The Polarization of American Environmental Policy: A Regression Discontinuity Analysis of Senate and House Votes, 1971–2013

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Abstract

The partisan polarization of environmental policy is an important development in American politics, but it remains unclear how much such polarization reflects voter preferences, as opposed to disagreements between partisan elites. We conduct a regression discontinuity analysis of all major environmental and energy votes in the Senate and the House, 1971–2013. In total, we have 368,974 individual roll call votes by senators and House Representatives. The causal effect of electing a Democrat instead of a Republican in close elections on pro-environmental voting is large: when a Democrat wins, pro-environmental voting increases by over 40 percentage points. Because of the quasi-experimental research design, this difference cannot be attributed to the median voter's preferences. Next, we test hypotheses concerning possible explanations for the elite partisan conflict. The Democrat–Republican gap is the widest when fossil fuel interests make contributions exclusively to Republicans and when state-level public opinion is polarized.

KEY WORDS: American politics, Congress, partisan politics, environmental politics, causal inference, regression discontinuity

Introduction

The partisan polarization of environmental policy has been one of the major developments in American politics since the establishment of the Environmental Protection Agency in 1970 by Republican President Richard Nixon. Over the past four decades, policies to protect the environment have driven a wedge between the Democratic and Republican parties, and it would be difficult to find Republicans with Nixon's views of the importance of environmental protection. The conflict over environmental protection has brought major environmental legislation to a standstill, and new environmental policies at the federal level now largely stem from executive action by the Democratic Party.

The polarization of environmental policy has major implications not only for Americans, but also for the citizens of other countries. Perhaps most notably, the United States remains the world's second largest source of carbon dioxide emissions, only behind China, with a share of 16% of the global total in 2012 (Olivier, Janssens-Maenhout, Muntean, & Peters, 2013). In the American political system, major legislation to control climate change and other environmental problems is improbable as long as Republicans and Democrats remain sharply divided on the issue. Any legislation to reduce greenhouse gas emissions must secure 60 votes in the Senate to avoid a filibuster. At current levels of partisan polarization, major climate legislation is thus politically infeasible. The 2009 Waxman–Markey Bill, e.g., would have passed in the Senate if Republican Senators had agreed with the

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Democratic majority on the importance of mitigating climate change. More generally, as McCright and Dunlap (2011, p. 179) argue, "the existing divide on global warming between political elites poses a serious impediment to creating and implementing an effective federal climate policy with any potential of significantly reducing our nation's greenhouse gas emissions." Therefore, understanding the sources of partisan polarization over environmental policy in the United States is of global significance.

What drives partisan polarization over environmental issues? The literature in political science proposes two explanations for this polarization. One emphasizes public opinion: if Democrats and Republicans compete for the support of the median voter, then the Democrat–Republican wedge reflects the preferences of this median voter in different electoral conditions. In this telling, local factors that shape public opinion—in particular, the median voter's preferences—are ultimately decisive for understanding the Democrat–Republican cleavage in the Congress.

The other explanation argues that the Democrat–Republican difference reflects conflict between partisan elites. Even in identical electoral conditions, Republicans may vote against environmental protection more often than Democrats due to their commitment to free markets and their preference for small government and limited regulation. If elected officials hold stronger ideological preferences than the public, their political survival in the primaries depends on the support of ideological party activists, and both campaign contributions and lobbying move policies away from the median voter. According to this explanation, the Democrat–Republican difference could have independent effects on environmental politics in the American Congress.

Existing studies (Dunlap, Xiao, & McCright, 2001; McCright, Xiao, & Dunlap, 2014) have shown that there is a descriptive difference between Democratic and Republican elites, but the relative importance of versus elite partisan conflict remains unclear. In a recent discussion, McCright and others (2014, p. 258) argue that "polarization on the environment among political elites (e.g., party activists and members of Congress) has resulted from this increasing anti-environmentalism of conservatives and Republicans." This hypothesis is widely accepted among researchers, but it remains unclear how much of such elite polarization is merely a response to changing electoral conditions or reflects a more fundamental elite conflict. Controlling for determinants of the median voter's preferences, such as economic conditions and inequality in a regression analysis, does not solve this problem, as researchers can never be sure that they have included all the relevant variables, addressed reverse causality, and correctly specified the functional form of the regression equation.

To overcome these difficulties, we present a regression discontinuity analysis of the partisan effect on all environmental votes in the House and the Senate between 1971 and 2013. Every year, the League of Conservation Voters (LCV) identifies all significant environmental and energy votes made in Congress and determines either "yea" or "nay" as the pro-environmental position (LCV, 2013). We have scraped the LCV database for the outcomes of 368,974 individual votes over a period exceeding four decades—the largest dataset ever used to analyze environmental voting in Congress.

As research in American politics shows (Eggers, Fowler, Hainmueller, Hall, & Snyder, 2015; Lee, 2008), the regression discontinuity design (RDD) allows us to

consider the election of Republican and Democratic officials in close elections as essentially random. In a quasi-experimental fashion, we can then estimate the effect of electing a Democrat—against the baseline of a Republican—on the propensity to vote in favor of the environment. As we shall see, this effect exists and is large. Depending on the model specification, the estimated effect of selecting a Democrat over a Republican is over 40 percentage points; the result holds in both the House and the Senate. Thus, the Democrat–Republican gap over environmental issues does not reflect differences between, say, Wyoming and Vermont. Instead, it reflects elite-level differences between Democrats and Republicans.

Given the large amounts of data we have assembled, we can also examine geographic, temporal, and cross-issue variation in partisan polarization over the environment. In the literature on American environmental politics, scholars have noted the widening partisan gap over time (e.g., Dunlap et al., 2001), the importance of geography (e.g., Cragg, Zhou, Gurney, & Kahn, 2013), and the particularly polarized discourse on climate change (e.g., Guber, 2013). Our research design allows us to estimate differences in the partisan gap along these dimensions. Using the same regression discontinuity for subsets of the data, we show that the partisan conflict has grown worse over time and is particularly extreme with respect to questions of climate change. At the same time, the Democrat–Republican gap remains wide and was significant even in the 1970s and outside the domain of climate change. These findings are consistent with the expectations of a large body of literature in environmental politics. Interestingly, however, we find limited evidence for regional differences. In a departure from previous literature (e.g., Shipan & Lowry, 2001), we do not find evidence of a particularly strong elite partisan conflict in the Southern states. According to our results, any differences between the South and the rest of the country must reflect public opinion, as opposed to partisan conflict at the elite or activist level.

Next, we evaluate the explanatory power of factors that aggravate the elite partisan conflict. Although the above results uncover that electing a Democrat over a Republican bears a significant causal effect, the magnitude of this effect may still vary across political settings. Analyzing the degree of partisan conflict in different contexts can help us understand the origins of the partisan conflict. Does it reflect the internal logic of the Democratic and Republican parties? Or, do interest groups, with their campaign contributions and lobbying, contribute to the partisan conflict? Or, does the degree of partisan conflict vary with public opinion or the median voter's preferences, such that Democrats and Republicans respond differently to an anti-environmental electorate?

Specifically, we test hypotheses on the role of polarized public opinion (McCright et al., 2014), anti-environmental interest groups that support Republican candidates (Layzer, 2012), and fossil fuel endowments (Fisher, 2006) in amplifying elite partisan polarization. Across various analyses of heterogeneous treatment effects, we find that the Democrat–Republican divide is maximized when oil and gas interests contribute exclusively to Republicans and when state-level environmental public opinion is sharply polarized. In contrast, fossil fuel endowments cannot explain variation in the causal effect of electing a Republican over a Democrat on voting patterns.

For environmentalists, the presence of a strong local treatment effect is significant. Environmental advocates have expended a lot of effort to educate the public

concerning climate change, but our results suggest that these efforts have inherent limitations. Unless they reach conservative party activists and elites, their efforts will not influence environmental policy at the federal level. Indeed, previous survey research suggests that educated conservatives are particularly prone to contest anthropogenic climate change (Hamilton, 2011).

Our results are also relevant to the broader question of partisan polarization in American politics. If Democrats and Republicans vote over the environment in dramatically differing ways, even in the same electoral setting, variation in the preferences of voters across states and electoral districts cannot explain partisan polarization in this issue area. This finding supports arguments made by scholars such as Fiorina and Abrams (2008, p. 580); Ansolabehere, Rodden, and Snyder (2006, p. A99); and Baldassarri and Gelman (2008, p. 408), who argue that elite polarization is more extreme than the polarization of public opinion over specific issues. Conversely, our findings also confirm that the extent of elite conflict depends on the polarization of public opinion, consistent with Bafumi and Shapiro (2009, p. 10), who note that partisanship has played an increasingly important role for voting behavior among the American public. To the extent that our findings apply to other issue areas, they suggest that the roots of partisan polarization are to be found in party politics at higher levels, while public opinion, in turn, aggravates the conflict between Democratic and Republican elites.

The Partisan Politics of Environmental Voting in the Congress

Environmental policies are intended to protect ecosystems and human beings from harm, but they often carry a cost. As a result, environmental policy is a deeply political subject. Citizens and groups who worry about or suffer from environmental deterioration support tighter restrictions on pollution and waste, whereas those who would pay a high price for said restrictions oppose them. In the American context, these political conflicts frequently play out in the Congress, where federal environmental legislation is enacted. Some environmental issues, such as climate change, are frequently in the headlines and reflect deep cleavages between conservative and liberal voters and elites (McCright et al., 2014). Other issues are less visible and often reflect interest group bargaining, lobbying, and elite ideology (List & Sturm, 2006).

In the United States, growing environmental awareness led to federal legislation around the year 1970 (e.g., Shabecoff, 2003). Concerns about a variety of environmental problems ranging from urban air pollution to water quality and pesticides led the Nixon administration and the Congress to enact comprehensive federal legislation to protect the environment. On January 1, 1970, President Nixon's National Environmental Policy Act was enacted and, on December 2, 1970, the U.S. Environmental Protection Agency was founded. Over time, however, the Republican and Democratic Parties grew increasingly polarized and environmental legislation at the federal level no longer expanded. The 1990 Clean Air Act Amendment was the last comprehensive legislative act in the Congress—and thus an important watershed in partisan polarization.

In this section, we review existing explanations for environmental politics in the Congress. We begin by highlighting determinants of public opinion that are

independent of the Democrat–Republican cleavage at the elite level. If these factors are the best explanation for the behavior of Senators and Representatives, then the Democrat–Republic cleavage should not be significant as long as we hold the electoral context constant. Indeed, the Downsian median voter theorem (Downs, 1957) suggests that politicians compete for swing voters in the middle and that Democrat–Republican differences ultimately reflect disparities in the median voter's preferences across congressional districts (House) and states (Senate). Conversely, many scholars of environmental politics have argued that Democrats and Republicans are in a fundamental conflict for ideological, cultural, and interest group reasons. If this elite partisanship perspective is significant, then Democrats and Republicans should vote differently even when the electoral and socioeconomic context is the same. A regression discontinuity test is a rigorous approach to testing the relative importance of the elite partisanship.

After motivating our test of the elite partisanship hypothesis, we next investigate how contextual variation might modify the effect of electing a Democrat over a Republican in the Congress. We consider variation over time, across regions, and across issues to assess the conditions under which elite partisan polarization is most likely. We also specifically test hypotheses from the literature on the role of interest groups, fossil fuel endowments, and public opinion.

The Role of Public Opinion

There are many reasons to believe that public opinion shapes the behavior of politicians. The median voter model suggests that politicians often compete for the support of voters in the middle of the ideological spectrum, expecting strongly ideological voters to choose their sides as a matter of course. In the case of environmental policy, voting in the Congress would largely reflect the interest of the median voter. This interest would depend on local conditions, such as economic structure and natural resource endowments, as the median voter is not strongly partisan. Under this framework, then, the voting decisions of elected officials would reflect the preferences of their median voters. Indeed, Layman, Carsey, and Horowitz (2006, p. 87) note that "[t]he predominant explanation for the increase in party polarization in Congress focuses on electoral change."

Natural resources are an important determinant of public opinion. Focusing on the frontline issue of climate change, Fisher (2006) finds that there is a strong association between the amount of fossil fuels that a state produces and the behavior of elected officials in the Congress. Because coal is a major source of carbon dioxide emissions, which is the most important greenhouse gas, coal-producing states have a lot to lose from climate policies that restrict greenhouse gas emissions. Conversely, Lyon and Yin (2010) find that states with considerable potential for renewable energy are more likely to implement portfolio standards for these energy sources. These studies provide descriptive evidence for the intuitive claim that the public's material interest shapes environmental voting both in the Congress and in individual states.

Besides producer interests, it is important to also consider the consumer perspective. In an analysis of "carbon geography," Cragg and others (2013) show that there is a negative correlation between the per capita carbon dioxide footprint and support for climate legislation in the Congress, even when controlling for

partisanship. Furthermore, household income is positively correlated with support for climate legislation. Consistent with the conventional wisdom, these results suggest that voters who are poor and rely on fossil fuels will not support elected officials that propose costly climate legislation. Conversely, wealthy voters who emit little carbon to begin with are supportive of stringent measures to protect the environment. Indeed, in a survey experiment, Aldy, Kotchen, and Leiserowitz (2012) also find that willingness to pay for renewable energy decreases rapidly with the expected electricity price.

Taken together, these studies suggest that public opinion is important. However, these studies do not tell us whether or not public opinion is so decisive that they override other factors, such as elite partisanship. A correlation between the cost of climate legislation and the behavior of elected officials suggests that these officials are concerned about the electoral effects of imposing costs on voters, but it remains unclear whether or not two electoral officials would behave in the same way in identical structural settings. The median voter theorem states that they would, as each electoral official would propose policies that are appealing to the median voter.

Hypothesis 1 (primacy of public opinion): Holding public opinion constant in the electoral setting, Democratic and Republican officials vote similarly.

The primacy of public opinion is a strong hypothesis, as it would mean that the aggregate differences between Democrats and Republicans ultimately reflect underlying factors that have nothing to do with partisan identity. If we hold opinion constant in the electoral setting, it is possible that other considerations might still drive a wedge between Democrats and Republicans. These considerations include intrinsic elite ideology, political strategies to mobilize the base and party activists, and the need to cater to interest groups that offer campaign contributions and other forms of electoral support. Considering these factors is important because, historically, environmental issues have been less polarized than other economic issues (Baldassarri & Gelman, 2008, p. 424). Some studies, such as Konisky and Woods (2012, p. 560), also find that state-level determinants of public opinion have inconsistent associations with different types of policies.

In a recent article on popular and elite opinion concerning the environment in America, Dunlap and others (2001, p. 45) shed light on why one might expect salient Democrat–Republican differences independent of the structural setting. Drawing on a thorough review of existing studies and time-series data on environmental voting in the Congress, their key observation is that "partisan differences in environmental concern are typically significant among political elites and the activist and attentive segments of the public, but often only minimal among the general public." This cleavage suggests that the leaders and party activists of the Democratic and Republican parties disagree on the environment more strongly than members of the public. The Democrat–Republican difference does not manifest itself in differences between median voters of different congressional districts (House) and states (Senate), but rather in the influence that the party leadership and activists have on elected officials.

If candidates and officials are not exclusively concerned with the median voter, then the elite polarization over environmental issues can have significant implications for congressional roll-call votes. Elected officials may enact policies that appeal

to their core constituencies in an effort to retain their position in the party and to collect campaign contributions. Moreover, candidate self-selection can contribute to polarization. Großer and Palfrey (2014) develop a formal model in the citizen-candidate tradition and show that, under private information concerning ideal points, only people with relatively extreme preferences run for office. In such a situation, both Democratic and Republican candidates will have strong ideological preferences that drive them away from the median voter.

In the general literature on American politics, this top-down and activist party pressure is recognized as an important source of polarization beyond environmental issues. Although the received wisdom considers American party discipline to be relatively weak, Layman and others (2006, p. 96) note that "[a] number of scholars have identified party activists, and recent changes in party politics that have increased their influence, as the principal catalysts for the recent growth in ideological polarization between the Democratic and Republican parties in government and in the electorate." In this view, party activists, whose preferences tend to be stronger and more ideological than those of the public, drive a Democrat–Republican wedge even if the public's preferences are relatively homogeneous. As Aldrich (1995) argues, partisan activists ultimately decide who the electoral candidates are in primaries, and this means that moderate candidates face a major hurdle to nomination.

Other scholars, such as Krehbiel (1998), argue against the view that political parties ultimately determine the voting behavior of their members. Even these scholars, however, characterize elected officials as having ideological preferences, instead of blindly pursuing the median voter that Downsian accounts predict. In this sense, the assumptions required for a Democrat–Republican difference in identical structural settings are not very demanding.

In more recent studies, there is suggestive evidence for a Democrat–Republican difference beyond the electorate's preferences with respect to specifically environmental issues. Coley and Hess (2012, p. 582) analyze the determinants of voting over renewable energy in state politics and find that, even after controlling for fundamentals such as household income, environmental activism, and the significance of the fossil fuel industry, there is a large difference between Democrats and Republicans. While the methodology of this study does not allow a causal interpretation of the coefficients due to the lack of a clear and provable identification assumption, the partial correlation is sufficiently strong to raise the possibility that there is a genuine Democrat–Republican difference.

According to several recent studies on American environmental politics (Layzer, 2012; McCright & Dunlap, 2003), conservatives in the United States have, at least since President Reagan's presidency, aggressively moved against new environmental policies. In a major historical study of the origins of the conservative backlash against environmental policy, which used to be a largely consensual affair at the time of the 1970 Earth Day, Layzer (2012, p. 2) shows that the highly strategic activities of activists and elites, as opposed to some sort of organic evolution of public opinion, played a critical role in creating political conflict around environmental issues:

> For the conservative coalition, the two transcendent and unifying values are freedom of individuals from government interference and economic inefficiency, assumed to result from markets unfettered by government regulation. Government in the economy must be resisted because it reduces individual freedom and creativity; impairs the ability of

business to maximize profits and create jobs, dampening overall economic growth; is almost invariably ineffective; and causes perverse, unintended consequences.

If these ideological commitments are stronger among Republican party activists and elites than among Republican voters, and where electoral competition furthermore requires the mobilized support of these activists and elites, one would expect Republicans and Democrats to vote differently on the environment even under identical structural conditions.

Besides intrinsic ideological preferences among partisans, Democrat–Republican differences could reflect interest group politics. In an earlier study, Shipan and Lowry (2001, pp. 253–254) show that there is an association between environmental group activity and the vote gap between Democrats and Republicans in environmental affairs in the Congress. As they argue, environmental groups have over time become alienated from Republicans and have started to openly support Democrats in elections. At the same time, scholars such as McCright and Dunlap (2003) attribute much of the political success of American conservative groups in challenging the scientific consensus around anthropogenic climate change and gaining access to the Congress to the resurgence of the political right in what is known as the 1994 "Republican takeover" of the Congress. These kinds of sharply diverging alignments would explain why Democrats and Republicans, in an effort to cater to their elite supporters, would vote very differently in identical electoral conditions. More generally, Heaney and Rojas (2015) show that the ability of activists and social movements with highly ideological preferences to influence the positions of American political parties depends on the electoral strength and opposition or government status of these parties, again suggesting that elite ideology should not be considered a given.

Hypothesis 2 (partisan polarization): Holding public opinion constant in the electoral setting, Democrats are more likely to vote in favor of environmental protection than Republicans.

In evaluating this hypothesis, we conduct our analysis separately for the House and the Senate. Based on our experience with American environmental politics, we believe Senate and House environmental voting dynamics to be largely similar. However, we are cognizant of the argument that senators are more sensitive to the concerns of political moderates. Albouy (2011) has argued that, compared to House Representatives, senators face less party discipline and have more flexibility in tailoring their voting behavior to the wishes of pivotal voters in the states. Therefore, it is useful to separately conduct the analysis for the House and the Senate.

Variation: Geography, Time, Issues

While our first test uses all of the available data, we can also investigate variation across regions, across issues, and over time. These supplementary tests characterize contextual variation in the degree of elite partisan polarization, and thus offer a better understanding of the nature of the issue in American politics:

- The first salient cleavage in American environmental politics that we consider is regional. Because public opinion in the South has historically been

much more conservative than in the rest of the country (e.g., Wright, Erikson, & McIver, 1987), so that even Democratic candidates adopt conservative positions, we might expect less partisan divergence between Democratic and Republican politicians (Nelson, 2002; Shipan & Lowry, 2001).

- Recent literature on American environmental politics (Dunlap et al., 2001; McCright et al., 2014) has focused on changes in partisan polarization over time. We can investigate whether polarization has increased at the partisan elite level by examining the effects of electing a Democrat over a Republican in different decades.
- With the rise of climate change to the top of the environmental agenda, cross-issue differences in partisan polarization have also become increasingly important. Climate change, in particular, has emerged as a highly partisan issue (Guber, 2013). We can examine the extent of elite partisan polarization, holding the preferences of the median voter constant.

Conditions for Partisan Polarization

To better understand the conditions under which elite partisan conflict over the environment emerges, we now turn to explanations from the existing, largely descriptive literature. We consider three canonical explanations: public opinion, fossil fuel resources, and the behavior of interest groups.

The elite partisan conflict could originate from a similar divide found within the public. According to Dunlap and others (2001, p. 32), longitudinal trends at the national level show the increased polarization of liberal and conservative public opinion on the importance of environmental protection. Even though we have focused on close races, therefore questioning the median voter's views as explanation for the Democrat–Republican difference, it is possible that a sharply polarized public is associated with the causal effect estimated above. If some liberal voters become increasingly pro-environmental while conservative voters become increasingly anti-environmental, then a politician interested in securing the strong support of his or her base will have to move away from the median. This, in turn, would result in polarization at the elite level.

This line of reasoning is based on classic ideas in the American politics literature. Key (1942) proposes a typology in which political parties are composed of the party organization, the party in government, and the partisan public. While these components are sometimes at odds with each other, the fact remains that the partisan public determines the electoral fortunes of the party organization. As Fiorina and Abrams (2008, p. 580) put it, evidence on public opinion suggests that, even though the American electorate as a whole has not become more polarized over time, "parties have become better sorted on moral and cultural issues ... another major issue area where party sorting has occurred is foreign policy and defense." While economic issues appear not to have seen such partisan sorting, overall, important segments of the mass public appear to be divided on some key political issues. Because the environment bears significant cultural, moral, and religious relevance, it is not unreasonable to expect that partisan sorting over environmental issues is related to broader trends in American politics.[1]

Notably this approach to the role of public opinion does not require a high level of sophistication among the voters. Indeed, as Achen and Bartels (2016) note, most American voters are not aware of legislative debates or, in our case, the specific substantive implications of environmental and energy legislation. For public opinion to condition partisan polarization in roll call voting, however, widespread awareness is not necessary. As long as voters have anti-environmental or pro-environmental preferences and either the media or other organizations disseminate some information concerning the voting behavior of legislators, incumbents face electoral consequences for voting against the preferences of their base (e.g., Ashworth, 2012; List & Sturm, 2006). For example, Butler and Nickerson (2011) provide experimental evidence that when legislators learn about their constituents' policy preferences, they move their voting behavior toward these constituents' preferences to avoid an electoral backlash. Similarly, Nyhan and Reifler (2015) find that the threat of "fact-checking" induces legislators to avoid incorrect claims during the election period. Thus, incumbents have incentives to adjust their environmental and energy voting in accordance to voter preferences.

Based on this logic, we hypothesize that polarization of environmental public opinion between liberals and conservatives should amplify partisan polarization among elected officials. When the public is polarized, elected officials face pressures to vote according to the polarized preferences of their constituents.

Hypothesis 3 (partisan public opinion): Where the liberal–conservative gap among the public is wide, Democrats are more likely to vote in favor of environmental protection than Republicans.

Another line of research emphasizes the role of special interests. Schattschneider (1960) has already claimed that the ability of interest groups to shape policy has turned Americans into a "semi-sovereign people." In a Grossman and Helpman (1994) framework, which Aidt (1998) has applied to environmental policy, special interests can influence a politician's behavior when the politician puts only a little weight on public opinion. In the environmental case, this polarization is particularly pronounced because it pits an environmentalist coalition against certain business interests that oppose government regulation and restrictions on natural resource use (Kamieniecki, 2006; Layzer, 2012; Shipan & Lowry, 2001). In this telling, the positions adopted by Democratic and Republican officials would depend on the contributions they receive from various interest groups with large stakes in influencing environmental policy. Given that Democrats are significantly more favorable to environmental protection than Republicans, we can test this hypothesis by analyzing the extent of the Democrat–Republican gap in campaign contributions made by the fossil fuel industry. When the gap is wide, we would expect the election of a Democrat to have a large positive effect on pro-environmental voting because the candidate supported by the fossil fuel industry lost; when the gap is narrow, we would expect a smaller effect because the fossil fuel industry gave relatively even contributions to both candidates, and thus gained some leverage over the Democratic candidate.

While the literature suggests a pronounced influence of special interests on politicians' behavior, the latter can also have an influence on how special interest groups allocate their financial contributions. Specifically, the voting behavior of

legislators is also an important determinant of political action committee (PAC) contributions (Grier & Munger, 1986). The fossil fuel industry, for instance, may prefer to make contributions to anti-environmental candidates who will represent the industry's interests. Due to this selection effect, whereby interest groups' choose to contribute to their preferred candidates, estimating the causal effect of interest groups' influence on a politician's behavior is challenging. We do not rule out this possibility that a politician's behavior partly drives the fossil fuel industry's contribution. Yet our claim is that even when we account for this selection effect, the role of special interests can still have an independent effect on politicians' voting records.

Hypothesis 4 (organized interests): Where campaign contributions by the fossil fuel industry are polarized, Democrats are more likely to vote in favor of environmental protection than Republicans.

Finally, we must consider the possible role of fossil fuel resource endowments in explaining the "carbon geography" of environmental roll call voting (e.g., Cragg et al., 2013). As Fisher (2006) notes, e.g., senators from coal-producing states tend to oppose pro-environment bills. While some part of this association is probably related to interest group politics, concerns such as employment in the fossil fuel industry in the state imply that the modifying effect of fossil fuels can be broader than that of, say, lobbying by the fossil fuel industry. Furthermore, such concerns can be geographically dispersed and not restricted to within electoral district boundaries. Fossil fuel endowments can shape the economy of an entire state, as people commute across district boundaries to the workplace and the fossil fuel industry creates economic spillover effects across the entire state through low energy prices and hence the creation of heavy industry. For this reason, state-level measures are an appropriate way to capturing the modifying role of fossil fuel endowments.

Based on this logic, we would expect a narrower Democrat–Republican gap in states endowed with abundant fossil fuels, as even Democratic senators and representatives would face pressure to vote against the environment. In other words, a Democratic legislator from a state with economic interests in the fossil fuel industry is less likely to vote pro-environmentally, narrowing the difference in voting behavior vis-à-vis Republican legislators.

Hypothesis 5 (fossil fuels): In states with scarce fossil fuel endowments, Democrats are more likely to vote in favor of environmental protection than Republicans.

A Regression Discontinuity Approach

We examine whether Democratic or Republican legislators vote similarly or differently on environmental issues when public opinion held constant. However, an empirical investigation of these hypotheses is challenging because legislators' partisanship is not randomly assigned to electoral units (states in the case of the Senate; electoral districts in the case of the House). States or electoral districts that typically elect Democratic legislators can be quite different from others that tend to elect Republican legislators. For instance, coal-producing states may be more likely to elect Republican legislators while states with potential for renewable energy may be more likely to elect Democratic legislators (Cragg et al., 2013). While we can

account for observable differences by including control variables in the statistical model, unobservable differences in public opinion and its determinants may exist between Democratic and Republican states or districts.

To address this challenge of identifying the causal effect of elite partisanship, we employ a RDD that enables us to compare states or districts that are very similar in their probability of electing a Democrat but have legislators with different partisanship (Eggers et al., 2015; Lee, 2008). Consider a district where a Democratic candidate won 49.9% of the two-candidate vote and another district where a Democratic candidate won 50.1% of the vote. These two districts can be considered as fairly similar in their probability of electing a Democratic legislator, but the two districts are represented by legislators with different party affiliation, the former by a Republican legislator, and the latter by a Democratic legislator. A RDD allows us to focus on these close elections and to estimate the effect of having a Democratic over a Republican legislator, holding public opinion constant. As such, the discontinuity design uncovers the local average treatment effect of electing a Democrat over a Republican in highly competitive elections.

The unit of the RDD analysis is the *voting decision* made by an individual representative or senator. In total, we have 319,258 individual votes in the House and 49,716 in the Senate between 1971 and 2013. We use two different specifications for estimating the effect of partisanship on voting. First, we take a parametric approach by using the full sample. The treatment is a binary indicator for a Democratic legislator and the forcing variable is the Democratic candidate's share of the votes received by the top two candidates. This continuous measure of support for the Democratic candidate is used to capture the underlying functional relationship between partisanship and voting on environmental bills. In different models, we not only include the vote share of the Democratic candidate but also the second, third, and fourth powers to account for the potentially complex relationship. Specifically, the model is estimated as follows:

$$\text{Pro-Env}_{i,t,r} = \beta_0 + \beta_1 \text{Democrat}_{i,t} + f(\text{Vote Share}_{i,t-\alpha}) + \epsilon_{i,t,r} \quad (1)$$

where i denotes legislator (House Representative or Senator), t denotes year, and r denotes a roll call in that year. Next, α is the gap between the previous election year and the roll call year such that $\text{Vote Share}_{i,t-\alpha}$ denotes the vote share of the Democratic candidate in the last election. Finally, $\epsilon_{i,t,r}$ is the error term.

Second, we also use a nonparametric RDD approach and limit the sample to close elections. By comparing Democratic and Republican politicians who barely won their last election, we can conduct a quasi-experiment on the causal effect of partisanship on voting. We consider various thresholds in defining close elections, including 3, 2, 1, and 0.5% margins of victory. Here, the margin indicates the difference between the Democratic candidate's vote share received by the top two candidates and 50% of the top two candidates' vote share. Choosing the bandwidth for close elections creates a trade-off between bias and precision, but given the large number of observations in our dataset, we can narrow the margin down to 0.5% while sustaining a fairly large number of observations (see Supporting Information Table A5 for the number of close elections at the 3 and 0.5% margin as well as all elections in the dataset). We present the results from different thresholds to show that the results do not depend on the particular choice of the bandwidth.

In the nonparametric models, it is not necessary to include the polynomial for the forcing variable because focusing on the small subset of close elections provides a quasi-experimental setting. The model is specified in a manner similar to the parametric design except that the functional form of the forcing variable is excluded here:

$$\text{Pro-Env}_{i,t,r} = \beta_0 + \beta_1 \text{Democrat}_{i,t,r} + \epsilon_{i,t,r}. \quad (2)$$

In all specifications, we cluster standard errors by legislator to account for the fact that our treatment variable is at the legislator session, not vote, level. The clustering of standard errors by legislators, instead of legislator session, is a conservative choice that guards our analysis against false positives. To improve the precision of our estimates, we sometimes include state and year fixed effects.

Dependent Variable

The dependent variable is a binary indicator for whether or not the Congressman voted in favor of the environment, as determined by the LCV annual scorecards. Every year, the LCV collects data on all votes in the House and the Senate. The LCV then determines some votes as relevant to the environment and also characterizes them by category, such as clean energy, transportation, or wildlife. For every environmental vote, the LCV decides whether "yea" or "nay" counts as a pro-environmental vote; the other alternative is coded as anti-environmental and abstentions are coded separately. In our primary specification, we collapse anti-environmental votes and abstentions into one base category, but the results are fully robust to excluding abstentions altogether.

The determination of a pro-environmental vote is ultimately a subjective exercise, but relying on LCV decisions is advantageous for two reasons. First, it means that we have no ability to influence coding decisions. Second, the LCV's positions reflect the views of the environmental community in the United States. Votes coded as pro-environmental by the LCV typically support renewable energy, oppose nuclear power, encourage pollution abatement, and call for the conservation of wildlife and habitats. According to LCV (2013, p. 1) itself, e.g., the 2013 scorecard represents "the consensus of experts from about 20 respected environmental and conservation organizations who selected the key votes on which members of Congress should be scored."[2] While the topics vary over time as the society changes, the basic approach of relying on the consensus of experts from major environmental and conservation organizations is a constant.[3]

To see how the LCV determines significant votes and the pro-environmental position on them, consider three examples from the Senate votes in the year 2013 (LCV, 2013). According to the scorecard, pro-environmental Senators would vote in support of disaster relief to victims of Hurricane Sandy (H.R. 152) but against reduced military investment in advanced biofuels (amendment to H.R. 933) and against a budgetary amendment to cut funding from environmental agencies (amendment to S. Con. Res. 8). For each such vote, the LCV provides a paragraph justifying their position. The determination of pro-environment and anti-environment votes is, therefore, transparent.

Explanatory Variable

The explanatory variable is a binary indicator for being a member of the Democratic Party. Throughout the period of investigation, the vast majority of House Representatives and Senators belonged either to the Republican or Democratic Party, while a very small minority could be considered independent. In our dataset, fewer than 0.5% of all votes were made by legislators not affiliated with Republicans or Democrats. Therefore, we can contrast Democrats to everyone else, although excluding independents does not change our results at all, as shown in Supporting Information Table A7. In the Supporting Information Figure A1 shows the geographic distribution of votes by party. As the graph shows, the Democrat–Republican difference is larger than the House–Senate difference, although Senators tend to vote more in favor of the environment than House Representatives in both parties. For additional summary statistics, see Supporting Information Section A1 of Supporting Information.

Identification

Our identifying assumption is that, in the American political system, marginal victories in highly competitive races are essentially random (Eggers et al., 2015; Lee, 2008). When the margin of victory between the winner and the runner-up is low in a "first past the post" political system, the outcome essentially depends on a handful of votes. Since electoral decisions depend on a variety of random factors, such as the weather, it is impossible to predict in advance how highly competitive races will play out. Therefore, an analysis of the effect of Democratic victory in highly competitive races allows us to identify the partisan difference in environmental voting in the Congress under a quasi-experimental framework. In Supporting Information Table A6, we demonstrate that the close races are indeed balanced with respect to important pre-treatment covariates, such as energy use and environmental public opinion.

The validity of the assumption of "as-if random" assignment in close elections has drawn attention in the election literature. Beginning with Lee, Moretti, and Butler (2004), many studies have empirically examined the validity of quasi-random assignment assumption. Lee and colleagues' (2004) empirical analysis found that Republican and Democratic districts at the margin in fact have similar observable characteristics including real income, percentage with a high school degree, black residents, eligible voters, and size of the voting population. Nonetheless, Caughey and Sekhon (2011) note that, in the U.S. House elections, highly competitive races do not appear entirely random. They show that, during the 1942–2008 period, bare winners "possess large *ex ante* financial, experience, and incumbency advantages over their opponents" (Caughey & Sekhon, 2011, p. 385). This means that the randomization strategy based on marginal victories could be compromised by the nonrandom selection of winners. To guard against this effect, we additionally consider donut RDD specification following Almond and Doyle (2008) and Barreca, Guldi, Lindo, and Waddell (2011). The basic idea of the donut RDD is to estimate the model excluding the small sample of very close elections where imbalance exists. We demonstrate that the partisan effects on voting with respect to environmental bills remain substantial even when we exclude this subset of observations, as presented in Supporting Information Table A7.

We also conduct an additional balance test to demonstrate that local conditions are not systematically different in the Democratic and Republican states when we focus on close elections. We show in Supporting Information Table A6 that gross state production, coal production, coal consumption, and public attitudes toward the environment do not show a systematic difference, regardless of whether a Democrat or a Republican wins a close election.

Perhaps more importantly, we also estimate the partisan difference in the Senate, where Eggers and others (2015) report no evidence of the nonrandom selection of winners. While the Senate number of votes is considerably smaller than that in the House, it turns out we are able to generate robust and reliable estimates of the Republican causal effect, and the causal effect is remarkably similar to that found in the House. Together with the donut design, this robustness across the board strongly suggests that our findings are not driven by the bias identified by Caughey and Sekhon (2011).

Variation: Geography, Time, Issues

To examine contextual variation in elite partisan polarization, we conduct subsample analyses of close elections. We begin by splitting the sample by decade, then split it by census region, and finally split it by issue area based on LCV tags. These subsample analyses allow us to compare the width of the partisan gap under different conditions.

Role of Modifying Factors

To test the three hypotheses on modifying factors above, we use data on campaign contributions, the polarization of public opinion, and fossil fuel endowments. We estimate our RDD models but condition the effect of a Democratic electoral victory on the modifying factors by including an interaction term. To make the coefficients comparable, we standardize the modifying variables such that the mean is 0 and the standard deviation is 1 (see Supporting Information for summary statistics and results with nonstandardized variables).

We first examine how the polarization of liberal and conservative public opinion on environmental issues influences the elite partisan conflict over these issues. To estimate the effect of the polarization of public opinion on the Democrat–Republican difference at the elite level, we first estimate state-level public opinion concerning environmental issues by partisanship (Republicans, Independents, and Democrats). For the estimation, we use responses to the following question in the survey data of the General Social Survey (GSS) for the 1973–2012 period:

> We are faced with many problems in this country, none of which can be solved easily or inexpensively. I'm going to name some of these problems, and for each one I'd like you to name some of these problems, and for each one I'd like you to tell me whether you think we're spending too much money on it, too little money, or about the right amount. Are we spending too much, too little, or about the right amount on improving and protecting the environment?

The major advantage of this question is that it is consistently available for a period of four decades. Unfortunately, however, the GSS survey is not representative at the state level. Therefore, we follow Kastellec, Lax, Malecki, and Phillips (2015) who build on the "multilevel regression and poststratification" (MRP) technique to

estimate the share of individuals with pro-environment attitudes among Democrats, Independents, and Republicans for each state and for each year. As the GSS was not conducted in some years,[4] we take the average of the estimation from the preceding and the following year for the missing years. With this estimated value, we construct the measure of polarization taking the difference in the estimated share (0–1) of individuals with pro-environment attitudes among Democrats and the estimated share of those individuals among Republicans.

Next, to examine the effect of polarized campaign contributions on the difference between Democratic and Republican voting, we estimate the same RDD models conditioning on the share (0–100%) of PAC contributions from the oil and gas industry to the Democratic candidate. Because anti-regulation business interests tend to favor conservative candidates (Layzer, 2012; McCright & Dunlap, 2003), a large share of oil and gas PAC contributions made to Democratic candidates would mean a relatively low level of partisan polarization in a state. In contrast, if oil and gas PAC contributions overwhelmingly go to Republican candidates, the partisan gap should grow wider. We collected the PAC contributions data from 1990 to 2012 from the OpenSecrets.org database, which provides the industry classification code of the contributors.[5] We calculated the share of oil and gas PAC contributions made to the Democratic candidate in each race. This variable is coded 0 (100) if only a Republican (Democratic) candidate received contributions from the oil and gas industry. This variable is missing if no candidate received any oil/gas PAC contributions.

Finally, we estimate the same RDD models conditioning on state-level resource endowment. We measure resource endowment at the state level in terms of per capita energy production from fossil fuel resources: coal, crude oil, and natural gas (converted into British thermal units for comparability).[6]

We next validate the above findings with an alternative approach: Bayesian additive regression trees (BART) (Green & Kern, 2012). The details of this methodological application are given in the Supporting Information Section A8). The intuition is that BART estimates a large number of regression models, including various interactions between explanatory variables, to obtain estimates of condition treatment effects. In this regard, BART is a flexible alternative to the conventional approach of including various interaction terms to linear regression models. By considering a large number of possible regressions with different interactions, BART reduces the dependence of the results on model specification.

Results

We present the results in three parts. First, we estimate the average effect of electing a Democrat over a Republican across all roll call votes. We then examine contextual variation in the subsamples. The final part of the analysis tests hypotheses concerning the role of public opinion, natural resources, and interest group behavior.

Estimating Partisan Polarization

The main results of the analysis are shown in Table 1. The first three columns show the results for the Senate and the last three columns for the House. We report results from

Table 1. Voting on Environmental Bills by Senators and House Representatives, 1971–2013

	(1)	(2)	(3)	(4)	(5)	(6)
		Senate			House	
OLS	.436***	.369***	.373***	.458***	.438***	.446***
	(.027)	(.018)	(.018)	(.012)	(.010)	(.010)
	49716	49716	49716	319258	319258	319258
RDD, second-order polynomial	.485***	.401***	.394***	.473***	.462***	.466***
	(.037)	(.023)	(.023)	(.014)	(.012)	(.012)
	49311	49311	49311	313604	313604	313604
RDD, third-order polynomial	.429***	.399***	.395***	.431***	.424***	.431***
	(.043)	(.027)	(.027)	(.016)	(.014)	(.014)
	49311	49311	49311	313184	313184	313184
RDD, fourth-order Polynomial	.429***	.399***	.395***	.443***	.432***	.438***
	(.043)	(.027)	(.027)	(.015)	(.014)	(.014)
	49311	49311	49311	313184	313184	313184
3% Margin	.453***	.467***	.467***	.422***	.411***	.422***
	(.048)	(.031)	(.029)	(.025)	(.023)	(.022)
	4933	4933	4933	13479	13479	13479
2% Margin	.524***	.499***	.515***	.416***	.407***	.421***
	(.054)	(.040)	(.034)	(.029)	(.028)	(.028)
	3367	3367	3367	8764	8764	8764
1% Margin	.462***	.523***	.739***	.446***	.441***	.497***
	(.093)	(.066)	(.139)	(.040)	(.034)	(.031)
	1724	1724	1724	4546	4546	4546
0.5% Margin	.493***	.612***	.785***	.407***	.467***	.520***
	(.100)	(.044)	(.224)	(.064)	(.051)	(.078)
	915	915	915	2259	2259	2259
State FE	No	Yes	Yes	No	Yes	Yes
Year FE	No	No	Yes	No	No	Yes

Notes. As the table shows, the effect of electing a Democrat over a Republican in narrow races on pro-environmental voting is large and positive: all coefficients are positive and statistically significant, while most of them are larger than 40% points.
Standard errors clustered by legislators in parentheses.
***$p < .01$.

simple ordinary least squares (OLS), from three parametric RDDs, and four nonparametric local regressions. Given the large number of observations, we are able to conduct local analyses even when excluding all observations outside a narrow 0.5% band.

The results uncover a very large effect of Republican electoral victory on environmental voting in both the Senate and the House. Depending on the model, the size of the estimate ranges from 0.37 to 0.79. Given the quasi-experimental method, this difference means that, even holding the socioeconomic context fully constant, there is a very large difference between Democrats and Republicans. Democrats overwhelmingly vote in favor of the environment, whereas Republicans vote against it. The result is also stable across the House and the Senate, suggesting that the differing institutional incentives are not important.

In the case of the House, following Caughey and Sekhon (2011), we validate our results through a donut design by excluding the narrowest of all electoral victories (Supporting Information Table A8). This strategy deals with the possibility that incumbents and other privileged candidates can bias a very narrow race to their advantage. While the concern is valid, it does not significantly change the results in the case of environmental voting. The results are reported in the Supporting Information. We also add state–year fixed effects for all of our estimations for the House. The main substantive findings remain unchanged as reported in Supporting Information Table A9.

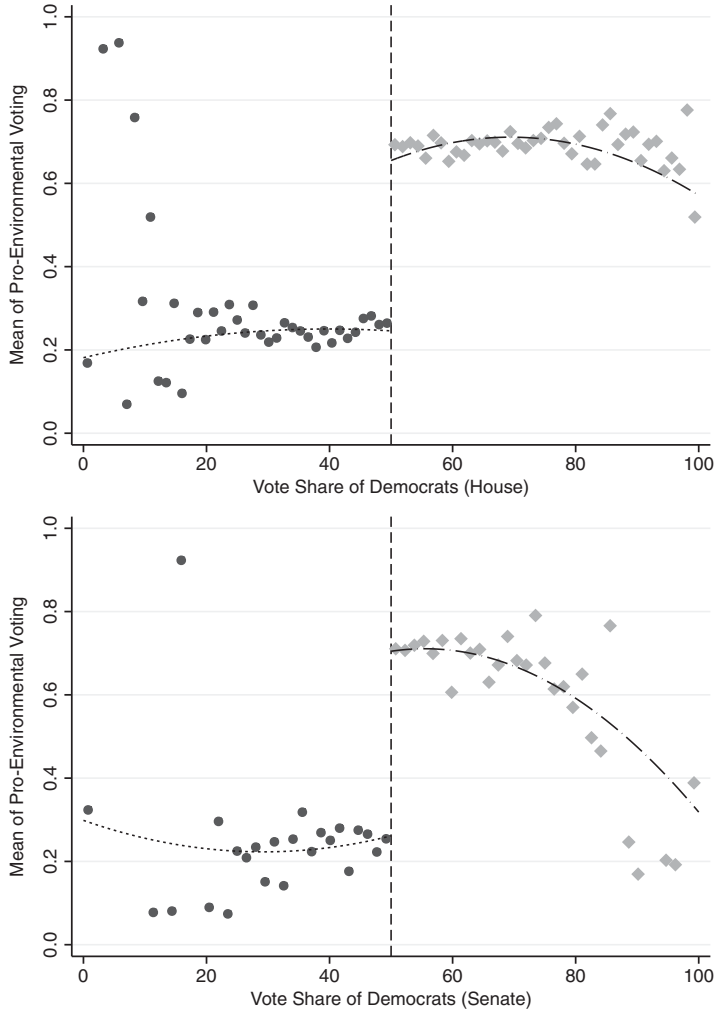

Figure 1. Graphical Illustration of House (Upper) and Senate (Lower) RDD Results, 1971–2013
Note: The horizontal line represents a 50% Democratic share; that is, the floor for Democratic electoral victory.

A graphical illustration of these results is provided in Figure 1. We calculated the average pro-environmental voting score on the scale of 0–1 for each legislator in a given year, and present the binned averages of the voting scores for House Representatives (upper panel) and Senators (lower panel) against the Democratic candidate's vote share received by the top two candidates. The interval for each bin is a 1.25% point. Dotted curved lines are quadratic of best fit on either side of the discontinuity.

As the figure shows, while the margin of victory has hardly any predictive power around the 50% cutoff, the discontinuity itself is dramatic. According to these estimations, both House and Senate Republicans tend to vote for the environment in a clear minority of the cases, whereas Democrats in the House consistently vote in favor of the environment. In the Senate, Democratic votes are less favorable to the environment, but even there, a clear majority of Democratic votes are in favor of the environment. In each case, however, there is a big jump of almost 50

percentage points at the cutoff. Around the cutoff, Republicans and Democrats consistently vote according to clearly specified ideological preferences, and the only question is which party wins the election.

The substantive significance of these results is twofold. First, they show that socioeconomic characteristics and differences across states cannot possibly explain the Democrat–Republican difference. Even holding all such factors constant, Republicans and Democrats behave in a fundamentally different fashion. In some models, a Democrat from any one state is more than 50 percentage points more likely to vote for the environment than a Republican from the same state. In other words, in the same socioeconomic setting, Democrats almost always vote for the environment and Republicans almost always against.

Second, the results show that electoral models built on the Downsian median voter (Downs, 1957) cannot be applied to American environmental politics at the level of Congress. Democrats and Republicans do not vote based on competition for swing votes. Instead, they vote according to the stated ideology of their party. We believe this result reflects, along the lines of List and Sturm (2006), the nature of environmental affairs as secondary considerations for most voters. Our result is consistent with a theory that emphasizes the influence of highly ideological party activists. Democratic and Republican Senators and Representatives may or may not compete for swing voters on other issues, but their environmental voting decisions are targeted toward party activists. Republicans vote against the environment to secure the support of anti-environmental activists who oppose pro-environmental policies, whereas Democrats follow the opposite strategy.

Variation: Geography, Time, Issues

The rich dataset we have compiled allows us to evaluate the extent of elite partisan conflict across regions, over time, and in different issue areas. We do so by examining variation in the importance of partisan cleavages in different contexts. Drawing on the literature on environmental politics in the American context, we emphasize key contextual considerations: partisan polarization over time, variation in the extent of polarization across issue areas, and regional politics.

We summarize all these estimation results in Figure 2. We estimated the RDD models using a different subset of the sample each time, replicating our analysis by decade, by different issue areas, and by different regions. The marginal effects of Democrats estimated from the models with a 3% margin are presented in the figure. The full results with different specifications are presented in Tables A15–A20 in the Supporting Information. The results clearly show that the effect of electing a Democrat is substantial over time, regardless of environmental issues, and across geographic regions. These results suggest that our results are robust across different circumstances.

We first consider temporal variation. Virtually every study of American environmental voting emphasizes increased partisan polarization over time. For example, Dunlap and others (2001) and McCright and others (2014) show that polarization has increased sharply over time across a variety of environmental issues, with climate change being the most contested issue. We examine whether the causal effects of Democrats on voting appear only in recent years or throughout the period

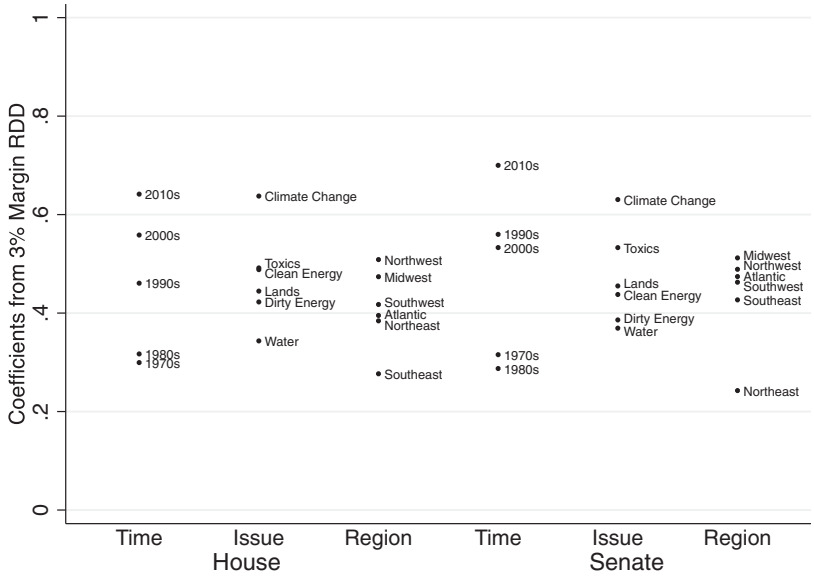

Figure 2. Graphical Summary of Marginal Effects of Democrats across Time, Issue Areas, and Regions
Notes: The point estimates are coefficients—all positive—of electing a Democrat over a Republican in different subsamples of the data. We present coefficients from the RDD estimations with a 3% bandwidth. We estimate the same models with a sample of different subgroups according to time, issue areas, and regions. The figure clearly shows that the partisan effect is substantial for both the House and the Senate across time, issue areas, and regions. However, it also shows that partisan polarization over the environment has increased over time, is most extreme in the case of climate change, and does not show clear regional patterns.

under examination. We replicate our analysis by decade focusing on one decade at a time. As summarized in Figure 2, the magnitude of the Democrat–Republican difference has grown sharply over time, a pattern that other scholars have identified (McCright et al., 2014). However, even in earlier decades of the 1970s or the 1980s, the effect of electing a Democrat is clear, suggesting that there was never a time of a bipartisan consensus over the environment in American politics.

We also explore variation across different issue areas. According to various scholars (Aklin & Urpelainen, 2014; McCright & Dunlap, 2003, 2011), there is a sharp difference between the political right and the left on climate change. Because measures to mitigate climate change would require policies such as carbon taxes or other forms of government intervention, the politics of global warming bring questions concerning big government, economic freedom, and regulation to the forefront in a way that is simply not true of most environmental issues. By replicating our results using the six most common issue tags (lands, toxic, water, dirty energy, clean energy, and climate change), we examine if the partisan difference is only evident in the climate change issue.[7] While the question of climate change stands out among the different issue areas, a Democrat–Republican difference endures regardless of the issue. The partisan difference appears to be smallest for bills related to water issues, but even there, the effect is estimated to be a 32 and 42 percentage point difference for the House and the Senate, respectively, according to the 3% margin models. These results show that while climate change stands out as the polarizing issue of our time, there is no bipartisan environmental issue area in American politics.

Finally, regional considerations could play a role. Scholars such as Polsby (2005) have argued that the increase in conservatism among Southern whites has contributed to a sharp Democrat–Republican difference in this area of the country in particular. There is also some evidence that regional considerations are specifically relevant to the environment (Shipan & Lowry, 2001). In a study of environmental ideology in the Congress, Nelson (2002, p. 527) shows that the ideological difference between Democrats and Republicans appears to be smaller in the South, where both parties are relatively conservative, than in other areas of the country. We thus explore whether regional differences remove the causal effects of Republican and Democratic victories. The estimated partisan effects are lower in the Senate in the Northeast than in other regions,[8] but the estimates taken together provide strong evidence for a sharp causal effect across electoral contexts. Interestingly, although the Southeast has less partisan polarization in the House, it is very similar to other census regions in the Senate, casting doubt on the hypothesis that the South is less polarized because of a conservative public opinion that would force even Democrats to adopt anti-environmental positions.

Role of Modifying Factors

The results are shown in Table 2. The three panels condition the effect of Democratic victory on pro-environmental voting on the three modifying factors. First, we condition on the polarization of public opinion. Second, we condition on the oil and gas PAC contributions to the Democratic candidate in elections. The last panel conditions on fossil fuel resource endowment. Besides the OLS model, we report results from two parametric RDD designs with higher order polynomials and from two local RDD designs. All models include year fixed effects.

Across all models, Democratic victories have strong positive effects on pro-environmental voting at the mean of the variable. Equally notable, all three modifying factors turn out to be relevant. When the polarization of public opinion increase by one standard deviation, the estimated effect of a Democratic victory increases by 8–16 percentage points in the RDD estimations. When the share of oil and gas PAC contributions to the Democratic candidate increase by a standard deviation, the Democratic effect on pro-environmental voting decreases by 6–13 percentage points—a similar effect in magnitude. These results show that although elite partisan polarization itself is not driven by public opinion, local conditions *do* modify the size of the effect. When fossil fuel interest groups favor Republicans, or there is polarization of either public opinion, the Democrat–Republican difference grows. Where fossil fuel resources are abundant, the Democrat–Republican difference decreases. But even when such factors are minimal, the difference remains:

- When the value of the partisan polarization of public opinion at the state level is two standard deviations below the mean, the Democratic treatment effect is about 28 percentage points (3% margin).
- When the share of oil and gas PAC contributions to the Democratic candidate in the race is two standard deviations above the mean, the Democratic treatment effect is about 37 percentage points (3% margin).

Table 2. State-Level Polarization of Public Opinion, Oil/Gas PAC Contributions, and Natural Resource Endowment as Modifying Factors in Elite Partisan Conflict over Environmental Issues

Public Opinion	(1) OLS	(2) 2nd-Order	(3) 4th-Order	(4) 3% Margin	(5) 1% Margin
Democrat	0.458***	0.468***	0.446***	0.437***	0.476***
	(0.010)	(0.013)	(0.015)	(0.022)	(0.036)
Democrat * Polarization (Public Opinion)	0.164***	0.161***	0.160***	0.080***	0.123***
	(0.006)	(0.006)	(0.006)	(0.022)	(0.030)
Polarization (Public Opinion)	−0.354***	−0.346***	−0.346***	−0.256***	−0.357***
	(0.026)	(0.025)	(0.025)	(0.077)	(0.130)
Observations	341950	335954	335954	17316	5803
Interest Groups					
Democrat	0.628***	0.595***	0.555***	0.536***	0.581***
	(0.016)	(0.018)	(0.020)	(0.029)	(0.042)
Democrat * Oil and Gas PAC for Democrat	−0.064***	−0.060***	−0.074***	−0.085**	−0.128**
	(0.018)	(0.018)	(0.019)	(0.037)	(0.053)
Oil and Gas PAC for Democrat	0.026	0.004	−0.006	−0.048**	−0.041
	(0.016)	(0.017)	(0.017)	(0.024)	(0.031)
Observations	170849	169007	169007	8899	2663
Natural Resources					
Democrat	0.437***	0.444***	0.425***	0.416***	0.458***
	(0.011)	(0.013)	(0.015)	(0.022)	(0.037)
Democrat * Fossil Fuel Resources	−0.138***	−0.133***	−0.128***	−0.116***	−0.128***
	(0.017)	(0.017)	(0.017)	(0.038)	(0.042)
Fossil Fuel Resources	−0.020***	−0.020***	−0.020***	−0.024***	−0.021***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.006)
Observations	355958	349644	349644	17888	6076

Notes: Polarization (Public Opinion) indicates the difference in the estimated share of individuals with pro-environment attitudes among Democrats and Republicans. *Oil and Gas PAC for Democrat* indicates the share of PAC from the oil and gas industry for a Democratic candidate. *Natural resources* is the state-level per capita energy production from coal, oil and natural gas. All variables are standardized with mean 0 and standard deviation 1. We estimate the model using the full sample with OLS in the first model and add forcing variable (margin of victory) in models 2–3. In models 4–5, we focus on close elections with 3 and 1% margins, respectively. All models include year-fixed effects. The gray rows indicate the interaction coefficients: positive (negative) coefficients indicate that the effect of electing a Democrat increases (decreases) as the value of the covariate grows.
Standard errors clustered by legislators in parentheses.
$^{**}p < .05$, $^{***}p < .01$.

- When the value of resource endowment at the state level is two standard deviations above the mean, the Democratic treatment effect is about 20 percentage points (3% margin).

In every case, there remains a sharp partisan wedge even when the structural conditions predict minimal polarization.

Because these three modifying factors are related to each other, it is difficult to directly test their relative importance. As shown in the correlation tables presented in Supporting Information Tables A3 and A4, the polarization in public opinion is negatively correlated with the share of oil and gas PAC contributions to Democratic candidates (−0.21) and state-level per capita fossil fuel resources (−0.08). The share of oil and gas PAC contributions is also negatively correlated with fossil fuel resources (−0.08). By allowing the effect of a Democratic electoral victory to depend on all three factors at the same time, however, we can offer some preliminary evidence of the relative importance of these factors. The results of this analysis are shown in

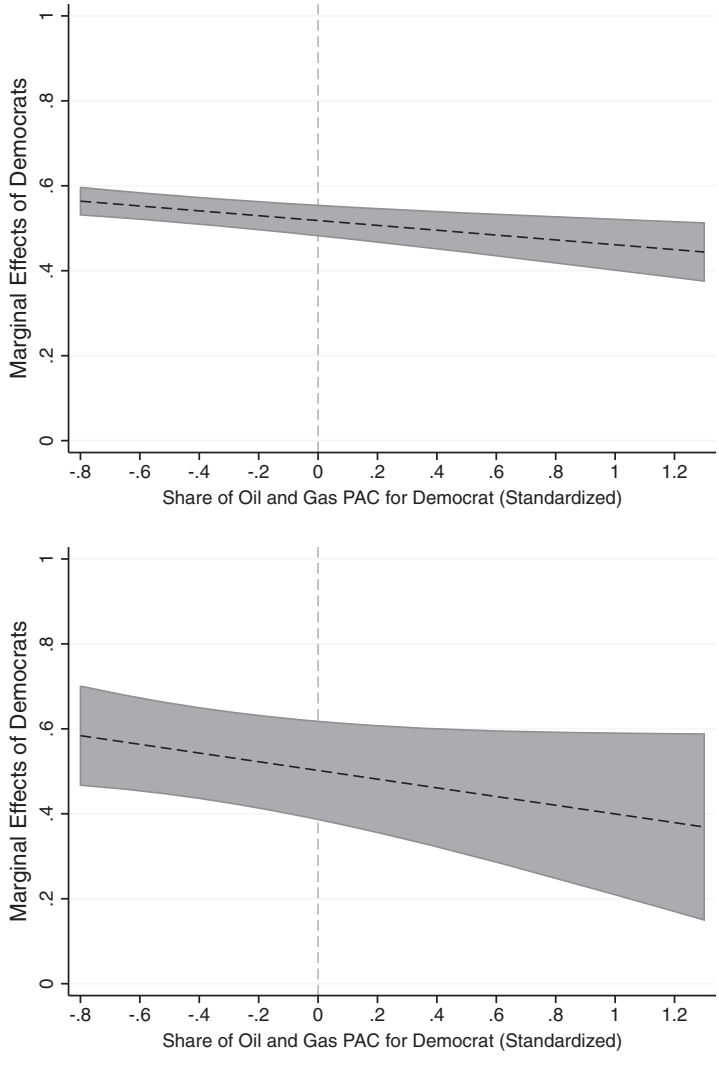

Figure 3. Graphical Illustration of Marginal Effects of Democrats Conditional on the Share of Oil and Gas PAC Contributions for Democrat (Standardized)
Notes: The upper figure is based on the OLS results with the full dataset; the lower figure is based on the RDD results with 1% margin of victory. all other moderating variables—polarized public opinion and fossil fuel resources—are held at their standardized mean of 0. The figures show that as oil/gas pac contributions to the Democratic candidate increase, the positive effect of electing a Democrat over a Republican on pro-environmental voting (i.e., partisan polarization) decreases.

Supporting Information Table A10. As the table shows, the one interactive term that is also robust in close elections is the oil/gas PAC contributions to Democrats. In this sense, the role of interest group politics appears to be particularly important as a precondition for extreme polarization at the elite level.

Figure 3 illustrates the effect of Democrats on pro-environmental voting conditional on the share of oil/gas PAC contribution to Democrats (OLS estimation, model 1). We vary the level of oil/gas PAC contributions made to Democrats between −0.8 and 1.3 as we use the standardized values. Other moderating variables such as the level of polarization in public opinion are held constant at their standardized mean of 0. The figure demonstrates that the effect of Democrats on being pro-environmental becomes smaller as Democrats receive more PAC contributions from the oil and gas industry.

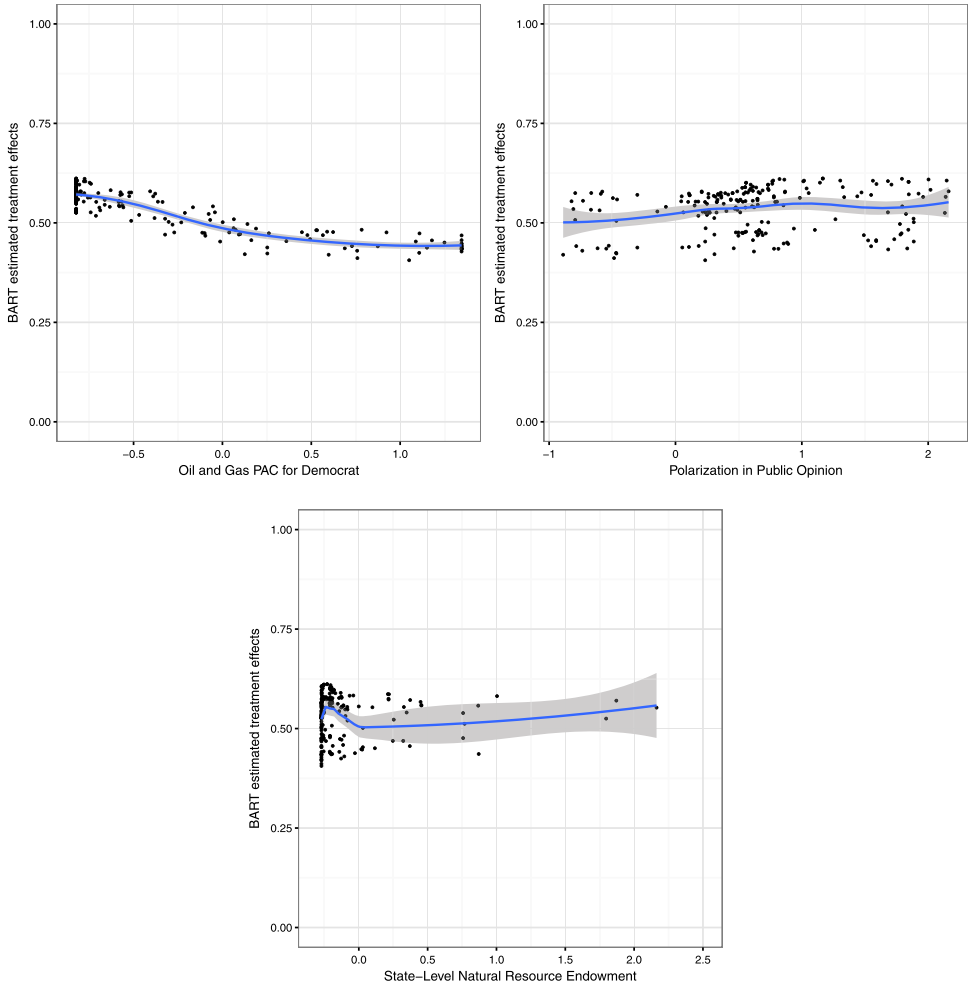

Figure 4. BART Analysis of Modifying Factors
Notes: In each panel, the *x*-axis shows the standardized values of the modifying factor and the *y*-axis the estimated conditional treatment effect. the *x*-axis is cut at 2.5 standard deviations for natural resources because of outliers such as Wyoming.

The BART results for the conditional average treatment effects are shown in Figure 4. In the figure, we show the estimated conditional treatment effects at different levels of the standardized variables. As the figures show, there is little support for the heterogeneity of treatment effects across public opinion or natural resource production. There is some evidence for larger treatment effects when public opinion is also more polarized, but the most important predictor of the effect of Democratic electoral victory is, similar to the linear regressions, oil/gas PAC contributions to Democratic candidates in races. When Republicans receive the vast majority of contributions, partisan polarization is maximized. The Supporting Information Appendix further shows that when we use BART to evaluate the inclusion proportion and relative importance in the regression trees, oil/gas PAC contributions and the polarization of public opinion perform better than the other two variables.

Among the three modifying factors, the share of oil and gas PAC contributions requires more elaboration due to the potential issue of selection bias. While our

analysis focuses on the effect of oil and gas PAC contributions on legislators' voting behavior, we cannot rule out the possibility that legislators' position on environmental issues determine the amount of oil and gas PAC contributions. Indeed, we find that legislators' past environmental voting records are an important determinant of the amount of PAC contribution they receive from the oil and gas industry, as presented in Supporting Information Table A13. While we cannot rule out the possibility that oil/gas industry chooses to support their preferred candidates, we demonstrate that PAC contribution still exerts influence on legislators' position even when we account for the selection effects. Specifically, we use the over-time average share of PAC for Democrats out of all contribution from the oil and gas industry. This measure captures the relative importance of oil/gas PAC contributions to Democrats in the districts (House) or in the states (Senate). As this measure only varies across districts/states, and is thus far less influenced by the voting records of any particular legislators themselves, our approach addresses the selection issue to some extent. Supporting Information Table A14 demonstrates that the influence of oil and gas industry is significant even when we partly account for selection issue by using this measure.

Conclusion

Partisan polarization is a major barrier to the introduction of new environmental policies, including cooperation on climate change. We have used the quasi-experimental regression discontinuity approach to uncover a large Democrat–Republican difference, with the election of a Democrat in close elections increasing the likelihood of voting in favor of the environment by over 40 percentage points. This regression discontinuity analysis allows us to reject public opinion, the median voter's preferences, and other differences across districts and over time, including the state of the economy, as confounding factors that could alternatively account for this difference. Even in identical electoral circumstances, Democrats are much more favorable to environmental concerns than Republicans. Thus, the Democrat–Republican difference reflects partisan conflict at higher levels.

There is, however, variation in the elite partisan gap across time, regions, and issues. While the partisan gap in environmental roll-call voting has grown wider over time, our analysis also suggests that the environment was never a truly bipartisan issue, consistent with an early analysis by Dunlap and Allen (1976). Partisan polarization has increased rapidly over time and reached extreme levels over climate change, but the environment was already in the early 1970s a frequent source of Democrat–Republican divergence in the Congress. Equally important, we find little support for the hypothesis that elite partisan polarization over the environment would be less significant in the South, where even Democratic candidates tend to be quite conservative. In the South, e.g., Democratic Senators vote very differently from their Republican counterparts. Next, we show that the Democrat–Republican difference is aggravated by interest group politics and the polarization of public opinion. Although there is an elite partisan conflict even in minimally conflictual political settings, the conflict is maximized in the presence of more general polarizing factors. A polarized public and interest groups that support Republican

candidates at the expense of Democratic competitors aggravate the elite partisan conflict.

This collection of interrelated results has important implications for the study of American environmental politics. Most importantly, the strong and robust effect of elite partisan polarization on environmental roll-call votes calls for new research on its origins. Why is there elite partisan polarization even in the absence of societal polarization more broadly? Why has such polarization increased over time? Our study suggests fruitful directions for answering these questions, as we both (i) rule out public opinion as an explanation and (ii) identify conditions under which the Democrat–Republican gap is maximized. We propose that future studies first focus on understanding the origins of elite partisan polarization and then investigate how it both shapes and responds to partisan polarization among the public. In particular, we concur with McCright and colleagues' (2014) call for new research on the effects of elite partisan polarization on the society more broadly. Given that elite partisan polarization over the environment has increased dramatically, there is a risk that it spills over to the American society and raises barriers to bipartisan policy proposals.

Our results do not offer a solution to the problem of elite partisan polarization. By highlighting the robustness of the elite partisan conflict across contexts, however, we see that the root cause does not lie with broader societal developments. As such, we encourage climate policy advocates to consider both the ideological and interest group origins of the elite partisan conflict, and then focusing possible solutions to alleviating this conflict. The other suggestion we can offer is for climate policy advocates to develop innovative strategies to mitigate polarizing spillovers from the elite to the grassroots level.

Notes

1 To be sure, many American politics scholars have found that the public tends to be *less* polarized than the elites: "like other political scientists who have tackled this issue, we find that most Americans are ideological moderates on both economic and moral issues" (Ansolabehere et al., 2006, p. A99). In a similar vein, Fiorina and Abrams (2008, p. 581) note that, despite descriptive evidence for partisan sorting among the mass public, "[t]here seems to be general agreement that party sorting is largely a top-down process wherein the more visible and active members of a party, especially its elected officials and party activists, sort first and provide cues to voters that party positions are evolving."

2 Snyder (1992) shows that interest-group rankings of policies tend to exacerbate partisan polarization because such groups focus on polarizing issues. Given that the environment is widely recognized as a polarizing issue (e.g., McCright et al., 2014), this observation is not a problem for our analysis.

3 It should be emphasized again that we focus on individual voting records instead of the LCV scores for legislators. The LCV scores are not strictly comparable over time because the legislative agenda change over time. A pro-environmental score of 0.9 in 2000, e.g., cannot be considered as more pro-environmental than a score of 0.8 in 1995 due to differences in legislative agenda (Nelson, 2002). As the unit of our analysis is the voting records of individual legislators on individual bills, our analysis is not subject to the concern over the comparability of LCV scores overtime.

4 The GSS was conducted in every year from 1973 to 1977, in every even year from 1978 to 1982, in every year from 1983 to 1991, in 1993 and 1994, and in every even year from 1994 to 2012.

5 Our variable was constructed based on the amount of PAC contributions from the oil, gas, and mining industries. However, the total mining industry contribution is very small relative to the oil and gas industries. Negative contributions (refunds) were considered as 0 in calculating the share

of PAC contributions to the Democratic candidate. For details on the industry classification and data, see http://www.opensecrets.org/pacs/ (accessed October 30, 2015).

6 We acquired the data for energy production from the Energy Information Administration's State Energy Data System, available at http://www.eia.gov/state/seds/.

7 We follow the issue tags provided by the LCV. These categories are not exclusive, and any given vote may have more than one tag attached to it.

8 A closer look at the dataset reveals that this pattern is partly driven by a few Republican senators who voted in favor of environmental protection throughout their terms. For instance, Edward Brooke (Senator from Massachusetts, 1967–79) cast pro-environment votes on 81% of the environmental bills in our dataset, William Cohen (Senator from Maine, 1979–97), and Olympia Snowe (Senator from Maine, 1995–2012) were pro-environment in 71 and 65% of the environmental bills, respectively.

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