Who Governs Climate Change? Business Interests and the American Clean Energy and Security Act*

Carl Benedikt Frey†‡ Pedro Llanos-Paredes§

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Abstract

We investigate how competing business interests shaped congressional voting on the American Clean Energy and Security (ACES) Act of 2009. Merging establishment-level data with roll-call records, we find that districts with more carbon-intensive ("Brown") firms were less likely to support ACES, while districts with more clean-tech ("Green") firms showed higher support. Conservative representatives responded more strongly to local business interests, though mobilized public opinion could mitigate this effect. Using falsification tests and a Bartik-style instrument based on the shale-fracking boom, we demonstrate that our findings are robust and plausibly causal rather than coincidental.

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†Oxford Internet Institute, University of Oxford. 31 St Giles', Oxford OX1 3JS, United Kingdom (Email: carl.frey@oii.ox.ac.uk).

‡Oxford Martin School, University of Oxford. 34 Broad Street, Oxford, OX1 3BD, United Kingdom.

§Oxford Martin School, University of Oxford. 34 Broad Street, Oxford, OX1 3BD, United Kingdom (Email: jmar0101@ox.ac.uk).

1 Introduction

Robert Dahl (1961) began his landmark work on modern political science with the question, "In a political system where nearly every adult may vote but where knowledge, wealth, social position, access to officials, and other resources are unequally distributed, who actually governs?" When Bartels (2016) revisited Dahl's question half a century later, he found that its "significance... has been magnified", noting that a range of policies have failed to be implemented despite widespread popular support. This contrasts theories of majoritarian electoral democracy (Downs, 1957; Black, 1948; Harold, 1929), which suggest that government policies largely reflect the collective will of average citizens.

Understanding who actually governs is particularly pressing in the context of climate change and the need to use policies to accelerate the green transition. According to Gallup polling, since the 1990s, a consistent majority in the United States believes that global warming is real and man-made. Meanwhile, recent research suggests that climate change could reduce global GDP by 23 percent by 2100 (Burke, Hsiang, and Miguel, 2015). And yet, enacting comprehensive legislation to counteract the climate threat has proven notoriously difficult: despite global commitments to limit warming to 1.5 or 2 degrees Celsius under the Paris Agreement, progress toward these targets has been slow in most countries (UNEP, 2019).[1] While political scientists and economists have long pointed to the role of political ideology, constituent interests, and special interests in shaping government policy in general (Stigler, 1971; Posner, 1974; Peltzman, 1976; Kau and Rubin., 1979, 1993), we know little about how these factors operate and interact in the context of climate policy.

To fill this empirical void, we study the determinants of politicians voting behavior in the context of the ACES Act of 2009, also known as the Waxman-Markey bill. A key advantage of investigating this particular bill is that the winners and losers from it can be clearly identified. In essence, the bill proposed a) a cap-and-trade system to reduce greenhouse gas emissions; b) setting standards for utilities to obtain a certain percentage of their electricity from renewables; and c) 190 billion USD worth of subsidies for R&D in new clean energy technologies, job creation, and tech-

[1] https://www.unep.org/resources/emissions-gap-report-2019

nology adoption.[2] In short, if enacted, the ACES would have significantly increased production costs for brown industries, while supporting green growth and innovation among Green industries. It would also have responded to the widespread concerns among citizens over global warming.

At its core, the ACES represents two intertwined conflicts: the economic battle between green and brown industries, and the ideological divide between conservative values and the rising concerns of constituents about climate change. This makes the bill an ideal case for addressing long-standing questions in political economy: How responsive are politicians to constituent interests and values versus their own ideology, and how important are special business interests and their lobbying efforts in shaping political decisions?

In our empirical analysis, we begin by exploring the role of competing business interests using data on the incidence of green and brown establishments by congressional district collected by the Bureau of Labor Statistics (BLS). As noted by Olson (1965), large, dispersed groups often struggle to act collectively due to the free-rider problem, where individuals benefit from a collective good without contributing. In contrast, smaller, well-organized special interest groups can more easily navigate this challenge by offering selective incentives and closely monitoring participation. As a result, these groups exert disproportionate influence on policy-making, even when their interests conflict with the broader public's. Following this logic, policy outcomes are the result of a tug-of-war among competing interest groups, each exerting influence proportional to their efficiency and the stakes involved (Becker, 1985; Gene and Helpman, 1994; Goldberg and Maggi, 1999; Austen-Smith and Wright, 1994).

Given that almost all Republican members of Congress opposed the bill, our empirical analysis focuses on the variation among Democrats to elucidate how the proportions of green and brown establishments in congressional districts shaped voting behavior. Doing so, we find that among Democratic members of the House, a higher share of brown establishments is linked to an lower likelihood of voting in favor of the ACES bill, whereas representatives from places where Green

[2]The bill specifically earmarked 90 billion USD for renewable energy by 2025, 60 billion USD for carbon capture and sequestration, 20 billion USD for electric and advanced technology vehicles, and 20 billion USD for basic scientific research and development.

establishments are far more numerous than the brown ones exhibit a higher likelihood of supporting this particular piece of legislation. Our preferred estimate suggests that a 1 percentage point increase in Brown establishments corresponds to a 7.9 percentage point decrease in the probability of a politician supporting ACES. The effect of business interests, we also find, is more pronounced in highly competitive districts defined by the margin of victory.

Although simple regressions indicate that districts with more carbon-intensive (Brown) establishments were markedly less likely to send Democrats who supported ACES, those correlations could be driven by unobserved factors such as fixed resource endowments or historical infrastructure. To isolate exogenous variation, we construct a Bartik-style instrument that interacts the local brown establishment shares in extractive industries in 2000 (ten years prior to the ACES bill), with the 2005–10 nationwide surge in fracking-intensive production. Because shale formations are geologically predetermined and the post-2005 boom was propelled by technological and regulatory changes rather than local politics, this shift–share captures shocks to Brown employment that are plausibly unrelated to pre-existing political preferences. Instrumenting the Brown share with this measure and estimating by two-stage least squares, we find that a one-percentage-point, fracking-induced increase in Brown establishments reduces the probability that a Democratic representative votes for ACES by about 8.08 percentage points.

The observed relationship between business interests and legislative outcomes could reflect either the number of jobs (and consequently potential voter influence) associated with a particular industry or the effectiveness of their lobbying campaigns. To further explore the influence of lobbying, we use campaign contributions data from the OpenSecrets database. After controlling for the number of green and carbon-intensive establishments, we find that the influence of campaign contributions is relatively modest. This finding aligns with Ansolabehere, De Figueiredo, and Snyder Jr (2003), who emphasize that the magnitude of campaign finance in American politics is smaller than often perceived, with contributions typically serving to secure access or signal appreciation rather than directly changing legislative outcomes.

We then ask whether these economic effects are conditioned by ideology and public sentiment.

We show that higher DW-Nominate scores (greater economic conservatism) are, as expected, associated with lower support for ACES, while pro-climate public opinion strongly predicts a "Yea." A one-percentage-point rise in the share of constituents who say Congress should act on global warming increases the probability a Democrat supports ACES by roughly 5.7 points. Our interaction terms also show that public engagement moderates business pressure: in districts with strong pro-climate sentiment, the positive effect of Green establishments and the negative effect of Brown establishments both shrink, implying that constituent preferences override local industry interests when the issue is salient.

Ideology, in contrast, interacts with economic structure in less intuitive ways. While conservative ideology generally predicts opposition to climate-friendly legislation, we find a notable nuance: at a given level of green industry presence, more conservative representatives exhibit an increased likelihood of supporting the ACES bill. Although this might appear counterintuitive, this finding speaks to conservative representatives' broader preference for policies supportive of local business interests—whether Green or Brown. Thus, conservative Democrats, in particular, appear more responsive to local economic considerations, even though those considerations stand in conflict with conservative values over climate change.

Our paper contributes to four main strands of literature. First, we engage with the longstanding debate on majoritarian electoral democracy (Gilens and Page, 2014; Harold, 1929; Black, 1948; Black et al., 1958; Downs, 1957; Mian, Sufi, and F., 2010; Bartels, 2016; Dahl, 1961), particularly the concern that government policies predominantly reflect special interests rather than the preferences of average citizens (constituent interests). Our research is most closely aligned with Mian et al. (2010), who examine how both constituent and special interests influenced congressional voting during the 2008 mortgage default crisis. We extend this analysis into the context of climate policy. Unlike mortgage policy, which had immediate, tangible impacts on voters' economic outcomes, climate policy represents a longer-term challenge with less immediate effects. By examining competing pressures from Green and Brown industries, we demonstrate that while special interests exert significant influence on legislative outcomes, robust public support for climate

action can counterbalance this influence, thereby facilitating a transition toward greener policies.

Second, we add to a growing literature on money in politics, exploring whether lobbying and campaign contributions are buying political influence (Baumgartner, Berry, Hojnacki, Leech, and Kimball, 2009; Bertrand, Bombardini, and Trebbi, 2014; Bombardini, 2008; Bombardini and Trebbi, 2011; Snyder Jr, 1990; Austen-Smith, 1995). For instance, Meng and Rode (2019) estimate that lobbying reduced the likelihood of the Waxman–Markey bill's passage by 13 percentage points. However, as Stratmann (2002) notes, "if interest groups contribute to legislators who support them anyway, a significant correlation between money and votes does not justify the conclusion that money buys votes." Consistent with this view, we find that the local presence of carbon-intensive establishments significantly shapes legislators' voting behavior, and once these local economic interests are accounted for, the independent effect of campaign contributions is relatively modest. This interpretation aligns with Goldberg, Marlon, Wang, Van Der Linden, and Leiserowitz (2020), who analyzed 28 years of U.S. congressional votes and contributions, concluding that donations from the oil and gas industry primarily reward legislators already opposed to environmental protections. Similarly, Kang (2016) shows that although lobbying expenditures have a statistically significant effect on policy outcomes, their practical impact on a policy's probability of enactment remains quite limited.

Third, our study contributes to the existing body of research on the role of ideology in shaping congressional voting patterns. Indeed, while it has been demonstrated that ideology plays a significant, and often decisive, role in congressional voting behavior (Ringquist and Dasse, 2004; Poole and Rosenthal, 1985, 1996; Lee, Moretti, and Butler, 2004; Kau and Rubin, 1979), few studies consider ideology in the context of climate politics (Rodríguez-Pose, You, and Teirlinck, 2025). In this paper, we document that although conservative politicians are generally more inclined to vote against climate legislation, they are more likely than their liberal counterparts to support such measures when local green business interests are prevalent.

Fourth, we build on a growing literature investigating the factors that influence public support for climate policies, as outlined in the review by Drews and Van den Bergh (2016). Notably,

Dechezleprêtre and Stantcheva (2025) identify three key perceptions that influence support for climate policies: the perceived effectiveness of the policies in reducing emissions, their impact on low-income households, and their effect on respondents' own households (self-interest).[3] In contrast, in this paper, we examine how responsive politicians are to public opinions about climate change and the demand for regulation. To the best of our knowledge, we are the first to document how public values about climate change affects voting patterns in congress, and how they interact with other factors.

2 Data and Methods

We begin by constructing a new dataset from multiple sources to investigate the determinants of politicians voting behavior for the American Clean Energy and Security Act (ACES) of 2009. We restrict our analysis to Democratic members of Congress since only eight Republicans voted in favor of the bill, leaving us with too little variation (see Table A1). To enhance robustness and capture cross-party attitudes toward environmental policies, we also retrieve the League of Conservation Voters (LCV) Environmental Scores—an annual rating system that assesses the environmental voting records of U.S. Congress members. It provides a percentage score based on how frequently legislators vote in favor of pro-environment positions on key legislation during a given year. These scores take a value between 0 and 100 on the basis of the voting record of each representative.

To capture competing business interests within each congressional district, we calculate the share of firms that belong to either "Green" or "Brown" industries in 2008 (one year prior to the vote on the ACES bill). Specifically, we collect industry information at the zip code level from the County Business Patterns (CBP). Following Mian et al. (2010), we then aggregate zip code level data to the congressional district level using the MABLE-Geocorr software, creating establishment numbers for the 111th Congress at the district-industry level (6-digit NAICS).[4] In order

[3] This latter dynamic is related to some recent studies on how firms react to the risk of being affected by climate change (Horbach and Rammer, 2025).

[4] When converting zip codes to 111th congress, the GeoCorr software only allows for using the zip codes from 2010. Since zip codes rarely change over time and there were no changes in the congressional districts between 110th

to categorize firms as either "Green" or "Brown", we combine two lists of industries: the BLS Green Job industry list[5] and a list of polluting industries identified by Vona, Marin, Consoli, and Popp (2018).[6] While the BLS clusters 333 detailed (6-digit NAICS) industries as providers of "green goods and services", Vona et al. (2018) classify 62 4-digit NAICS industries according to the intensity of their emissions of carbon monoxide and dioxide (CO and CO_2), nitric oxide and nitrogen dioxide (NOx), sulfur dioxide (SO_2), and volatile organic compounds (VOCs). Due to the different approaches for grouping industries, whenever an activity was simultaneously classified as Brown and Green we consider it to be Brown. We then calculated the Green and Brown establishment shares for all congressional districts included in the analysis, and their difference as a measure of how "balanced" the local business interests are. Figure 1 offers a three-panel snapshot of the industrial landscape across congressional districts. Panel 1a maps the concentration of Brown establishments, Panel 1b does the same for Green establishments, and Panel 1c shows their net balance (Green minus Brown). We note the relatively high share of Green establishments in coastal districts, generally known to be Democratic strongholds, while Brown firms seem to be more common in the Mountain and Central Census Division.

As noted, campaign contributions provide a key channel for voters and businesses wanting to influence politicians. To account for this aspect of the political process, we compile all Political Action Committee (PAC) and individual contributions ahead of the 2008 election (one year prior to the vote on the ACES bill) from the OpenSecrets database, and classify them according to their source. This includes PAC and individual donations from firms belonging to the Energy, Oil, Gas and Mining industries (or "Energy and Extractive" industries), and funds raised by individuals, environmental activists, and Green PACs and pressure groups.

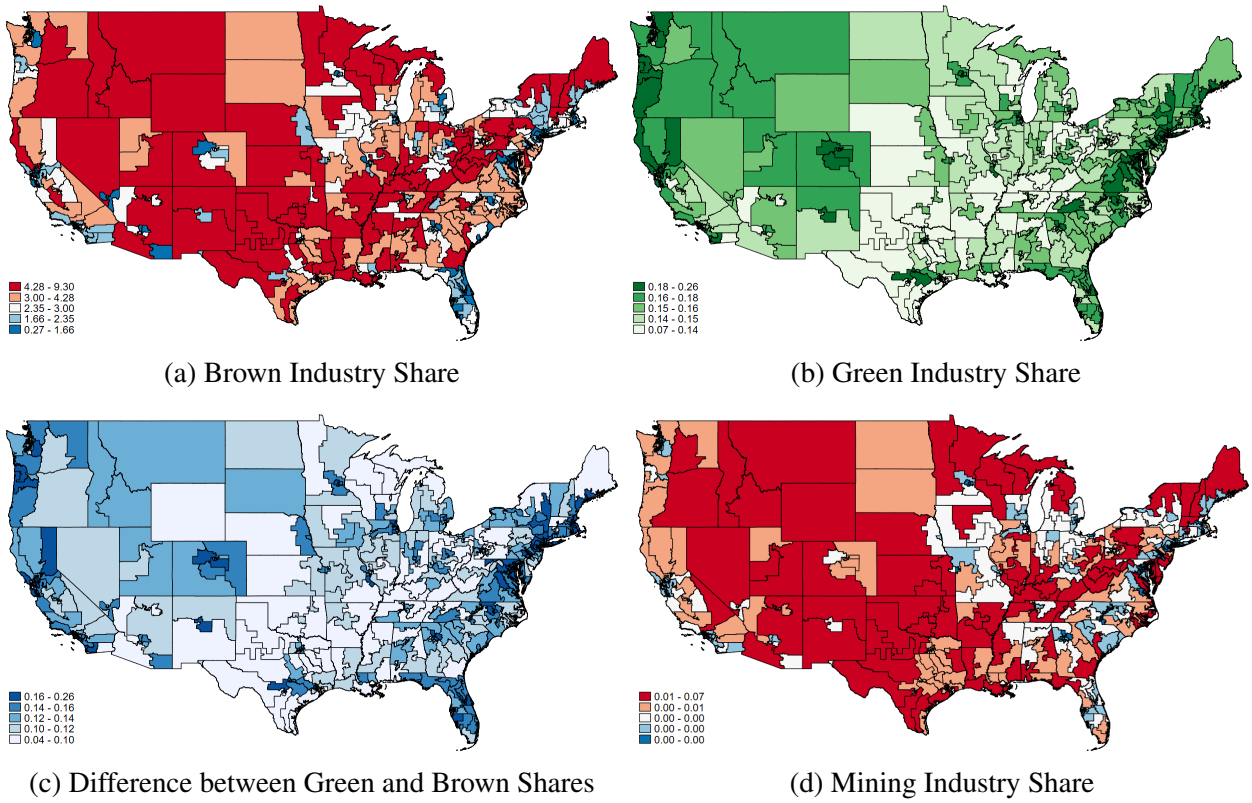
To account for the values and policy preferences of voters, we use the Yale Climate Opinion Maps from 2010. This dataset originates from an extensive national survey carried out under the Climate Change in the American Mind project, a joint initiative by the Yale Program on Climate

and 111th congress, this does not raise any issues. For more information please refer to https://www.census.gov/geographies/reference-maps/2005/geo/109th-112th-congressional-district-maps.html.

[5] See https://www.bls.gov/green/home.htm for more information.

[6] The full list is in Table A2. See Bergant, Mano, and Shibata (2022) for an application of this classification.

Figure 1: Brown and Green Establishment Shares by Congressional District



(a) Brown Industry Share

(b) Green Industry Share

(c) Difference between Green and Brown Shares

(d) Mining Industry Share

Note: Panel (a) shows the share of firms categorized as Brown at the Congressional District level. Panel (b) shows the share of firms categorized as Green at the same level of aggregation. Panel (c) maps the difference of Green minus Brown establishment shares. Panel (d) reports the Mining Establishment shares (one of the main Brown industries in the US).

Change Communication and the George Mason University Center for Climate Change Communication. Importantly, for our purposes, it includes questions about attitudes towards climate change, perceptions of risk, and support for related policies. While this data is only available a year after the ACES vote, the geographic distribution of responses has shown high stability over time, allowing us to reasonably infer that voter preferences in 2009 were similar.[7]

We further collect congressional district electoral and voting behavior data from VoteView. This dataset provides information on the representatives' names, party affiliations, congressional districts, vote margins, ideology, and voting patterns. One of the key variables we derive from this

[7]For instance, the State-level shares of people that think that Congress should be doing more to address global warming did not change much between 2010 and 2011. This is reflected in a correlation coefficient of 0.95. This metric is equal to 0.92 for 2012 and 0.81 for 2023 (13 years after the survey series started). Similar patterns are observed for different variables.

Table 1: Summary Statistics – Democrats

	Mean	SD	p25	Median	p75
A. Voting Record					
Pr(Voting for ACES)	0.83	0.38	1.00	1.00	1.00
LCV Environmental Score	4.53	0.15	4.47	4.62	4.62
Economic Ideology (Left-Right)	-0.35	0.14	-0.45	-0.35	-0.26
B. Business Interests					
Brown Establishment Share	0.03	0.01	0.02	0.02	0.03
Green Establishment Share	0.16	0.03	0.14	0.16	0.18
Green minus Brown Share	0.13	0.04	0.11	0.13	0.16
C. Economic and Demographic Controls					
Ln (Median Household Income)	10.84	0.26	10.65	10.83	11.02
Total Number of Firms	9.74	0.32	9.58	9.73	9.96
% Hispanic	0.17	0.20	0.04	0.10	0.21
% Black	0.15	0.17	0.04	0.08	0.21
% of Households in Poverty	0.11	0.05	0.07	0.10	0.14
% with Bachelor Degree	0.17	0.06	0.13	0.16	0.21
D. Campaign Contributions					
Contributions from Energy and Extractive Industries	17.08	4.17	16.02	18.24	19.70
Contributions from Green Industries	4.32	5.00	0.00	0.00	7.83
Contributions from Environmental Activists	9.68	6.55	3.04	9.97	15.81
E. Opinion Polls					
% who think global warming is very or extremely important	0.23	0.03	0.21	0.23	0.25
% who think Congress should be doing more/much more to address global warming	0.53	0.02	0.52	0.54	0.55
% who believe that most scientists think global warming is happening	0.33	0.04	0.30	0.32	0.36
% who are somewhat/very worried about global warming	0.52	0.04	0.50	0.52	0.56
% who somewhat/strongly support funding research into renewable energy sources	0.84	0.01	0.83	0.85	0.85
% who somewhat/strongly support regulating CO2 as a pollutant	0.71	0.03	0.69	0.71	0.73

dataset is the first dimension of the DW-Nominate scores. This particular index maps the relative position of all members of the 111th Congress along the left-right axis of the political spectrum, with scores being higher the more conservative a representative is (Mian et al., 2010).

Finally, we collect congressional district-level characteristics from the 2008 American Community Survey.[8] At the 111th Congressional district level, we control for variables such as the percentage of population that is Hispanic or Black, the percentage of households in poverty, the natural logarithm of the median household income, and the share of population with a bachelor's degree. Additionally, we control for the logarithm of the total number of establishments, as derived from the County Business Patterns.

Table 1 presents summary statistics of the resulting estimation sample. The variables are split into six categories: voting behavior and record of the Democratic members of Congress, business interests measured at the district level, other district-level economic and demographic covariates, ideology and campaign contributions at the politician level, and state-level opinion polls.

2.1 The American Clean Energy and Security Act of 2009

The American Clean Energy and Security (ACES) Act, also known as the Waxman-Markey bill, was introduced to the U.S. Congress in May 2009 with the goals of addressing climate change, enhancing energy efficiency, and promoting renewable energy sources. Key provisions included establishing a cap-and-trade system designed to reduce greenhouse gas emissions by 17 percent by 2020 and 83 percent by 2050 (relative to 2005 levels), setting renewable electricity standards that required suppliers to source 20 percent of their electricity from renewable sources by 2020, and providing R&D subsidies for clean energy technologies such as electric vehicles, carbon capture, and Smart Grid advancements.

Additionally, the bill aimed to stimulate job creation by facilitating a transition toward a "green economy" and provided offset credits for agricultural and forestry practices. Emerging from the 2008 recession, the House Report projected that aggressive investment in energy efficiency could

[8] Key results remain consistent when using the 2009 American Community Survey.

generate approximately 37 million jobs and nearly 4.3 trillion USD in revenue by 2030. Based on projections by the Center for American Progress and UMass-Amherst, which estimated that an immediate investment of 100 billion USD across five renewable and energy-efficient strategies could create two million jobs, the House Report argued that the ACES bill would surpass traditional economic stimulus measures in addressing the post-recession crisis (House Report, 111-137).

Although the ACES bill narrowly passed the vote in the House (219 to 212), it never advanced to a Senate vote. This failure has been attributed primarily to intense lobbying by fossil fuel industries. Between 2000 and 2016, U.S. climate lobbying expenditures exceeded 2 billion USD, largely driven by fossil fuel, utility, and transportation sectors, significantly overshadowing spending by environmental NGOs and renewable energy groups. During the debate over the ACES bill, spending peaked at 362 million USD in 2009 (almost 9 percent of all lobbying that year), reflecting intensive opposition from carbon-intensive industries (Brulle, 2018). Some scholars have suggested that these lobbying efforts significantly decreased the bill's chances of passing Congress (Meng and Rode, 2019). Additionally, ad campaigns portraying the cap-and-trade system as imposing "job-killing" taxes, coupled with economic anxieties from high unemployment, arguably further eroded support (Weiss, 2010). Many senators and Democratic representatives were hesitant to endorse the bill due to concerns over potential job losses and increased energy costs for constituents. Skocpol (2013) further notes that organized opposition from the emerging Tea Party Movement, which also targeted other Obama administration initiatives, undermined legislative support as well.

Thus, a combination of conservative politics, opposing constituent interests, and lobbying by special interests, is said to have contributed to the ACES bill's demise. While we are unable to shed new light on why the bill never reached the Senate, we proceed to explore the role of these factors in shaping congressional voting patterns.

2.2 Empirical Strategy

To explore how business and constituent interests shape congressional voting behaviour, we estimate the probability of Democratic representatives voting "Yea" on the American Clean Energy

and Security Act of 2009. As noted, our analysis is limited to Democratic members of the House, given the minimal variation in voting patterns among Republicans. We further include a host of covariates to account for key factors such as the economic dynamism of the congressional district, their socio-demographic composition, and the individual ideological preferences of the representatives. The specific estimation is based on the following equation:

$$\Pr(v_{idt} = 1) = \alpha + \gamma BI_{d,t-1} + \delta CC_{i,t-1} + \phi PO_{d,t-1} + \beta_1 \mathbf{U}'_{it} + \beta_2 \mathbf{X}'_{d,t-1} + \varepsilon_{idt} \quad (1)$$

Where v_{idt} is a dichotomous variable that takes a value of one if Representative i of congressional district d voted in favor of the bill in year t (2009). In other specifications, we also use an indicator of a broader Green/Pro-Environmental Ideological stance: the logarithm of the LCV Environmental Score. Our key variable of interest is $BI_{d,t-1}$, which denotes the share of firms of congressional district d that belonged to "Green" and "Brown" industries in 2008 (i.e., one year before the vote for the ACES bill). We also subtract local Brown from Green Establishment shares to retrieve an indicator of how balanced these interests are, and to what extent they may influence politicians to vote for a pro-environmental agenda. We create this "balance of interests" measure since there are many congressional districts in which both industries coexist and compete to influence their representatives. Given the higher Green shares among Democratic congressional districts, this third indicator can be interpreted as the influence of Green business interests net of the influence of Brown industries.

Since activists, industries and pressure groups can influence representatives through campaign contributions, we also include in the specification $CC_{i,t-1}$, which is the natural logarithm of the total value of campaign contributions given to politician i by different sources. With this, we aim to capture the independent effect of political donations made by the energy, oil, gas and mining industries (which we group as "Energy and Extractive Industries"), and by ideologically motivated groups such as environmental organizations and activists. Finally, $PO_{d,t-1}$ includes various measures of the local public opinion on issues such as climate change and the energy transition.

All of our specifications also include two sets of controls: one at the politician level ($\mathbf{U}'_{it}$), and one at the congressional district level ($\mathbf{X}'_{d,t-1}$). Within the politician-level covariates, we include the left-right dimension of the DW Nominate Score to account for the ideological leanings of all the Democratic representatives in the House. For other district-level controls, we draw from the American Community Survey various indicators of the social, economic, and demographic composition of congressional district d one year prior to the vote on the ACES bill ($X_{d,t-1}$). These include the shares of population of Hispanic or Black heritage, the proportion of households in poverty, the natural logarithm of the total number of establishments (i.e., firms), the natural logarithm of the median household income, and the share of population with a bachelor's degree.

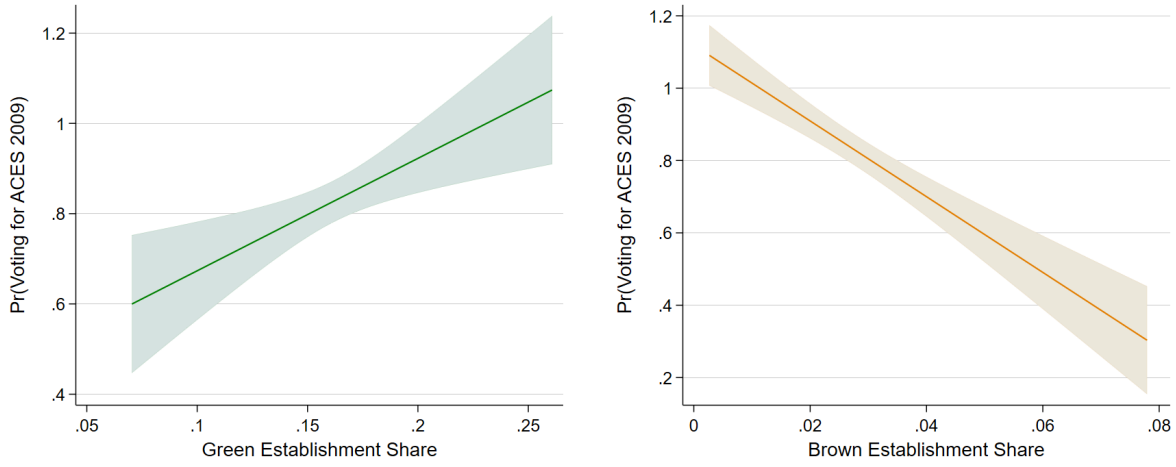
3 Business Interests and Voting Patterns

In this section we probe how local business interests shaped House votes on the 2009 American Clean Energy and Security (ACES) Act. We begin by linking each representative's roll-call decision to the share of Green and Brown establishments in their district—and to the net balance between the two—while controlling for a full set of economic and sociodemographic covariates. We then test whether campaign money adds a separate channel of influence by incorporating PAC and individual contributions from both green and brown industries. Finally, we ask whether electoral vulnerability magnifies these effects, examining whether business pressure is stronger in districts where the previous election was closely contested.

3.1 Green and Brown Business Interests

Figure 2 presents initial evidence on the importance of business interests in explaining voting patterns on environmental legislation. It plots the correlation between Green and Brown establishment shares and the propensity to vote in favor of the ACES bill of 2009. We note that Democrats from areas with a higher Green establishment share were more likely to vote in favor of the bill, while the opposite is true for those representing districts with high shares of Brown firms. In Figure A1,

Figure 2: Vote for the ACES Bill and Business Interests



(a) Green Establishment Shares

(b) Brown Establishment Shares

Note: Panels (a) and (b) document the propensity of voting for the ACES bill by the Green (Brown) Establishment Shares in Democratic Districts. Shades represent the 95% confidence level intervals for predictions from a linear probability model (LPM).

we also observe same patterns if we use the difference between Green and Brown establishment shares.

Table 2 examines these relationships in greater depth. Columns 1 through 3 use an OLS estimator to analyze the probability of voting in favor of the ACES bill in 2009, while Columns 4 through 6 focus on the 2009 LCV Scores–a summary measure of each representative's environmental voting record.[9] These baseline estimates indicate that a one percentage point increase in the share of Brown establishments is associated with an approximately 7.9 percentage point decrease in the probability of voting for ACES. A similar pattern is observed when LCV scores are used as dependent variable: a 10 percentage point increase in the brown establishment share is associated with an almost 30 percent decrease in politicians' LCV score. Green establishment shares, however, do not seem to be correlated with the either outcome variable. Interestingly enough, it is the difference between Green minus Brown interests (our measure of how "balanced" local interests are) that exhibits a positive correlation with LCV scores and the probability of voting for the ACES bill

[9] As described in section 2, this score is compiled by the League of Conservation Voters (LCV) and is based on the representatives' past voting record on environmental issues.

(see Columns 1 and 4). These results suggest that Brown interests exert greater influence wherever they are present, while Green industries only prevail if they are not directly clashing with strong Brown interests within the same congressional district.

Table 2: Business Interests and Voting Patterns

	Pr(Voting for ACES)			LCV Score		
	(1)	(2)	(3)	(4)	(5)	(6)
Green minus Brown Share	2.148**			0.937**		
	(0.811)			(0.328)		
Brown Establishment Share		-7.916***			-3.299***	
		(2.227)			(0.852)	
Green Establishment Share			1.143			0.532
			(0.862)			(0.347)
Ln(Median Income)	0.188	0.239	0.228	0.054	0.076	0.070
	(0.180)	(0.176)	(0.181)	(0.074)	(0.069)	(0.074)
Total Number of Firms	-0.127	0.043	-0.149	-0.067	0.003	-0.078
	(0.093)	(0.089)	(0.099)	(0.041)	(0.039)	(0.044)
% of Hispanic Households	0.442**	0.371*	0.449**	0.113*	0.083	0.116*
	(0.165)	(0.163)	(0.168)	(0.056)	(0.054)	(0.058)
% of Black Households	0.377*	0.280	0.425*	0.025	-0.014	0.046
	(0.172)	(0.165)	(0.169)	(0.060)	(0.058)	(0.061)
% of Households in Poverty	-0.231	-0.100	-0.148	0.149	0.206	0.182
	(0.927)	(0.861)	(0.926)	(0.388)	(0.360)	(0.390)
% of Households with Tertiary Education	0.797	-0.051	1.501*	0.297	-0.042	0.595*
	(0.682)	(0.669)	(0.648)	(0.269)	(0.262)	(0.271)
Observations	255	255	255	254	254	254
Adjusted R^2	0.163	0.185	0.149	0.107	0.129	0.091

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

To account for the fact that states may differ significantly on many dimensions beyond our initial set of controls, in Columns 1-6 of Table A3 we include State fixed effects to restrict the comparison of congressional districts *within* each individual state. Once again, these results point to a significant negative correlation between Brown business interests and voting for environmental legislation (including the ACES bill). Our results do not seem to be driven by the functional form of our estimators either: in Columns 7-9 of Table A3 we also model the probability of voting for the ACES bill using a logitstic regression (Logit) model. The sign and magnitude remains comparable to the ones retrieved by the linear probability model.

3.2 Electoral Competition

The influence of competing business interests may be enhanced by a heightened electoral competition. As shown by Mian et al. (2010), constituent interests gain greater traction when elections are closely contested. To investigate whether this pattern also applies to *business* interests, in Table 3 we use the margin of victory in the 2006 election cycle to identify highly competitive districts (i.e., districts in which the incumbent had a majority of less than 2%). This indicator of a narrow majority is then interacted with our three measures of local business interests: Brown, Green, and Balance (Green minus Brown). In Columns 1-3 we focus on their effect on the probability of voting for the ACES bill, and in Columns 4-6 we broaden the analysis to include the representatives' overall voting record on environmental issues (the LCV scores). Across these specifications the influence of business interests is significant for both competitive and non-competitive districts. Their leverage, however, rises sharply in the most contested seats, exerting greater sway over legislators in highly competitive districts than in secure ones.

Table 3: Business Interests in Competitive Districts

	Pr(Voting for ACES)			LCV Score		
	(1)	(2)	(3)	(4)	(5)	(6)
Green minus Brown Share	1.926*			0.850**		
	(0.795)			(0.320)		
Brown Establishment Share		-7.675***			-3.309***	
		(2.232)			(0.834)	
Green Establishment Share			0.844			0.401
			(0.852)			(0.344)
$<$ 2% majority=1	-2.835***	0.908*	-3.443***	-0.786*	0.170	-1.038*
	(0.586)	(0.361)	(0.863)	(0.310)	(0.099)	(0.443)
$<$ 2% majority=1 $\times$ Green minus Brown Share	18.189***			5.081*		
	(4.429)			(2.155)		
$<$ 2% majority=1 $\times$ Brown Establishment Share		-49.630**			-10.419*	
		(15.013)			(4.256)	
$<$ 2% majority=1 $\times$ Green Establishment Share			19.161***			5.863*
			(5.097)			(2.590)
Economic and Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	255	255	255	254	254	254
Adjusted R^2	0.220	0.236	0.200	0.164	0.181	0.147

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.3 Campaign Contributions

The observed relationship between business interests and voting patterns could stem from either a larger number of jobs (and potential votes) linked to an industry, or the effectiveness of local firms in lobbying and directly influencing politicians. To that end, in Table 4 we explore the voting behavior of the Democratic members of congress and their voting record on environmental issues (LCV scores) while controlling for campaign contributions from both industries and pressure groups. In Columns 1 and 4 we control for contributions from the Energy and Extractive Industries (such as Oil, Gas and Mining), while in Columns 2 and 5 we also consider the potential moderating effect of contributions from Green and Environmental-related industries. Finally, in Columns 3 and 6 we replace this indicator with contributions from environmental activists and organizations.

Table 4: Green minus Brown Shares and Campaign Contributions

	Pr(Voting for ACES)			LCV Score		
	(1)	(2)	(3)	(4)	(5)	(6)
Green minus Brown Share	2.023*	2.030*	1.984*	0.895**	0.903**	0.869**
	(0.807)	(0.800)	(0.797)	(0.330)	(0.324)	(0.314)
Contributions from Energy and Extractive Industries	-0.009	-0.012*	-0.012*	-0.003	-0.005**	-0.005**
	(0.005)	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)
Contributions from Green Industries		0.006	0.005		0.005*	0.004*
		(0.005)	(0.005)		(0.002)	(0.002)
Contributions from Environmental Activists			0.004			0.003*
			(0.004)			(0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	255	255	255	254	254	254
Adjusted R^2	0.169	0.171	0.172	0.109	0.131	0.146

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Across all these specifications, the positive relationship between the business interests indicator and support for climate legislation remains unaltered. As expected, we observe a negative relationship between contributions from Energy and Extractive industries and the probability of voting for the ACES bill, while Contributions from Green Industries are positively correlated with a higher LCV score (i.e., a "greener" voting record). Taken together, these findings indicate that while campaign contributions can shape voting patterns, they do not appear to be the principal channel through which local firms exert political influence. This aligns with the observation by

Ansolabehere et al. (2003) that the amount of money in U.S. politics is surprisingly modest, and campaign contributions generally secure access or gratitude rather than directly influencing electoral outcomes. Rather, the political influence of Brown establishments on congressional voting in the context of the ACES bill may simply reflect the representatives' concerns over jobs and the local economy.[10]

4 Effect Modifiers

As noted, public opinion and ideology may condition the influence of business interests. We therefore expand the baseline dataset with (i) state-level climate-opinion measures from the Yale Climate Opinion Maps (2010) and (ii) each member's DW-Nominate score, the standard left-right ideology metric. We then ask whether these variables interact with the local Green- and Brown-industry mix in predicting support for the 2009 ACES bill.

4.1 Public Opinion

To capture constituent preferences, we rely on the 2010 Yale Climate Opinion Maps, which provide district-level estimates of climate attitudes—including awareness, perceived risks, and support for policy action.[11] We note that stronger pro-climate sentiment is positively and significantly associated with a representative's likelihood of voting "Yea" on the ACES bill, even after controlling for the local Green- and Brown-industry mix, campaign contributions, and the full set of socioeconomic covariates (see Table 5). Districts where a larger share of voters regard global warming as urgent or endorse climate policy are also the districts whose Democrats supported the legislation.

[10] Greenstone (2002), for example, estimates that during the initial 15-year period following the implementation of the Clean Air Act (1972–87) the areas that were targeted by the policy experienced substantial economic losses, including approximately 590,000 fewer jobs, a reduction of 37 billion USD in capital stock, and a decrease of 75 billion USD (in 1987 dollars) in output from pollution-intensive industries.

[11] Unfortunately, survey data reporting begins only from 2010. However, the correlation of survey results across the years is high, allowing us to reasonably assume that the results for 2009 or 2008 would be similar to those of 2010.

Table 5: Green minus Brown Shares and Public Opinion

	Pr(Voting for ACES)					
	(1)	(2)	(3)	(4)	(5)	(6)
Green minus Brown Share	1.755*	1.693*	1.538*	1.880*	2.536**	2.279**
	(0.772)	(0.722)	(0.700)	(0.763)	(0.787)	(0.772)
% who think global warming is very or extremely important	1.259					
	(0.908)					
% who think Congress should be doing more/much more to address global warming		5.785***				
		(1.180)				
% who believe that most scientists think global warming is happening			3.243***			
			(0.656)			
% who are somewhat/very worried about global warming				1.466		
				(0.848)		
% who somewhat/strongly support funding research into renewable energy sources					7.117***	
					(1.911)	
% who somewhat/strongly support regulating CO2 as a pollutant						3.653***
						(0.983)
Economic and Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	255	255	255	255	255	255
Adjusted R^2	0.175	0.241	0.246	0.180	0.215	0.218

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We then ask whether public sentiment can blunt the electoral leverage of carbon-intensive industries. Splitting the sample at the median Brown-establishment share, we interact this high-Brown indicator with each opinion measure (see Table 6). For four of the six opinion measures——the share saying Congress should "do more" about global warming, the share perceiving scientific consensus, support for renewable-energy research, and support for classifying CO_2 as a pollutant——the interaction terms are positive and statistically significant. In these cases, stronger pro-climate sentiment appears to mitigate, and in some specifications counterbalance, the baseline negative association between Brown-industry presence and support for ACES. This suggests that, within Brown-heavy districts, a mobilised pro-environment public can weaken or counteract the disincentive representatives face to vote for climate legislation.

Table 6: Public Opinion in Districts with High/Low Brown Shares

	Pr(Voting for ACES)					
	(1)	(2)	(3)	(4)	(5)	(6)
High Brown Share District	-0.674*	-3.868***	-1.269***	-1.032	-7.242**	-2.655*
	(0.288)	(0.906)	(0.312)	(0.648)	(2.392)	(1.165)
% who think global warming is very or extremely important	-0.718					
	(0.849)					
High Brown Share District × % who think global warming is very or extremely important	2.126					
	(1.233)					
% who think Congress should be doing more/much more to address global warming		-0.238				
		(1.195)				
High Brown Share District × % who think Congress should be doing more/much more to address global warming		6.893***				
		(1.686)				
% who believe that most scientists think global warming is happening			0.055			
			(0.822)			
High Brown Share District × % who believe that most scientists think global warming is happening			3.288***			
			(0.917)			
% who are somewhat/very worried about global warming				-0.240		
				(0.849)		
High Brown Share District × % who are somewhat/very worried about global warming				1.640		
				(1.242)		
% who somewhat/strongly support funding research into renewable energy sources					0.538	
					(1.466)	
High Brown Share District × % who somewhat/strongly support funding research into renewable energy sources					8.361**	
					(2.828)	
% who somewhat/strongly support regulating CO2 as a pollutant						0.139
						(0.844)
High Brown Share District × % who somewhat/strongly support regulating CO2 as a pollutant						3.503*
						(1.639)
Economic and Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes	Yes	Yes
Ideology Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	255	255	255	255	255	255
Adjusted R^2	0.285	0.345	0.332	0.283	0.323	0.303

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2 Ideology

Prior studies of congressional roll-call behaviour typically conclude that ideology dominates other influences, a finding that partly reflects the practice of analysing Democrats and Republicans together. When both parties are pooled, the strong partisan cleavage amplifies ideological effects and obscures the distinct constraints legislators face within their own caucuses. To assess whether ideology still shapes voting once cross-party differences are removed, we confine the sample to Democratic representatives and examine intra-party variation. Specifically, we incorporate the first dimension of DW-Nominate—the standard spatial measure of economic ideology—where higher scores denote greater conservatism. Controlling for district opinion, campaign finance, and the local mix of Green and Brown industries, we expect this within-party ideological gradient to be negatively associated with support for the ACES bill.

Table 7: Business Interests and Economic Ideology

	Pr(Voting for ACES)			LCV Score		
	(1)	(2)	(3)	(4)	(5)	(6)
Green minus Brown Share	2.401**			0.963***		
	(0.748)			(0.287)		
Brown Establishment Share		-8.029***			-3.431***	
		(2.081)			(0.763)	
Green Establishment Share			1.449			0.533
			(0.809)			(0.317)
% who supports renewable energy sources	5.616**	5.143**	5.241**	1.309	1.130	1.148
	(1.962)	(1.850)	(1.969)	(0.722)	(0.673)	(0.724)
Economic Ideology (Left-Right)	-0.885***	-0.904***	-0.890***	-0.533***	-0.540***	-0.535***
	(0.199)	(0.196)	(0.201)	(0.107)	(0.104)	(0.107)
Economic and Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	255	255	255	254	254	254
Adjusted R^2	0.293	0.312	0.277	0.352	0.377	0.335

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As shown in Table 7, the coefficients of the DW-Nominate score coefficients behave as anticipated: more economically conservative representatives are less inclined to support the ACES bill-—or a broader pro-environmental legislative agenda. Conservative Democrats, even after accounting for the influence of both Green and Brown industries, tend to be less supportive of en-

vironmental legislation. Despite the significant correlation of this indicator of economic ideology, its inclusion does not seem to alter in any meaningful way the coefficients for both the Brown establishment shares (Columns 2 and 5) and our measure of competing business interests (Columns 1 and 4) if we compare them with those reported in Table 2.

To further examine the interplay between ideology and business interests, we next classify Democratic House members based on the median value of the first dimension of the DW-Nominate scores. According to this definition, 125 representatives (49% of the estimation sample) can be considered as "conservative", while the other 130 Democrats (51% of the sample) can be considered as "liberal". We then proceed to compare the interaction terms between this dichotomised ideological variable and business interests. The results from this exercise are reported in Table 8.

Table 8: Business Interests in Districts with Conservative/Liberal Representatives

	Pr(Voting for ACES)			LCV Score		
	(1)	(2)	(3)	(4)	(5)	(6)
Conservative=1	-0.750***	0.105	-0.813**	-0.209***	0.010	-0.166
	(0.161)	(0.078)	(0.250)	(0.058)	(0.029)	(0.097)
Green minus Brown Share	0.223			0.447		
	(0.668)			(0.288)		
Conservative=1 × Green minus Brown Share	4.037***			0.904*		
	(1.036)			(0.383)		
Brown Establishment Share		-0.793			-1.092	
		(1.622)			(0.737)	
Conservative=1 × Brown Establishment Share		-10.916***			-3.428***	
		(2.736)			(0.959)	
Green Establishment Share			-0.093			0.288
			(0.767)			(0.323)
Conservative=1 × Green Establishment Share			3.731**			0.484
			(1.409)			(0.568)
Economic and Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	255	255	255	254	254	254
Adjusted R^2	0.255	0.279	0.226	0.214	0.249	0.192

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Once again we find that Conservative Democrats were less likely to support the ACES Act of 2009 (Columns 1-3). More interestingly, we note that they were also more responsive to local business interests: the likelihood for voting in favour of the bill is notably higher in districts with higher Green Establishment shares (see Columns 1 and 3). Conversely, in districts with high

Brown establishment shares we can observe a decrease in the likelihood of supporting this piece of environmental legislation (Column 2). If we extend the analysis to the broader LCV scores, the results are similar: Conservative Democrats oppose environmental bills when they are faced with high local Brown establishment shares (Column 5), but they also support an environmentalist agenda if faced with a relatively large share of Green firms (Column 4). This indicates that, despite the general tendency of conservative ideology to align with less support for climate-friendly policies, these representatives are more responsive to business interests than those that have a more left leaning economic ideology.

5 Exploiting the Fracking Shock

Thus far we have documented strong correlations between the district-level mix of Green and Brown establishments and Democratic support for ACES. These estimates, however, may be subject to omitted-variable bias: the location of carbon-intensive firms is itself shaped by fixed natural-resource endowments, historical infrastructure, and other unobserved factors that may also influence a legislator's stance. To move toward a causal estimate, we instrument the Brown-establishment share with exogenous variation generated by the post-2005 boom in hydraulic fracturing.

Hydraulic fracturing, also known as fracking, is a technological innovation that combined with horizontal drilling allowed American oil companies to access to previously unreachable shale gas and oil reserves (Bartik, Currie, Greenstone, and Knittel, 2019). These innovations significantly increased the efficiency and output of wells, making fracking economically viable (Fitzgerald and Mason, 2021). The use of this method started spreading across the US after the Barnett Shale in Texas showed that the method was both cost-effective and profitable. It also benefited from the Energy Policy Act of 2005, which exempted fracking from certain provisions of the Safe Drinking Water Act (Middleton, Gupta, Hyman, and Viswanathan, 2017). The reduction in regulatory barriers, combined with the relatively high energy prices between 2004-2013, encouraged more

investors to support the expansion of this new oil and gas extraction method (Golden and Wiseman, 2015). Because the locations of shale formations are geologically determined and national in scope, the subsequent expansion of oil- and gas-related establishments constitutes a plausibly exogenous shock to the Brown sector at the district level.

To isolate the variation in 2009 establishment shares attributable to the rise of fracking, we construct a congressional district-level shift-share instrument in two steps. First, we calculate a county-level instrument for each county c:

$$z_c = g_{2000\text{–}2010,-c} \times s_{c,2000} \tag{2}$$

where $g_{2000\text{–}2010,-c}$ is the 2000–2010 national growth rate of employment in gas and oil industries *excluding county* c, and $s_{c,2000}$ is county c's gas and oil share in 2000.

We then compute the congressional district-level instrument as the simple average of county instruments within each district d:

$$Z_d = \frac{1}{N_d} \sum_{c \in d} z_c \tag{3}$$

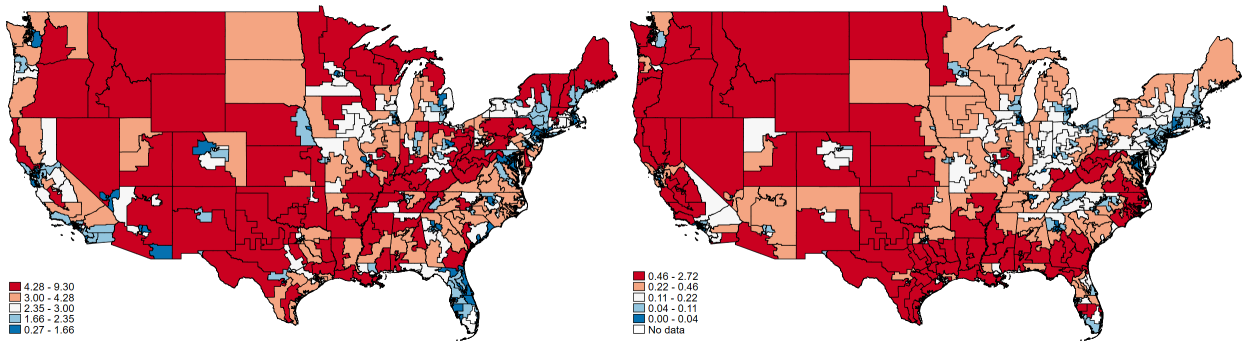
where N_d denotes the number of counties in congressional district d.

This way of mapping the fracking shock into the congressional districts allows us to estimate Equation 1 using a two-stage least squares estimator (2SLS) where $BI_{d,t-1}$ is instrumented with Z_d:

$$BI_{d,t-1} = \alpha + \gamma Z_d + \delta CC_{i,t-1} + \phi PO_{d,t-1} + \beta_1 \mathbf{U}'_{it} + \beta_2 \mathbf{X}'_{d,t-1} + \varepsilon_{idt} \tag{4}$$

The validity of our instrumental variable approach rests on two key assumptions. The first, is that the 2000s expansion of fracking affected legislators' voting behaviour only through its impact on the economic composition of their districts – specifically, the establishment share of brown industries. This implies that fracking does not directly affect voting behaviour through other unobserved confounding factors. This is a reasonable assumption considering that the brown establishment share includes many other economic activities and, as in our previous specifications, we include various covariates that allow us to account for the socio-economic composition of the

Figure 3: Brown Shares and Fracking Shock Instrument by Congressional District



(a) Brown Industry Share (b) Fracking Instrument

Note: Panel (a) shows the share of firms categorized as Brown at the Congressional District level. Panel (b) reports the Fracking Shock instrument derived from Equations 2 and 3.

congressional districts, the local public opinion, campaign contributions, and the legislators' own ideological leanings.

The second assumption is that the intensity of the fracking shock at the local level, determined largely by the geological distribution of extractable resources, is exogenous to other unobserved factors that might simultaneously influence both industrial structure and political preferences. In other words, 2000s growth in oil and gas industries is treated as a plausibly random shock, conditional on pre-existing resource endowments. To illustrate this point, in Figure 3 we compare geographical distribution of brown shares and the instrument Z_d. Their simple correlation coefficient is of 0.53.

The results of this instrumental variable strategy are organised in Table 9. The OLS coefficients of Column 1 go in the expected direction, with higher brown shares being associated with a lower probability of supporting the ACES bill and broader environmental legislation. The Reduced Form (RF) coefficient also show that the fracking shift-share instrument is negatively associated with supporting a green legislative agenda. The First Stage (FS) coefficients reported in Column 3 show that experiencing a fracking shock is highly correlated with high brown shares. Both this and the high First Stage F-Statistic (reported in Column 4) suggest that the instrument is strong and can be used for a 2SLS estimation. As expected, these coefficients are markedly larger in magnitude than their OLS counterparts in Column 1. This is because the 2SLS estimation only captures

Table 9: Effect of Brown Business Interests on Voting Behaviour

	(1) OLS	(2) RF	(3) FS	(4) 2SLS
A. Pr(Voting for ACES)				
Brown Establishment Share	-7.726***			-29.952**
	(2.166)			(10.693)
Fracking Shock		-0.355**	0.012***	
		(0.108)	(0.003)	
Economic and Demographic Controls	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes
Public Opinion Controls	Yes	Yes	Yes	Yes
Ideology Controls	Yes	Yes	Yes	Yes
Observations	255	254	254	254
First-Stage F Statistic				12.876
B. LCV Score				
Brown Establishment Share	-3.367***			-10.460***
	(0.774)			(3.118)
Fracking Shock		-0.124***	0.012***	
		(0.030)	(0.003)	
Economic and Demographic Controls	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes
Public Opinion Controls	Yes	Yes	Yes	Yes
Ideology Controls	Yes	Yes	Yes	Yes
Observations	254	253	254	253
First-Stage F Statistic				12.850

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

the portion of variation in brown establishment shares that is exogenously driven by the post-2000 fracking boom, omitting pre-existing industrial differences and the non-extractive segment of brown industries (e.g. manufacturing).

To further test the validity of our instrument, we also implement a 2SLS instrumenting Green minus Brown Shares instead of simply Brown (see Table A7). While the OLS result is aligned with previous results (higher net green shares are associated with a higher likelihood of supporting the ACES bill), the First Stage reported in Column 3 shows that there is no correlation between the Fracking Shock and the relative importance of Green industries in the analysed congressional districts. This also helps to explain the non-significant coefficient for the 2SLS estimator (Column 4) and the low First-Stage F Statistic (0.15). Taken as a whole, this falsification exercise shows that the instrument is not affecting other relevant variables that may obscure our identification strategy.

Finally, to account for any potential spillovers that may go beyond district-level changes in establishment shares, we also create a state-level version of the instrument. This means that instead of leaving the target county c out when calculating the size of the fracking shock, we take out the whole k state to which the district belongs to ($g_{2000-2010,-k}$). The results of this alternative approach are organised in Table A8 and are very similar to the ones reported in Table 9.

6 Robustness

In order to assess the robustness of our results, we test if the instrumented measure of Brown business interests affects other significant pieces of legislation. For this purpose, we implement a 2SLS estimation of Equation 1 instrumenting $BI_{d,t-1}$ with Z_d to identify the causal effect of Brown business interests on the probability of voting in favour of (a) the American Recovery and Reinvestment Act of 2009, (b) the Dodd-Frank Wall Street Reform and Consumer Protection Act, and (c) the Patient Protection and Affordable Care Act (also known as Obamacare). We selected these bills since they were considered important at the time, and they could have directly or indirectly affected businesses *in general*, but not specifically those that are carbon-intensive.

The results of this placebo test are organized in Table 10.

Table 10: Effect of Brown Business Interests on Other Landmark Legislation

	(1) OLS	(2) RF	(3) FS	(4) 2SLS
A. American Recovery and Reinvestment Act of 2009				
Brown Establishment Share	-0.050			-3.026
	(0.893)			(3.747)
Fracking Shock		-0.036	0.012***	
		(0.045)	(0.003)	
Observations	250	249	249	249
First-Stage F Statistic				12.424
B. Dodd–Frank Wall Street Reform and Consumer Protection Act				
Brown Establishment Share	-2.237			-14.896
	(1.763)			(9.233)
Fracking Shock		-0.176	0.012***	
		(0.094)	(0.003)	
Observations	251	250	250	250
First-Stage F Statistic				12.479
C. Patient Protection and Affordable Care Act (ACA / Obamacare)				
Brown Establishment Share	-4.689**			-5.026
	(1.732)			(6.083)
Fracking Shock		-0.059	0.012***	
		(0.076)	(0.003)	
Observations	248	247	247	247
First-Stage F Statistic				12.145
Economic and Demographic Controls	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes
Public Opinion Controls	Yes	Yes	Yes	Yes
Ideology Controls	Yes	Yes	Yes	Yes

Standard errors in parentheses

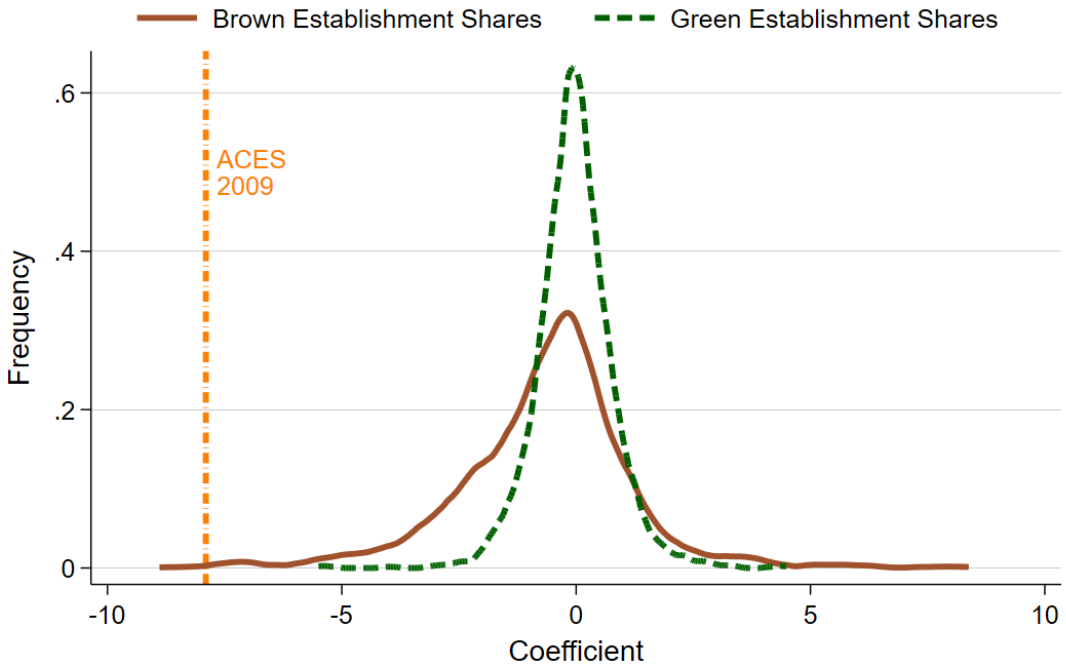
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Panel A shows that while the instrument is valid and has a strong first-stage, there is no causal effect or correlation between brown shares and supporting the stimulus package designed to combat the effects of the 2008 crisis (see Cols. 1 and 4). The same can be said about the Dodd-Frank act that tried to reform the US financial system and prevent future crises (Panel B, Cols. 1 and 4). Finally, even though we find a negative correlation between brown shares and supporting the Affordable Care Act (Panel C, Col. 1), the 2SLS estimation reveals that we cannot establish a causal link between the two (Panel C, Col. 3). Taken as a whole, these results suggest that our identification strategy effectively captures the variation in brown shares that was induced by the

rise of fracking and thus only affects voting behaviour when it comes to pieces of environmental legislation.

We take this exercise further by performing a sensitivity test to ensure that our main results are not due to chance. To achieve this, we compare our baseline estimate with estimations of the association of Brown and Green Establishment Shares with all the votes cast during 111th Congress. This falsification test includes all bills and motions on which representatives voted except those directly linked to the ACES bill of 2009.

Figure 4: Business Interests and Legislation Introduced in the 110th US Congress



Note: This graph plots the relative frequency of 3,294 point estimates of the association between Brown and Green Establishment Shares with the probability of voting 'Yea' on the 1,647 bills and motions brought to the House floor during the 110th US Congress. The dotted vertical line represents our baseline estimate for the relationship between Brown Establishment shares and the likelihood of voting for the ACES bill of 2009.

As shown in Figure 4, the distribution of estimates for both Green and Brown Establishment Shares are centered around zero. This suggest that they do not normally influence voting behavior. However, it also shows that there are some instances in which they can actually matter in the

votes cast by the representatives. The only cases that are comparable in magnitude to our baseline estimate (the vertical dotted line) are only *two*, and both of them are amendments to bills related to defence expenditures. Plausibly, these are settings where energy–security arguments might surface.

7 Conclusions

We analyse House voting on the American Clean Energy and Security Act of 2009——the most comprehensive climate bill to reach a chamber of Congress. By combining district-level counts of carbon-intensive ("Brown") and clean-technology ("Green") establishments with campaign-finance, opinion, and roll-call data, we separate the influence of constituent and special interests from ideology. We also trace the channels through which these economic interests shape roll-call behavior.

Our main findings are fourfold. First, the balance of Brown vs. Green industry in a district is predictive of voting patterns on ACES. Members from districts dominated by Brown industries were less likely to vote "Yea," whereas those representing Green-industry hubs were more inclined to support the bill. Substantively, a one percentage-point increase in the local share of Brown-industry employment is associated with about a 7.9 percentage-point decrease in the probability of a House Democrat voting in favor of ACES. Conversely, greater Green industry presence corresponded to a higher likelihood of support, indicating that clean-tech employers formed a countervailing force to carbon-intensive business interests. Moreover, electoral competition amplified the sway of local industries: in highly competitive districts (e.g. a margin of victory under 2 percent), legislators were especially responsive to the dominant industry mix. In other words, when reelection was uncertain, representatives hewed even more closely to the interests of local employers – siding with Brown industries when those jobs were at stake, or embracing Green industries' priorities when clean-energy firms were major employers. This pattern is consistent with an electoral pressure mechanism, wherein politicians in swing seats feel acute pressure not to jeopardize local employment tied to powerful industries.

Second, public opinion in the district moderated the impact of industry interests. Where constituents strongly favored climate action, business pressures were markedly blunted. In districts with high public concern about climate change, the negative effect of Brown-industry presence on support for ACES was significantly reduced, and the positive effect of Green-industry presence was also muted (since even Brown-heavy districts faced voter demands for climate policy). This implies that a mobilized, pro-climate electorate can counteract the influence of entrenched industries. Representatives proved more willing to defy local Brown businesses' preferences if their voters overwhelmingly endorsed addressing climate change. By the same token, in places where public support for renewable energy was tepid, lawmakers were more susceptible to industry influence. Thus, strong constituent pro-climate sentiment served as a constraint on special interests, aligning legislators' votes more with public will than with narrow economic concerns. This finding speaks to the notion that democratic accountability can limit the policy sway of organized interests.

Third, the role of campaign contributions appears secondary once one accounts for the real-economy influence of local industries. Our study shows that political donations from energy lobbies add little explanatory power on top of the underlying industry composition of a district. Controlling for the prevalence of Brown and Green firms renders contributions from both the fossil fuel sector and green advocacy groups statistically insignificant. Affected legislators seem to be responding to jobs and industry structure more than campaign funding.

Fourth, legislators' ideological leanings interacted with local industry pressures in decisive ways. Not surprisingly, more conservative Democrats were generally less inclined to support ACES. However, even these ideologically resistant lawmakers could be swayed by their district's industry structure. Notably, we find that conservative Democrats responded more strongly to local industry interests than their liberal counterparts. For instance, a conservative Democrat from a Green-intensive district was more likely to break with party skeptics and vote "Yea" on ACES, whereas a similarly conservative Democrat from a Brown industry district was more likely to oppose the bill. This interaction between ideology and economic interests suggests that local industry or employment considerations can trump ideology.

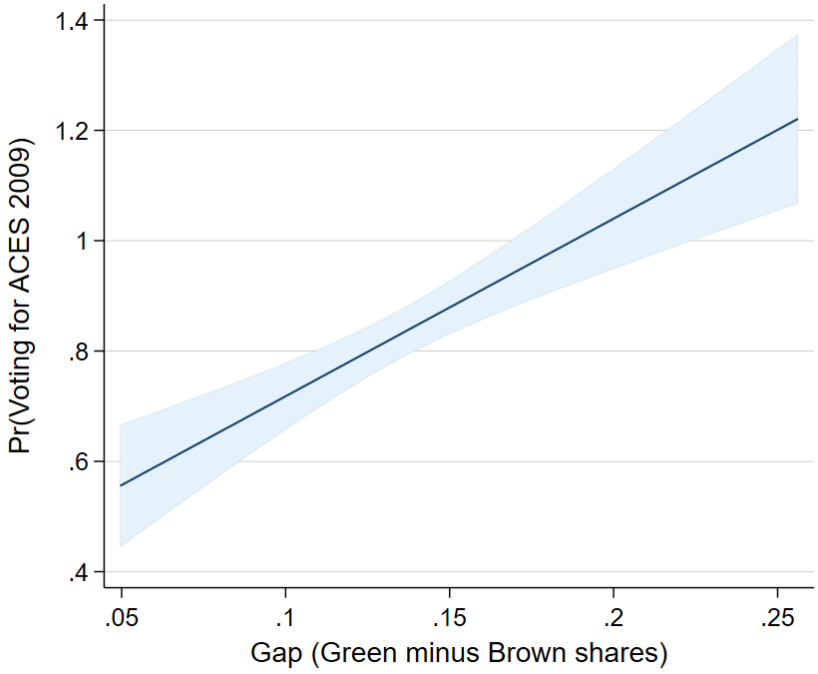
Online Appendix

A Tables and Figures

Table A1: Voting Patterns according to Party Affiliation

	Democrats	Republicans	Total
Yes	211	8	219
No	44	168	212
Absent	1	2	3

Figure A1: Vote for the ACES Bill and Balance Between Green and Brown Interests



Note: This figures plot the propensity of voting for the ACES bill by the Green minus Brown Establishment Share indicator. Shades represent the 95% confidence level intervals for predictions from a linear probability model (LPM).

Table A2: Brown Industries as categorized by Vona et al. (2018)

NAICS	Description	Pollutant Count	List of pollutants above 95th percentile
2122	Metal Ore Mining	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
2123	Nonmetallic Mineral Mining and Quarrying	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
2211	Electric Power Generation, Transmission and Distribution	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
2213	Water, Sewage and Other Systems	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3112	Grain and Oilseed Milling	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3113	Sugar and Confectionery Product Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3114	Fruit and Vegetable Preserving and Specialty Food Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3121	Beverage Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3133	Textile and Fabric Finishing and Fabric Coating Mills	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3212	Veneer, Plywood, and Engineered Wood Product Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3221	Pulp, Paper, and Paperboard Mills	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3241	Petroleum and Coal Products Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3251	Basic Chemical Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3252	Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3259	Other Chemical Product and Preparation Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3271	Clay Product and Refractory Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3272	Glass and Glass Product Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3273	Cement and Concrete Product Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3274	Lime and Gypsum Product Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3279	Other Nonmetallic Mineral Product Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3311	Iron and Steel Mills and Ferroalloy Manuf	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3312	Steel Product Manuf from Purchased Steel	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3313	Alumina and Aluminum Production and Processing	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3314	Nonferrous Metal (except Aluminum) Production and Processing	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
3315	Foundries	8	CO VOC NOX SO2 PM10 PM2. 5 Lead CO2
5622	Waste Treatment and Disposal	8	CO VOC NOX SO2 PM10 PM2.5 Lead CO2
2111	Oil and Gas Extraction	7	CO VOC NOX SO2 PM10 PM2.5 CO2
2212	Natural Gas Distribution	7	CO VOC NOX SO2 PM10 PM2.5 CO2
3119	Other Food Manuf	7	CO NOX SO2 PM10 PM2.5 Lead CO2
3122	Tobacco Manuf	7	CO VOC NOX SO2 PM10 PM2.5 CO2
3222	Converted Paper Product Manuf	7	CO VOC NOX PM10 PM2.5 Lead CO2
3256	Soap, Cleaning Compound, and Toilet Preparation Manuf	7	CO NOX SO2 PM10 PM2.5 Lead CO2
3262	Rubber Product Manuf	7	CO VOC NOX PM10 PM2.5 Lead CO2
3361	Motor Vehicle Manuf	7	CO VOC NOX PM10 PM2.5 Lead CO2
3365	Railroad Rolling Stock Manuf	7	CO VOC NOX PM10 PM2.5 Lead CO2
4862	Pipeline Transportation of Natural Gas	7	CO VOC NOX SO2 PM10 PM2.5 CO2
4881	Support Activities for Air Transportation	7	CO VOC NOX SO2 PM10 PM2.5 Lead
4882	Support Activities for Rail Transportation	7	CO VOC NOX SO2 PM10 PM2.5 Lead
2121	Coal Mining	6	CO NOX SO2 PM10 PM2.5 CO2
3161	Leather and Hide Tanning and Finishing	6	CO VOC NOX PM10 PM2.5 CO2
3211	Sawmills and Wood Preservation	6	CO VOC NOX PM10 PM2.5 Lead
3219	Other Wood Product Manuf	6	CO VOC NoX PM10 PM2.5 Lead
3328	Coating, Engraving, Heat Treating, and Allied Activities	6	CO VOC NOX PM10 PM2.5 Lead
3359	Other Electrical Equipment and Component Manuf	6	CO NOX SO2 PM10 PM2.5 Lead
4861	Pipeline Transportation of Crude Oil	6	CO VOC NOX PM10 PM2.5 CO2
4869	Other Pipeline Transportation	6	CO VOC NOX PM10 PM2.5 CO2
3111	Animal Food Manuf	5	CO NOX PM10 PM2.5 CO2
3115	Dairy Product Manuf	5	CO NOX PM10 PM2.5 CO2
3132	Fabric Mills	5	CO NOX PM10 PM2.5 CO2
3141	Textile Furnishings Mills	5	NOX SO2 PM10 Lead CO2
3254	Pharmaceutical and Medicine Manuf	5	CO NOX SO2 PM10 CO2
3369	Other Transportation Equipment Manuf	5	CO VOC PM10 PM2.5 Lead
5629	Remediation and Other Waste Management Services	5	CO NOX PM10 PM2.5 Lead
3255	Paint, Coating, and Adhesive Manuf	4	VOC PM10 PM2.5 Lead
3329	Other Fabricated Metal Product Manuf	4	CO PM10 PM2.5 Lead
4247	Petroleum and Petroleum Products Merchant Wholesalers	4	CO VOC NOX CO2
2131	Support Activities for Mining	3	CONOXCO2
3321	Forging and Stamping	3	CO NOX CO2
3322	Cutlery and Handtool Manuf	3	CO PM10 PM2.5
3366	Ship and Boat Building	3	VOC PM10 PM2.5
3371	Houschold and Institutional Furniture and Kitchen Cabinet Manuf	3	VOC PM10 PM2.5

Table A3: Business Interests and Voting Patterns (Logit and State FE)

	Pr(Voting for ACES)			LCV Score			Pr(Voting for ACES)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	Logit	Logit	Logit
Green minus Brown Share	2.272*			0.925**			44.131*		
	(0.935)			(0.304)			(18.005)		
Brown Establishment Share		-5.825*			-1.883*			-69.349	
		(2.794)			(0.863)			(38.429)	
Green Establishment Share			2.108			0.952*			43.822
			(1.159)			(0.377)			(25.008)
Ln(Median Income)	-0.095	0.035	-0.077	-0.046	0.009	-0.044	-2.307	-0.501	-2.109
	(0.247)	(0.238)	(0.250)	(0.081)	(0.080)	(0.082)	(3.261)	(2.970)	(3.003)
Total Number of Firms	0.063	0.172	0.025	0.027	0.063	0.009	-0.469	1.153	-1.426
	(0.090)	(0.101)	(0.096)	(0.031)	(0.033)	(0.032)	(1.432)	(1.755)	(1.837)
% of Hispanic Households	0.804**	0.606*	0.810**	0.192*	0.115	0.201*	8.453**	5.321*	8.881**
	(0.243)	(0.236)	(0.248)	(0.080)	(0.078)	(0.082)	(3.009)	(2.615)	(3.016)
% of Black Households	0.683**	0.612**	0.706**	0.238**	0.215*	0.249**	8.186*	7.366*	8.312*
	(0.225)	(0.216)	(0.223)	(0.087)	(0.086)	(0.088)	(3.437)	(3.302)	(3.381)
% of Households in Poverty	-0.844	-0.379	-0.715	-0.158	0.050	-0.130	-4.451	1.639	-2.407
	(1.252)	(1.226)	(1.250)	(0.424)	(0.416)	(0.422)	(19.875)	(16.656)	(19.995)
% of Households with Tertiary Education	0.485	0.049	1.023	0.164	0.098	0.368	5.541	4.087	16.279
	(0.723)	(0.832)	(0.674)	(0.256)	(0.299)	(0.233)	(8.854)	(10.083)	(8.554)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	255	255	255	254	254	254	155	155	155
Adjusted R^2	0.357	0.355	0.351	0.501	0.493	0.497			

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4: Green Business Interests, Public Opinion, and Voting Record

	LCV Score					
	(1)	(2)	(3)	(4)	(5)	(6)
Green Establishment Share	0.287	0.389	0.307	0.446	0.650	0.851*
	(0.355)	(0.325)	(0.329)	(0.332)	(0.351)	(0.346)
% who think global warming is very or extremely important	0.732					
	(0.416)					
% who think Congress should be doing more/much more to address global warming		2.347***				
		(0.650)				
% who believe that most scientists think global warming is happening			1.364***			
			(0.352)			
% who are somewhat/very worried about global warming				0.762*		
				(0.298)		
% who somewhat/strongly support funding research into renewable energy sources					2.087**	
					(0.792)	
% who somewhat/strongly support regulating CO2 as a pollutant						1.893***
						(0.471)
Economic and Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	254	254	254	254	254	254
Adjusted R^2	0.140	0.202	0.214	0.146	0.152	0.208

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5: Brown Business Interests, Public Opinion, and Voting Record

	LCV Score					
	(1)	(2)	(3)	(4)	(5)	(6)
Brown Establishment Share	-3.256***	-2.900***	-2.849***	-3.048***	-3.368***	-2.561***
	(0.822)	(0.757)	(0.736)	(0.812)	(0.803)	(0.745)
% who think global warming is very or extremely important	0.789*					
	(0.395)					
% who think Congress should be doing more/much more to address global warming		2.234***				
		(0.650)				
% who believe that most scientists think global warming is happening			1.304***			
			(0.344)			
% who are somewhat/very worried about global warming				0.653*		
				(0.299)		
% who somewhat/strongly support funding research into renewable energy sources					2.044**	
					(0.757)	
% who somewhat/strongly support regulating CO2 as a pollutant						1.570***
						(0.453)
Economic and Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	254	254	254	254	254	254
Adjusted R^2	0.181	0.233	0.244	0.178	0.189	0.221

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6: Green minus Brown Shares, Public Opinion, and Voting Record

	LCV Score					
	(1)	(2)	(3)	(4)	(5)	(6)
Green minus Brown Share	0.754*	0.757*	0.690*	0.821**	1.039**	1.019***
	(0.320)	(0.292)	(0.286)	(0.305)	(0.318)	(0.289)
% who think global warming is very or extremely important	0.652					
	(0.409)					
% who think Congress should be doing more/much more to address global warming		2.298***				
		(0.650)				
% who believe that most scientists think global warming is happening			1.329***			
			(0.351)			
% who are somewhat/very worried about global warming				0.726*		
				(0.297)		
% who somewhat/strongly support funding research into renewable energy sources					2.237**	
					(0.791)	
% who somewhat/strongly support regulating CO2 as a pollutant						1.845***
						(0.454)
Economic and Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	254	254	254	254	254	254
Adjusted R^2	0.152	0.214	0.224	0.159	0.170	0.221

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A7: Instrument Validity I: Instrumenting Green Shares

	(1) OLS	(2) RF	(3) FS	(4) 2SLS
Green minus Brown Share	1.986**			145.947
	(0.724)			(358.692)
Fracking Shock		-0.355**	-0.002	
		(0.108)	(0.006)	
Economic and Demographic Controls	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes
Public Opinion Controls	Yes	Yes	Yes	Yes
Ideology Controls	Yes	Yes	Yes	Yes
Observations	255	254	254	254
First-Stage F Statistic				0.150

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A8: Instrument Validity II: State-Level Shift-Share

	(1) OLS	(2) RF	(3) FS	(4) 2SLS
Brown Establishment Share	-7.726***			-30.218**
	(2.166)			(11.114)
Fracking Shock (State-Level)		-0.521**	0.017**	
		(0.178)	(0.005)	
Economic and Demographic Controls	Yes	Yes	Yes	Yes
Campaign Contributions Controls	Yes	Yes	Yes	Yes
Public Opinion Controls	Yes	Yes	Yes	Yes
Ideology Controls	Yes	Yes	Yes	Yes
Observations	255	254	254	254
First-Stage F Statistic				10.414

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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