0002)	(0.0005)	(0.0009)	(0.0046)	(0.0047)
Mean DV	0.0009	0.0035	0.01467	0.3728	0.6081
Controls	Yes	Yes	Yes	Yes	Yes
Yes					
Zip code FE	Yes	Yes	Yes	Yes	Yes
Yes					
Year FE	Yes	Yes	Yes	Yes	Yes
Yes					
Observations	20,139	20,139	20,139	20,139	20,139
Zip codes	5,175	5,175	5,175	5,175	5,175

Note: Dependent variables are the share of Republican contributions to candidates based on their ideology, from the most liberal ones (Column 1) to the most conservative ones (Column 5). Independent variables in logs. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

H.II Individual vs Corporate Donors

Table A19: Corporate Donors

	Republican Contributions (%) - State Races					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	0.01854***					
	(0.0043)					
Inspection		0.0236***				
		(0.0045)				
Enforcement			0.0328**			
			(0.0099)			
Violation				0.01831***		
				(0.0044)		
Penalty					0.03471**	
					(0.0101)	
Penalty Amount						0.00308*
						(0.00122)
Fracking	-0.01178	-0.01117	-0.01234	-0.01189	-0.01227	-0.01229
	(0.0087)	(0.0087)	(0.0087)	(0.0087)	(0.0087)	(0.0087)
Mean DV	0.4494	0.4494	0.4494	0.4494	0.4494	0.4494
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,290	12,290	12,290	12,290	12,290	12,290
Zip codes	3,876	3,876	3,876	3,876	3,876	3,876

Note: Dependent variable in all columns is the share of total contributions to Republicans in state races from corporate donors. Independent variables in logs. EPA variables for state activities. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** p<0.001, ** p<0.01, * p<0.05.

Table A20: Individual Donors

	Republican Contributions (%) - State Races					
	(1)	(2)	(3)	(4)	(5)	(6)
Action	0.0153***					
	(0.0026)					
Inspection		0.01734***				
		(0.0027)				
Enforcement			0.01269			
			(0.0070)			
Violation				0.01503***		
				(0.0026)		
Penalty					0.02048**	
					(0.0071)	
Penalty Amount						0.00227**
						(0.0008)
Fracking	-0.00526	-0.00468	-0.0046	-0.00526	-0.00464	-0.00469
	(0.0048)	(0.0048)	(0.0049)	(0.0048)	(0.0049)	(0.0049)
Mean DV	0.5036	0.5036	0.5036	0.5036	0.5036	0.5036
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,430	22,430	22,430	22,430	22,430	22,430
Zip codes	5,500	5,500	5,500	5,500	5,500	5,500

Note: Dependent variable in all columns is the share of total contributions to Republicans in state races from individual donors. Independent variables in logs. EPA variables for state activities. Controls include employment and weekly wages, and employment and weekly wages in the natural resources and mining sector, all at the county level and in logs. Standard errors are clustered at the zip code level. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

I Republicans and the Environment

To construct this sample I start with data on state House legislators from Klarner (2018). For each district/year I create the variable *Republican* which takes the value of one if the district has a Republican legislator and 0 otherwise. For those cases in which, in a given year, there was a special election or another reason for a change in the party representing that district, I assign a value of 0.5 to this variable. This is a very small fraction of the data and excluding these districts do not change the main results.

The main obstacle to work with state electoral districts (EDs) is that their geography does not necessarily coincide with other geographical units such as counties or zip codes. I use shapefiles for the years between 2002 and 2011, taken from the United States Census Bureau to bring the different data sources to the ED level.

Wu *et al* (2020) constructed a dataset on PM 2.5 concentration levels at the county level starting in the year 2000. When working with counties and EDs, we face different scenarios. To aggregate the information on PM 2.5 concentrations to the ED level I proceed as follows. When the limits of ED i and county j coincide perfectly, I assign this value of PM 2.5 to ED i. When ED i includes different counties, the level of PM 2.5 assigned to i is the average of those counties. I apply this method for cases in which ED i includes the totality of these counties, and when it includes only a fraction of these counties. Finally, there are cases in which many EDs lie within the same county$j$. This is the case for more populated counties, especially in urban areas. In these cases, each ED is assigned the value of PM 2.5 registered in county j.

The fracking wells data from Sances and You (2019) is presented at the zip code level. Given that these units are very small, the process of aggregating this data to EDs is more straightforward. I assign each zip code to a unique ED using centroid matching method, which locates the centroid of each zip code and matches that point to a given ED. Then, the number of fracking wells is aggregated at the ED level. There are few cases in which a zip code lies in different EDs, so this approach should not be particularly problematic.

Finally, the remaining control variables are taken from Social Explorer. I work with the American Community Survey 5 year waves, and the 2000 Census. For years starting in 2009, information is available at the ED level. For the years between 2002 and 2008 the data is available at the county level, so I use a similar approach as with the PM 2.5 data. For the years 2002, 2003 and 2004 I use Census data, and aggregate it to the ED level. For the years 2005, 2006, 2007, and 2009, I use ACS 2009, 5 year wave. Given that the variables used do not change dramatically from one year to the other, the loss of information is probably not very large. I take the following variables to use as controls:

real median income (in logs), total population (in logs), unemployment rate, education (as the percentage of adults with a bachelor degree), and the percentage of white population. I also include the share of the labour force in the following industries: agriculture, forestry, fishing and hunting, and mining; construction; manufacturing; wholesale trade; retail trade; transportation and warehousing, and utilities; information; finance insurance, and real estate and rental and leasing; professional, scientific, and management, and administrative and waste management services; educational services, and health care and social assistance; arts, entertainment, and recreation, and accommodation and food services; other services, except public administration; and public administration.

The measure of legislators' ideology is taken from Shor and McCarty (2011). Finally, I assign a value of one to the $RepublicanMajority$ variable if more than half of the members of the state House are Republicans, and zero otherwise. Descriptive statistics for these variables are shown in Table 20.

Table A21: Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
PM 2.5	6,535	9.4483	1.888	3.7786	15.8215
Republican	6,535	0.4865	0.4953	0	1
Ideology	6,535	0.2418	0.7249	-1.693	2.246
Republican Majority	6,535	0.4171	0.4931	0	1
Median income	6,535	86,042	36,517	22,089	246,735
Population	6,535	108,653	278,214	1,883	3,400,578
Unemployment	6,535	7.05	2.75	0.70	21.61
Education	6,535	21.54	11.52	3.14	72.67
White population	6,535	78.33	18.85	2.89	99.92
Emp: Agriculture and Mining	6,535	4.15	4.72	0.70	34.11
Emp: Construction	6,535	7.60	2.66	1.47	27.34
Emp: Manufacturing	6,535	11.97	5.74	1.92	43.98
Emp: Wholesale Trade	6,535	3.05	0.95	0.35	6.46
Emp: Retail Trade	6,535	11.88	1.97	5.82	35.9
Emp: Transportation and Utilities	6,535	5.57	1.68	1.13	15.46
Emp: Information	6,535	1.91	0.91	0	8.14
Emp: Finance and Real State	6,535	5.63	2.18	1.41	14.83
Emp: Professional Services	6,535	7.85	3.34	1.75	21.89
Emp: Education and Health Care	6,535	22.54	4.47	8.89	45.25
Emp: Entertainment	6,535	7.93	2.57	2.35	27.12
Emp: Other Services	6,535	4.96	0.92	1.95	9.29
Emp: Public Administration	6,535	4.94	2.26	1.08	18.56